



**Centre for Aerospace & Defence Laws (CADL)
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Course Material

**M.A. (AVIATION LAW AND
AIR TRANSPORT MANAGEMENT)**

1.1.4. Airport Management

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MODULE I- FUNDAMENTALS OF AIRPORT MANAGEMENT

CHAPTER I: HISTORICAL EVOLUTION

Historical Evolution of Air Transportation System: Air transportation was slow to take off initially with scheduled passenger services starting only on January 1, 1914, more than ten years after the first flight at Kitty Hawk in 1903 by Wright Brothers'. The world's first commercial scheduled flight flew from Tampa to St. Petersburg, Florida. World War I was disruptive in nature and gave the first real spur to the development of commercial aviation. Post war, experienced pilots and aircraft production facilities and technologies were readily available. This gave tremendous impetus to commercial air transportation and its subsequent growth. The first commercial international air transport service between England and France was realized in 1919. The Paris Convention in that year envisaged that each country controlled its airspace over own territory. In Europe, governments promoted new passenger airlines. US airmail also subsidized the emergence of the first major US passenger airlines. In the next two decades, airlines became commercially viable. However, only the elite could afford to fly due to exorbitant costs of air travel. World War II facilitated once again rapid growth of air transportation. By 1958, airlines were doing brisk business carrying more passengers than ocean liners across the Atlantic. In October 1958, jet engines were successfully used on commercial aero planes. Speeds doubled, productivity increased and fares reduced. Jet transportation extended connectivity between people and places. The Anglo-French Concorde which cruised at twice the speed of sound was hamstrung by very poor economics – it weighed half as much as a first-generation 747 but could carry only a quarter as many passengers and had a range more than 3,000 kilometers shorter. By the time the supersonic transport (SST) was finally grounded in 2003, only London, Paris, New York, and Washington had scheduled year-round services.

After World War II, aircraft were just beginning to be capable of crossing the Atlantic without stopping at intermediate places. Today, commercial aircraft are now capable of making trips of up to 18 hours in duration. Such ultra-long-range flights servicing the world's metropolises are both a response and a driver for globalization. Manufacturers, especially those producing high-value microelectronics, are heavily reliant upon air transport to tie together spatially disaggregated operations. Intel, the world's foremost computer chip manufacturer is an example of a firm that relies heavily on air transportation, both passenger and cargo, to tie together its global production network. The firm's Philippine operations, for instance, receive their main inputs and export their output almost exclusively by air. Relatively inexpensive air transport has also been crucial to the growth of tourism. Microelectronics and tourists comprise only two of the many kinds of airborne traffic. Since the dawn of the Jet Age, air transport has ascended to astonishing heights. Perishable and pharma cargo added to the business. In the US, for instance, air travel is the most important mode for trips more than about 1,100 kilometers in one-way length. In developing countries, too, LCCs are proliferating, which is bringing air fares down and propelling air traffic higher. By 2003, approximately 900,000 people were airborne on scheduled flights somewhere in the world at any one time; and worldwide, 1.6 billion passengers travelled by air transport in the centenary of the Wright Brothers' first flight, representing the equivalent of 25% of the global population. In 2010, this figure reached 2.4 billion passengers, underlining the enduring growth of air travel. Yet the propensity to fly is highly uneven. North America and Europe alone, accounted for 70.4% of all passenger movements in 2000, but this share is declining. At any given time, there are more than 5,000 planes in the air over North America. In 2019, the number of scheduled passengers boarded by the global airline industry reached over 4.54 billion people.

Air transportation's share of world trade in goods is only 2% measured by weight but more than 40% by value. For the international operations, freight can account to 45% of the revenue of a regular airline. Typically, air cargo relates to time sensitive, valuable or perishable freight carried over long distances. This is particularly suitable in supporting "just-in-time" production and distribution strategies with low inventory levels. Air cargo has also a niche market for emergency situations where the fast delivery of supplies (e.g. medical, food) prevails over cost issues.

Efficient and affordable air freight has contributed to changes in diet by making available new products or products in seasons during which they would not be available, to changes in retailing and correspondingly to changes in manufacturing. Examples abound, such as fresh produces growth on the southern hemisphere available in the northern hemisphere during winter, or merchandises purchased online and shipped promptly by air transport or a computer manufacturer depending of the global shipment of various components in the manufacturing and assembly processes.

In many parts of the world, government intervention in the industry took the form of state-owned airlines. In the early 1970s, Air Canada, Air France, British Airways, Japan Airlines, Qantas, and most other flag carriers throughout the world were fully state-owned. In the early 1970s, across the globe, dozens of airlines have been at least partially privatized, and many airline markets have been deregulated.

A key outcome of airline deregulation has been the emergence of hub-and-spoke networks centered on major airport where a single carrier is often dominant. Such networks existed before deregulation to some degree. Hub-and-spoke systems rely on the usage of an intermediate airport hub. They can either connect a domestic (or regional) air system if the market is large enough (e.g. United States, China, European Union) or international systems through longitudinal (e.g. Dubai, Reykjavik) or latitudinal (Panama City) intermediacy. An important aspect of an intermediate hub concerns maintaining schedule integrity since the majority of passengers are using connecting flights. Airports that are prone to delays due to congestion are not effective hubs since they compromise the schedule integrity.

After deregulation, most of the surviving major carriers tended to construct nationwide hub-and-spoke networks with several hubs to facilitate travel between different regions of the country. The advantages of large airlines were further deepened when nationwide hub-and-spoke networks were coupled to computer reservations systems broadly known as Global Distribution System (GDS) code sharing arrangements and frequent flyer programs. Yet by the late 1990s, large carriers like Delta were on the run. Low cost carriers, especially Southwest Airlines in North America and Ryanair in Europe, Air Deccan in India cut into the market share of the "legacy" carriers.

LCCs played an important in broadening the air transportation market beyond the relatively small affluent population in developing countries. International markets, too, have been opened up by deregulation, though not to the same degree as the US domestic market.

An important trend in the last decade of 20th Century has been the proliferation of Open Skies agreements. Open Skies agreements remove most restrictions on the number of carriers and the routes that they may fly between two countries. This is irrespective of the size of the respective aviation markets as long as national carriers are granted equal rights. By the end of 2006, the US, for instance, had such agreements with nearly 80 countries.

An important aspect of international airline networks is the recent formation of alliances. Alliances are voluntary agreements to enhance the competitive positions of the partners, particularly where the persistence of restrictive bilateral ASAs make it difficult for an airline to expand on its own. Members benefit from greater scale economies, a lowering of transaction costs, and a sharing of risks, while remaining commercially independent. The first major alliance was established in 1989

between KLM and Northwest Airlines. Today, the largest alliance is the Star Alliance, which was initiated in 1993 by Lufthansa and United Airlines. In 1996 British Airlines and American Airlines formed the One World Alliance. Members of airline alliances cooperate on scheduling, frequent flyer programs, and equipment maintenance, and schedule integration. Most importantly, they permit carriers to tap markets that would otherwise be beyond their reach. Indeed, each of the major alliances encompasses almost every significant market across the globe.

Another important aspect of airline networks is the emergence of separate air cargo services. Traditionally, cargo was carried in the belly hold of passenger airplanes, and provided supplementary income for airline companies. However, since passengers always had the priority when a plane was overloaded, such air freight services tended to be unreliable. Moreover, passenger aircraft are operated on routes that make sense for passengers, but may not attract much cargo. Today, about half of all air cargo is carried in dedicated freighters, aircraft in which goods are carried both on the main deck and in the belly hold. FedEx and UPS operate the largest freighter fleets in the world, operating large fleet of aircraft almost as large as the largest passenger airline fleet. Each deploys its aircraft worldwide. Yet many freighters are flown by so-called combination carriers like Northwest that carry both passengers and cargo. Still, cargo operations are ripe with inefficiencies. About 70% of the transit time for a payload carried by air was being spent on the ground, mostly at congested major airport terminals. This tends to mitigate the major speed advantage air freight is known for. This resulted in creation of Cargo hubs.

Regional Connectivity Scheme (RCS)

The Present: Although the past century witnessed the dramatic growth of air transportation, important challenges cloud its future. First, the airline industry may not be financially healthy enough to pay for commercial advances that have benefited the continuing growth of air transportation in the past. The development costs of new jetliners, even after adjusting for inflation, are unprecedented, partly because the latest generation of aircraft incorporate so many interfacing systems (e.g. in-seat inflight entertainment consoles). Meanwhile, the rise of the LCCs has put great pressure on the bottom lines at legacy carriers, and overall the airline industry has not been especially profitable. The financial woes of the industry have implications for the future of air transportation for it is the successful carriers that have provided the launch orders for new airliners in the past. Pan Am, for instance, launched the 707 and 747; United launched the 767 and 777; and Air France and Lufthansa provide the launch orders for most of Airbus' airliners. By contrast, the LCCs' focus on a handful of smaller, single aisle relatively short-haul aircraft thus limiting their capacity to serve as catalysts for technological breakthroughs in aviation. It should be quickly noted, however, that not all legacy carriers are struggling. Singapore Airlines, in particular, has emerged as one of the industry's most consistently profitable legacy carriers and one of the aircraft industry's most important customers. SIA launched the 555-seat Airbus A380 which ended the 747's long reign as the largest regularly used commercial aircraft when the "Superjumbo" finally took paying passengers in 2007. Asian carriers more generally are key players in the airline and aircraft industries today. Boeing has bet that Asian markets will be fragmented like those over the Pacific and has tailored its newest offering, the 787 Dreamliner, for that purpose. Interestingly, both the A380 and 787 are very long-range aircraft. Both Boeing and Airbus promise that the jetliners will offer unparalleled fuel efficiency. That is important because a second basic threat to the future of the airline industry is the price and availability of fuel. In 2006, fuel accounted for about 30% of the operating costs of US airlines, up sharply from a few years earlier. For air transportation, there is no easy substitute for fossil fuels in this regard. Still, the fuel efficiency of air transport has substantially improved in recent decades, as high as 70% between 1960 and 2000, and possible future reductions are expected to take place at a rate of 1 to 2% per year.

A third threat is terrorism and security. The rise of the airline industry was facilitated in part by the steady advance in the safety and predictability of air travel from the early post-WW I days of "Flying Coffins". Terrorism directed against civil aviation threatens the confidence of ordinary travellers in addition to impose additional security constraints taxing passengers in many ways. The September 11 attacks caused a two-year dip in traffic levels. The attacks of that day were unprecedented not only in their scale but also in their geography. Although American carriers had been targeted before, no major terrorism incident against the airline industry had occurred in the US previously. Instead, earlier attacks against aircraft and airports and airlines had been concentrated in Europe and the Middle East. Last, with the growth of air traffic, airports are facing capacity pressures and congestion which in some cases has resulted in changes in the scheduling of flights. The will to fly seems irrepressible, and aviation is now inextricably entwined in the fabric of 21st century everyday life across much of the world. Evolution of modern technologies like Artificial Intelligence and drone technologies are impacting the air transportation systems in a big way.

Historical Evolution of Airports: The earliest aircraft takeoff and landing sites were grassy strips. The plane could approach at any angle that provided a favorable wind direction. A slight improvement was the dirt-only field, which eliminated the drag from grass. However, these only functioned well in dry conditions. Later, concrete surfaces would allow landings, rain or shine, day or night.

The title of "world's oldest airport" is disputed, but College Park Airport in Maryland, US, established in 1909 by Wilbur Wright, is generally agreed to be the world's oldest continually operating airfield, although it serves only general aviation traffic. Bisbee-Douglas International Airport in Arizona was declared "the first international airport of the Americas" by US president Franklin D. Roosevelt in 1943. Pearson Field Airport in Vancouver, Washington had a dirigible land in 1905 and planes in 1911 and is still in use. Bremen Airport opened in 1913 and remains in use, although it served as an American military field between 1945 and 1949. Amsterdam Airport Schiphol opened on September 16, 1916 as a military airfield, but only accepted civil aircraft from December 17, 1920, allowing Sydney Airport in Sydney, Australia—which started operations in January 1920—to claim to be one of the world's oldest continually operating commercial airports. Minneapolis-Saint Paul International Airport in Minneapolis-Saint Paul, Minnesota, opened in 1920 and has been in continuous commercial service since. It serves about 35,000,000 passengers each year and continues to expand, later opening a new 11,000 foot (3,355 meter) runway. Of the airports constructed during this early period in aviation, it is one of the largest and busiest that is still currently operating. Rome Ciampino Airport, opened in 1916, is also a contender. Increased aircraft traffic during World War I led to the construction of landing grounds. Aircraft had to approach these from certain directions and this led to the development of aids for directing the approach and landing slope.

Following the war, some of these military airfields added civil facilities for handling passenger traffic. One of the earliest such fields was Paris – Le Bourget Airport at Le Bourget, near Paris. The first airport to operate scheduled international commercial services was Hounslow Heath Aerodrome in August 1919, but it was closed and supplanted by Croydon Airport in March 1920. In 1922, the first permanent airport and commercial terminal solely for commercial aviation was opened at Flughafen Devau near what was then Königsberg, East Prussia. The airports of this era used a paved "surfaces", which permitted night flying as well as landing heavier aircraft.

The first lighting used on an airport was during the latter part of the 1920s; in the 1930s approach lighting came into use. These indicated the proper direction and angle of descent. The colours and flash intervals of these lights became standardized under the International Civil Aviation Organization (ICAO). In the 1940s, the slope-line approach system was introduced. This consisted

of two rows of lights that formed a funnel indicating an aircraft's position on the glideslope. Additional lights indicated incorrect altitude and direction.

After World War II, airport design became more sophisticated. Passenger buildings were being grouped together in an island, with runways arranged in groups about the terminal. This arrangement permitted expansion of the facilities. But it also meant that passengers had to travel further to reach their plane.

Airport construction boomed during the 1960s with the increase in jet aircraft traffic. Runways were extended out to 3,000 m (9,800 ft). The fields were constructed out of reinforced concrete using a slip-form machine that produces a continual slab with no disruptions along the length. The early 1960s also saw the introduction of jet bridge systems to modern airport terminals, an innovation which eliminated outdoor passenger boarding. These systems became commonplace in the United States by the 1970s.

CHAPTER II: INTRODUCTION TO AIRPORT MANAGEMENT

Concept and Need

“Modern airports are the focal point of many skills and crafts in a common endeavor”

Airport has been traditionally viewed as a strategic entity of a nation and therefore they have been traditionally operated to meet the just needs from that perspective. The concept of ‘airport management’ as a discipline is a new adoption borne out of the progressive traffic growth, both of passengers and cargo during the past few years. Airport leaders have now realised that complexities of airport operations can no more be handled by a mere traditional ‘organisational’ structure the airport management is too demanding, and started looking at it as a ‘Business’.

Apparently there is a distinction between ‘Organisation’ and ‘Business’. Difference is that the business focus is ‘outward’ while the organisation focus is ‘inward’. A business entity is successful when it establishes a niche in the market place; it satisfies the legitimate needs and wants of its clients efficiently with products and services. Business elements include markets, clients, their demands and needs. A business operates in an environment that comprises of competition, economic and social trends, emerging technology, and with a business philosophy. Every business requires an effective organizational structure.

Is Airport a business Entity?

People often ask, is airport a business entity?

Airport is an essential component of an ever expanding air transport industry and airport has a niche in the market place. It is expected to satisfy all the legitimate needs and wants of its clients efficiently. In present time Airports are in competition with other modes and are required to promote their services, they have many business partners, have financial viability, marketing potential and they stimulate economic growth. Therefore, there should be no doubt about the nature of airport services. Airport is truly a business entity and it has to be managed on business principles. As per ICAO, when establishing the internal organisation structure of an airport, the key aim should be to create a structure that enables the airport to meet its objectives and carry out its functions in a most cost-efficient and cost-effective manner while maintaining a high standard of service. This objective makes it imperative that the airport be run as business and it therefore means, improving its profitability while providing users with a high level of service.

If you look around, you will observe that airport environments are changing at a rapid pace. Once viewed as critical public utilities, airports are rapidly evolving into prominent commercial enterprises. They face numerous challenges from a wide variety of sources including reduced government funding, environmental lobbying, complete or partial privatisation and emergence of

new Information Communication Technology (ICT). Some of the general factors that have a direct bearing on the airport management are; society is increasingly becoming information based and ICT is in full swing, air traffic growth is causing congestion and development of airports to meet the growing demand has virtually become a top priority. There is a global shift from centralization to decentralization of power and a shift from reliance on institutional help to more self-reliance, and a move from representative democracy to more participative democracy both in politics and at work place. These factors have created significant impacts on airports such as, higher service expectations, financial constraints and community-relations issues. Of course, these changing faces in turn also create new opportunities for airports. This objective makes it imperative that airports be run as business and it means improving its profitability while providing users with a high level of service.

Airport business dimension is therefore required to be focused 'outward' towards customers, markets, products and services that satisfy customer's needs and wants. The airport organisational structure will have to meet this 'outward' focused dimension. It means that airports should be able to adapt to the changing environment; it will have to be responsive and pro-active; focused on innovation and research oriented; focused on new technology; and totally quality oriented transparent management autonomy.

The ultimate objective of Airport management is to provide a feel good environment for its users, which includes airlines concessionaries and most importantly the passengers. This can only be achieved by ensuring safety, efficiency, complying with regulatory requirements and by providing World class customer experience. The Airport functional domain is very complex and includes Land side, terminal complex and air side. So detailed planning and attention has to go into each and every aspect right from surface transportation, parking, check-in, baggage and security screening, hording, aircraft operating areas, taxiway and runway, rapid exits, ramp handling, navigational aids, ATC etc.

With multiple operations taking place, the modern airport environment is a complex ecosystem. With the growing capacity needs, it is indeed a challenge to establish an airport environment of high standards and low costs, to meet the ever growing demand. Time, space and capability constraints also exist. Due to the complexity involved in modern Airport management, challenges are bound to exist, and identifying them and coming up with permanent universal solutions for the same is important.

The advent of low-cost carriers all over the World, and the arrival of modern airplanes like A380, B787 capable of flying hundreds of passengers and tons of cargo, air travel efficiency and affordability is bound to increase. As a result, airports all over the World need to have the capacity to facilitate this requirement, and with this comes the associated challenges. The capacity needs to be met not only at the terminal complex, but also the Landside and Airside. The increase in the number of airplanes operating at an airport reflects on the Peak Hour Passenger (PHP) that the airport needs to handle. As a result more parking areas, access roads, hotels/motels, entry points, security screening counters, baggage screening counters, check-in counters, boarding gates, customs and immigration for international airports, conveniences etc. are required.

In the Air Side, there is an increase in the requirement for more runways and taxiways, rapid exist ways, parking bays, ramp handling, maintenance, slots for airplanes, ATC requirements etc.

The role played by Air traffic controllers is crucial in airport operations. Effective Air Traffic Flow Management (ATFM) of airplanes by the ATC in the air and ground ensures on-time performance of departures and arrivals, which in turn helps regulate the passenger flow in the landside and terminal complex. For this they must make use of the latest navigational aids effectively. All over the World, there is a huge demand for ATC. The efficiency of ATC also needs to improve, in tune

with the demand. Since, airspace is an interdependent environment between airplanes, various categories of airplanes, flights under Visual Flight Rules (VFR) and Instrument Flight Rules (IFR), needs to be handled accordingly. Irrespective of the airplane size and flight rules, most ATC in some countries route the airplane for landing on Instrument Landing System (ILS) or with reference to other landing aids. This is not required for smaller VFR airplanes and is time consuming, the result of which many aircrafts are lined up and are kept on hold for the same runway.

Environmental concerns like noise and air pollution, land acquisition, bird activities also needs to be addressed in modern airport management. Back up of power for airport technology, runway lighting, and radar system is vital.

Air Transportation: A Historical Perspective

On 17 December 1903, in North Carolina, a frail structure of metal, wood and fabric struggled into the air and carried a single passenger 260 Meters, thus began the first manned flight. In less than six years, the first airline-Germany's Deutsche Luftschiffahrts was established in November, 1909. By the out break of war in 1914, it had flown over 33,000 intrepid passengers in 1500 Zeppelin airship flights. Following World War 1, regular air transportation began in January 1919, using make-shift landing strips and within 12 months air services were established in several countries. British operator, Air Transport and Travel (AT&T) became the first international scheduled airline operating the London-Paris Service using a DH 16, carrying four passengers operating.

By the end of 1919, Five carriers-AT&T, Denmark's Danske Luftartelskab, Norske Luftartederi (Norway), Deutsche Luftreederei (Germany) and Svenska Lufttrafik (Sweden) formed the International Air Traffic Association (IATA) and a sixth carrier-the only one which survives today joined from holland- Koninklijke Luchtvaart Maatschappij (KLM) Royal Dutch Airlines. Simultaneously, civil aviation became subject to world politics and in 1919, air transport operations were covered under the International Commission for Air Navigation (ICAN). Early air transport followed colonial lines, and by 1924, the UK Government set up Imperial airways and its service to India and Australia commenced in 1929. The trans-atlantic crossing took place in 1927 by Trans Continental Air Transport, a fore runner of Trans World Airways (TWA). American Airways was formed in 1930 to fly mail and later became American Airlines. This led to the birth of four significant US carriers; TWA, American, United and Eastern.(US Aviation Catalogue, 1970).

Around 1930, civil air transport operations began in South Africa, and the Union Airways and South-West Africa Airways were acquired by South African Airways. In 1931, the first UK-Africa services were operated to Khartoum and Nairobi and later on to Cape Town. By the late 1940s, thousands of war surplus C-47/Dakota aircraft supported innumerable airlines around the world. It boosted the civil air transportation growth as they were cheaper and readily available with minimum maintenance effort.

Civil Aviation in India started as early as on 18th February, 1911 when the first commercial flight took off from Allahabad for Naini and flew over a distance of 6 miles carrying 6,500 pieces of mail thus creating the world's first air mail service.

J.R.D. Tata flew from Karachi to Juhu (Mumbai) carrying mail thus starting the TATA Airlines in 1932.

Why Air transport is special

Towards providing efficient services, Air Transport Industry must combine the effort of:

- people who sell the service, for instance Travel Agents;
- people who operate aircrafts, airlines;

- people who operate airports;
- air traffic controllers;
- customs;
- security agencies;
- more importantly passengers
- concessionaries

Challenges

The demand for air transport has increased steadily over the years. Passenger numbers have grown by 45% over the last decade and have more than doubled since the mid-1980s. Freight traffic has increased even more rapidly, by over 80% on a tonne-kilometre performed basis over the last decade and almost three-fold since the mid-1980s. In 2004, the air transport industry carried 1,890 million scheduled passengers and 38 million tonnes of freight.

Its rapid growth has been driven by a number of factors, including:

- Rising GDP, disposable income, and living standards i.e. increasing the demand for travel for both business and leisure purposes.
- Reduced air travel costs - Improvements in airline efficiency and increased competition have reduced world airfares by around 40% in real (i.e. inflation-adjusted) terms since the mid-1970s.
- Globalization – The average distance travelled tends to increase as people take long-haul holidays and do business in countries which now have more favorable political and social environments
- Deregulation and Open Air Policy – Starting with the US domestic air market in the late 1970s, followed in the 1980s by the European Union (effectively completed in the late 1990s), with other regions deregulating gradually.

Compacting Strategies

Trends and Developments in Airport Design

The aviation business has a new appearance. The most obvious and serious factor that has reshaped the industry's processes is the security screening requirements mandated after the 9/11 tragedies. But the long-term impacts of airline deregulation may have an even bigger impact on the travel environment.

As airlines face continued financial challenges, they increasingly look to airport owners and their consultants to help maximize the use of existing gates and related terminal facilities, streamline the check-in process, facilitate passenger movement from airport curb to boarding gate and create an overall rewarding travel experience for passengers.

Though designers and facility executives still have to do more with tighter budgets, airport design and development trends have surfaced to address these challenges. Air traffic is expected to exceed the previous records, and the air carriers, are changing strategies. As the legacy airlines grapple with record debt and rising jet fuel costs, the low-cost carriers are bringing lower operating costs and higher customer-satisfaction ratings. Airport design is more closely tied to good business sense than ever before; therefore, the issue that rises to the top is cost. It's no longer a question of what an airport needs, but what it can afford.

Financial Planning

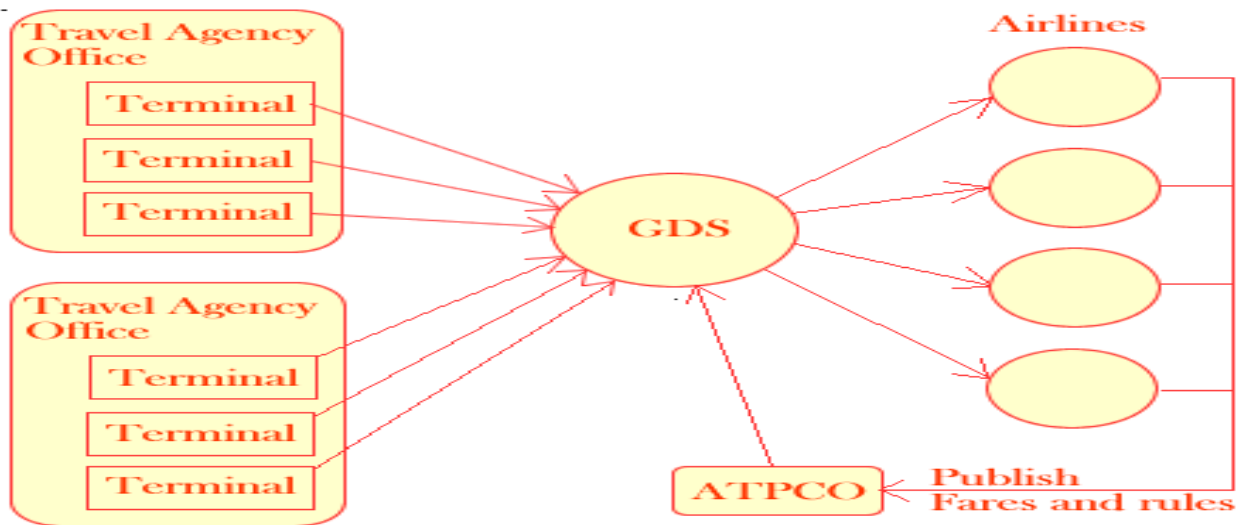
Integrating financing into every step of the planning and design process is not only desirable, it has become essential. Financially integrated airport planning and design is a smart means of preparing for aviation's future. There are numerous examples of airports making affordability a priority:

A facility planning effort is undertaken to seek the most cost-effective and flexible strategy for developing the airport's terminal, landside and support facilities to match its airfield capacity when a third runway is commissioned later this decade. The airport's Comprehensive Development Plan identified ways to better use of existing facilities rather than construct new ones. The plan capitalized on increased spatial efficiency, a byproduct of airlines' use of electronic ticketing and check-in, to reallocate space to other terminal functions. After extensive examination of passenger check-in, hold bag screening, passenger screening and general circulation processes in the 12-gate terminal, the airport determined that it could meet its needs at a cost that would not greatly impact airline rates and charges. The result is larger passenger screening areas, a semi-automated inline baggage screening system and a new hold bag screening area. Automated security walk in avoiding physical security check and stamping can reduce the time taken from curb to gate. Use of Artificial Intelligence with facial recognition system is going to change the scenario.

Programming for a new or improved airport facility is weighed towards maximizing value in those areas where passenger impact will be the greatest. Trends suggest departing passengers prefer to spend their time beyond security — in the gate areas rather than in the terminal building. In response, airlines and airports are committed to increasing the number of self-service check-in options so passengers can proceed to security expeditiously. The arrivals hall, on the other hand, increasingly is being enlarged and equipped with added services to support the meeter-greeter contingent concentrated on the fringes of the secured area.

Similarly, investment beyond security is most beneficial in areas where exposure to passengers is highest. Concessions concentrated in high-traffic areas, such as concourse entrances, as well as in remote gate areas make sense because they capture passenger dollars before boarding time. A terminal is almost a city within a city. The design attempted to enhance the experience of passengers moving through the terminal by applying principles of urban design theory to the organization of interior spaces.

Such urban design elements include major landmarks for ease of passenger wayfinding, connecting boulevards, open plazas with concession "villages" and displays of public art throughout. From the flow of the main thoroughways to the definition and placement of internal landmarks, such as the concession villages, emphasis was placed on visual connectivity. Major circulation passages are oversized to accommodate moving walkways and to allow increased use of service carts as volumes of older travelers increase. In ticketing lobbies and security checkpoints, departing passengers are calmed by orderly spaces, instantly available information, day lighting and spatial openness. The striking presence and visibility of the new terminal, its state-of-the-art amenities and technologies, and its easy connections to other terminals and transportation are expected to enhance the competitive advantage of.



Next comes the requirements of having special facilities. Besides Terminal buildings, government has designed numerous special facilities all over the world. They include:

- control towers
- aircraft hangars
- cargo buildings
- logistics parks
- office buildings
- catering facilities
- airline compounds
- restaurants
- hotel facilities
- workshops and test facilities , MRO facilities
- training facilities
- flight simulator buildings
- green zone

Airport management can be a rewarding profession. It centers around aviation, one of the most prolific user of exciting technologies of the twentieth century, and it involves complex relationships with many different people and groups of people. It brings involvement in the key economic development issues of the community, region, and, occasionally, the nation. Finally, it is frequently the center of political and media attention, which is sometimes desirable and sometimes not.

Airport management can also be frustrating. This industry is small and well understood by relatively few people. Few resources exist for a professional and uniform system of training the men and women who manage and direct these complex assets. Even seasoned veterans quickly admit that on-the-job training remains the norm, and every day brings new lessons to be learned.

Given these realities, the men and women who work in this industry have developed a tradition of open communication with one another. This open exchange of information is the primary means of industry education for most airport executives.

Important Terminologies

- Airport: The Hartford Municipal Airport.
- Airport Hazard: Any structure, object of natural growth, or use of land which obstruct the air space required for the flight of aircraft in landing or taking off at an airport or is otherwise hazardous to such landing or taking off.
- Apron: An area adjacent to the administrative and business hangar sections of the airport designed and used solely for the parking and servicing of aircraft.
- Concession: Any non-aeronautical or facility service required for the convenience of the public using the airport.
- Emergency Equipment: Ambulance, crash rescue and fire fighting apparatus and such other equipment as the Common Council may designate as necessary to safeguard passengers, airport runways, taxiways, ramps, buildings and other property.
- Fixed Base Operator: Any person carrying persons or property for hire, or furnishing aeronautical services, supplies, or instruction, and carrying on such business from a particular airport.
- Hangar: Any building designed and used for aeronautical purposes providing space for aircraft storage and service activities.
- Landing Strip: Any area designated and used for the landing and taking-off of aircraft.
- Nonconforming Use: Any structure, tree or use of land which does not conform to a specified regulation prescribed
- Private Hangar: A T-shaped or rectangular building capable of housing one or a few airplanes.
- Public Areas: The area consisting of the commercial municipal, and vehicle parking area in accordance with the zoning maps "A" and "B".
- Public Thoroughfare: Any area located in the administration section of the airport designed and used for the passage of people in vehicle or on foot.
- Runway: Any hard-surfaced area used and designed for the taking-off and landing of aircraft.
- Service, Maintenance and Construction Equipment: Equipment normally operated by the airport Administration on landing areas, runways, taxiways and peripheral roads for the servicing, maintenance and construction of airport facilities and services. This definition shall include equipment owned and operated by a contractor performing work on the airport under a contractual agreement.
- Shop: A building capable of housing one or more aircraft while such aircraft are being repaired.
- Structure: Any object constructed or installed by man.
- Taxiway: An area designated or used solely for the taxiing of aircraft, except apron areas.
- Tie-down: An area designed and used for the parking and tying down and storage of aircraft.
- Tree: Any object of natural growth, except farm crops which are cut at least once a year, and except shrubs, bushes or plants which do not grow to a height of more than five feet.
- Vehicle: Any device in, upon, or by which any persons or property is or may be transported or drawn upon a public highway.

CHAPTER III: AIRPORT GOVERNANCE

INTRODUCTION:

This chapter focuses on ownership and control structures of airports, which have implications for their governance and performance. The various organizational structures used by States can be grouped into two main types. The first type falls under government or public ownership and control. Although this is still the predominant form of organization, many States have established autonomous entities by separating the provision of airport services from the executive arm of the

State and by allowing them to operate on a commercial basis. The second type is where private interests are involved in whole or in part, a format that is becoming more common. Considering the diverse circumstances involved, it is not the intent of this manual to recommend one organizational format over another, but rather to provide guidance to States by describing relevant aspects of each format.

The decisions made by individual States at the national level as to the organizational format under which their airports operate will depend on the situation in the State concerned and will often be strongly influenced by government policy, as well as by the experiences of other States. The most appropriate choice can be determined in the context of the following factors:

- the legal, institutional and governance frameworks of the government and system of administration in the State;
- the cost and source of funds required to meet infrastructure needs and to secure the continuity of operation taking into account traffic forecasts and risks (for example, contingency planning to deal with the potential impact of reductions in revenue that could occur due to decreases in air traffic);
- market conditions including degrees of competition among airports and users;
- the requirements of the aviation industry; and
- the contribution of civil aviation to the State's economic and social objectives and the extent to which civil aviation has been developed to meet those needs.

The process of transition from one format to another will also depend on the circumstances and practices of each State but, in general, the transitional issues that may arise include:

- identification, valuation and transfer of assets;
- determination of the initial financial structure, staffing and conditions of employment including pension arrangements and maintenance of good labour relations during the transition period;
- establishment of good corporate governance;
- establishment of formal relationships between the airport(s) and the government, including the military;
- establishment of formal relationships between the airport(s) and the aviation safety and security organization(s);
- establishment of an economic oversight framework; and
- establishment of appropriate performance management systems and a consultation mechanism with users and other interested parties.

Regardless of the organizational format, according to ICAO's policies on charges in Doc 9082, the State is ultimately responsible for safety, security and, in view of the potential abuse of dominant position by airports, economic oversight of their operations (Doc 9082, Section I, paragraph 6). It is further stressed that whenever an autonomous entity is established, whether by a government or by private interests, the State should ensure that all relevant obligations of the State specified in the Chicago Convention, its Annexes and in air services agreements are complied with and that ICAO's policies and practices are observed (Doc 9082, Section I, paragraph 7). With regards to their responsibility for safety, States should ensure that airports undergoing changes of ownership and control structures are subject to a certification procedure in accordance with the Standards and Recommended Practices in ICAO Annex 14 – Aerodromes, Volume I – Aerodrome Design and Operations, to the Chicago Convention as well as other relevant ICAO specifications, and as outlined in the Manual of Certification of Aerodromes (Doc 9774).

GOVERNMENT OWNERSHIP & CONTROL

Government or public ownership may take the form of direct control and management, for example, through a civil aviation administration, or through another ministerial department, or through regional or municipal levels of government. Government control can also be exerted through bodies benefiting from a certain degree of autonomy, such as a government body with financial and operational autonomy, an autonomous corporation established under the provisions of a special statute (a statutory body), or a company established under company law.

Government Department:

The historical organizational format of the airport is a fully integrated component of the State's bureaucracy, where the operation of one or more airports represents only one of many functions performed by a government entity. Generally, this organizational format is characterized by the following features:

- a) the head of an airport department reports directly to the executive level of government;
- b) as an organization within government it is funded by the government, sometimes from general taxation. User charges levied for airports can be retained either by the government for general purposes or by the organization; and
- c) the organization may not be subject to taxes as paid by private business.

When a government plays both the role of regulator (i.e. performing its economic oversight function) and service provider, it should consider a clear separation of the regulatory and operational functions, with roles and powers clearly defined for each function as recommended in ICAO's policies on charges in Doc 9082 (Section I, paragraph 12). This is because too close a relationship between the regulator and the service provider can result in conflicts of interest and undermine public confidence and trust in the adequacy of the system, and because overlaps in the regulatory and operational functions may lead to diffused accountability relationships within the entity. Separation enhances transparency in the decision-making process and makes clear the lines of accountability and the authority of one branch to monitor the activities of the other.

The internal separation process of the two functions involves delegation of responsibilities of management and finance, giving much greater autonomy to an airport department within the entity. In general, the head of the airport department may have considerable authority in decisions pertaining to the daily operations of the airport, including personnel management, and the authority to make purchases of supplies and arrange for any services required for that purpose. The department head may also be given the authority to negotiate agreements concerning all but major concessions and rentals, the final decisions relating to which would normally be made at higher levels. Decisions involving, for example, major purchases or investments in facilities and equipment would normally be subject to the government's approval process and treasury rules and may compete against other claims for government funds.

If the government accounting system is inadequate to provide the necessary accounting information, separate accounts following commercial accounting standards and practices will be necessary.

Government Owned Autonomous Entities

An autonomous airport entity is essentially an independent entity established for the purpose of operating and managing one or more airports, which is empowered to manage and use the revenues it generates to cover its costs. Creating legal entities outside the government is usually called "corporatization". In some circumstances, a single autonomous entity may operate both airports and air navigation services. Such autonomous entities may, in some cases, operate not only airport facilities but also facilities for other modes of transport, covering such facilities as ports, bridges and tunnels. While not common, this approach has been found useful, for example, where cities operating airports wish to centralize the operation and management of these and other major transportation facilities for which they are responsible.

The extent to which the government-owned autonomous entity can function like a private sector company depends on the degree of autonomy conferred to the entity. On the one hand, the autonomous entity can still be subject to the government's directions or pressure to take account of wider public issues, as well as its approval process for major capital investment. On the other hand, the autonomous entity can be allowed to commercialize some of its activities. Commercialization refers to an approach to management of facilities and services in which business principles are applied or emphasis is placed on development of commercial activities and sustainability of not profitability.

In the past two decades, the number of autonomous entities has grown in all regions. While the establishment of an autonomous entity would not necessarily result in an unprofitable airport becoming profitable, experience gained worldwide from these developments indicates that the autonomous entities may have the following advantages:

- ensure that the revenues generated through the use of airport resources are transparently re-invested in operating and developing the facilities;
- ensure that the users of the airports contribute directly to the upkeep and development of the facilities that they use (user pays principle);
- reduce the financing burden on governments;
- encourage the growth of a business culture (for example, closer control over revenues and expenses, quicker decisions and more responsive actions, and good governance), thereby increasing efficiency and improving the quality of services;
- enable access to private capital markets, which may only become possible with a change in organizational format because of public sector borrowing restrictions; and establish a clear separation of the regulatory and operational functions.

Autonomous Civil Aviation Authority

ICAO recommends that the Govt. sets up autonomous agencies to operate airports. Even in circumstances where the establishment of an autonomous airport entity may not be desirable it is essential to establish an autonomous civil aviation authority to take over the functions, including the operation of airports, previously performed by a civil aviation administration. The establishment of an autonomous civil aviation authority could permit the State to obtain benefits such as an increased efficiency and a significant reduction of the contribution from public funds previously required for the civil aviation administration.

As in the case of autonomous airport entities, granting financial independence to the civil aviation authority would usually be an important prerequisite for realizing such benefits. However, experience in some States has shown that achieving complete financial autonomy remains a distant goal and that continuation of government financial support through grants sometimes remains necessary, at least in the early stages.

PRIVATE OWNERSHIP

In the past two decades, many government-owned autonomous entities have been commercialized and are expected to operate as a financially independent business entity and to be as competitive, efficient and cost-effective as any other commercial business. The ownership of some of the commercialized airport entities has been transferred partly or fully to the private sector. Further details and guidance material on airport privatization can be found in the Manual on Privatization in the Provision of Airports and Air Navigation Services (Doc 9980).

Motivations

The opening of the door to private interests has been driven by diverse motives, ranging from improving operational efficiency and reducing costs to a more pragmatic desire to relieve the State

of the responsibility for financing infrastructure developments. The government also expects to gain a one-time cash windfall from the sale of shares, as well as regular tax revenue from privatized airports. Public financing of airports is becoming more difficult because of budgetary constraints or other national spending priorities and pressure to move away from non-core public utilities. Governments also confront the increasing difficulty of the purchase, lease or reclamation of land and the growing expectations of the users in regard to the quality of service at airports.

The business and financial communities are aware that an airport can be a sound investment. Larger airports are turning into cities in themselves (“aerotropolis”), with marketplaces and meeting points for people and businesses. Growth in air traffic is generally related to economic growth. Depending on the economic cycles, the credit ratings of many major airports have historically been high and they have strong cash flows. Although airports are subject to States’ economic oversight, commercial activities at airports, which produce significant revenues, are generally less regulated than aeronautical activities or are not regulated at all. All these factors combined have resulted in major airport management companies investing and participating in the management of airports in other regions of the world. Thus airport management companies have developed, paralleling the development of the large international airline companies, and together creating a genuinely global aviation industry.

Privatization

Privatization is the term most commonly used in connection with the changes taking place in the ownership and control of airports. While the term privatization is often loosely interpreted as any move away from government ownership and control of airports, ICAO’s policies on charges define privatization as a transfer of full or majority ownership of airport facilities and services to the private sector (Doc 9082, Appendix 3). Privatization is usually achieved through outright sale of shares to a strategic partner or an Initial Public Offer (IPO) on the stock exchange market. In the event that a State would wish to regain full or majority ownership, it would have to buy back the shares, with the risk that their price may be higher than the original sale price.

Key features of a privatized airport are likely to include the following:

- a) there is a board of directors for the corporation appointed according to its charter;
- b) the privatized airport is self-financing, charges for its services, obtains funds from the capital market, applies commercial accounting standards and practices, and needs to achieve a financial return as a commercial entity; and
- c) the privatized airport is subject to normal business taxes.

Airport privatization requires careful consideration of a number of factors (paragraph 2.2 refers). These include an assessment of market conditions and the degrees of competition. This will serve to minimize the risk of airports, on the one hand, engaging in anti-competitive practices or abusing their dominant position or on the other the possibility of being subject to market pressure by users. In addition, the objectives of change of ownership structures may need to be clearly defined through appropriate consultations with existing airport management, users and other interested parties. Privatization should not in any way diminish the State’s requirement to fulfill its international obligations, notably those contained in the Chicago Convention, its Annexes and in air services agreements, and to observe ICAO’s policies on charges in Doc 9082.

Private Participation/Involvement

Private participation and private involvement, which are synonyms, mean that the private sector has a role in the ownership, control and/or management of an airport entity while majority or ultimate ownership remains with the government. Private participation/involvement that can be used for airport management and operation sometimes involves the establishment of a public-private partnership (PPP). The advantage of a PPP is that the management skills and financial acumen of private businesses could create better value for money for taxpayers, when proper cooperative arrangements between the public and private sectors are used. Private participation/involvement has

basically four different forms: management contract, lease (which is sometimes called concession), transfer of minority ownership, and private sector ownership and/or operation of parts of the activities of an airport (including PPP schemes).

Management contract

Under this option, the management of an airport or a group of airports is transferred to a private entity for a limited period of time for a fee or pre-determined payment terms. The private entity can be a local/national concern, or an international airport managing group, or a consortium associating various interests of which the former two may be part. The airport (or group of airports) benefits from professional management, but development of airport facilities may not be included in the contract.

Lease or concession

Airport leases/concessions can be short-, medium-, or long-term. Under this option, an airport or a group of airports is transferred for management and development to a private entity or consortium for a fixed period. In almost all cases, the responsibility for expansion and development of airports rests with the lessee or concessionaire, under conditions that are either listed in the contract or are dependent on traffic growth. The payment terms of leases or concessions vary widely. In some cases, it is all down payment, while in other cases it is partly down payment and partly annual payment, or only annual payment. One of the most common forms is the Build-Operate-Transfer (BOT) scheme, an ownership and management system under which a private entity obtains the right to finance, build and operate a certain facility, including land and/or buildings, over a long period of time, and on expiry of the right, returns it to the owner. Many variants of this scheme have come into existence (see definitions in the glossary of terms in ICAO's Manual on Privatization in the Provision of Airports and Air Navigation Services — Doc 9980).

When giving airports in concession to a company or a consortium, a number of aspects have to be considered in order to obtain the best results. In particular, States should duly take into account, in addition to economic policy and guidance material, other ICAO documents such as: a) Airport Planning Manual (Doc 9184), b) Airport Services Manual (Doc 9137), and c) Manual on Privatization of Airports and Air Navigation Services (Doc 9980). Factors to be considered include:

- a) the aeronautical and non-aeronautical services to be transferred to the private sector and those that will remain in the hands of the State should be identified, as well as the standards to be applied for the desired quality of the services provided;
- b) master plans and investment plans for airport concessions should be sufficiently flexible to enable their revision based on demand, taking into account State requirements, compliance with applicable international standards, and user needs. Such plans must give priority to the cost-effectiveness of concessions;
- c) the adequacy between the duration of the concession and the magnitude of the investment made;
- d) the contract between the State and the private airport operator must be the result of a competitive open bidding process that guarantees an efficient concession process, where all the required conditions, assessment formulae, and criteria used for awarding the contract are established with absolute transparency and are known to all stakeholders;
- e) the concession system should be based on the State and the private sector assuming their respective risks in the implementation of airport projects;
- f) airport concession contracts should allow for some flexibility in order to adjust to new market conditions resulting from an evolving air transport industry and the long duration of concession contracts; and
- g) measures should be taken to prevent the problems that have arisen with some concession contracts in relation to the timely payment of concession fees, delayed investments, definition of competencies, and management coordination.

Transfer of minority ownership

Under this option, minority ownership of an airport or a group of airports is transferred to the private sector, usually through the sale of shares to a strategic partner or through share flotation. It is sometimes a first stage or tranche of a full or multi-step privatization process to ensure a smooth transition during which the business can accommodate the market conditions.

Private sector ownership and control

Under this option, majority or full ownership of the airport is transferred to a private entity, including non-profit corporations or trusts.

Private sector ownership and/or operation of parts of the activities of an airport

This option refers to the ownership and operation of certain facilities or services at an airport, for example a passenger terminal, or a cargo warehouse, or security services. The activities of the operator are regulated by a contract that, from a legal point of view, is similar to a commercial concession agreement. Where a part of an airport (such as a passenger terminal) is privately owned and operated, measures need to be taken to ensure that the privatized element of the airport makes a proper contribution to the costs of operating the rest of the airport, for instance by payment of a significant concession or lease fee.

AIRPORT SYSTEMS, NETWORKS AND ALLIANCES

Whatever the form of ownership and control that the State has selected, the management of airports can be done either on an individual airport basis, on an airport system basis, on an airport network basis, or on a combination of these. An airport system is composed of two or more airports serving the same major metropolitan area and operated under a single ownership and control structure. An airport network is a group of airports within a State operated under a single ownership and control structure; it can include all airports serving the territory of this State or only some of these airports². There are arguments in favour of operating and managing a group of airports within an airport network, a form of organization that is common at a national level. Smaller airports may derive some benefit within a common ownership, which could include cross subsidization. Other arguments point to, inter alia: the advantages for a State having a national air transport system in achieving its national development objectives; the advantages in terms of economies of scale; the easier access of all airports to capital markets; and the better management of capacity and use of resources throughout the network. In summary, an airport network can be a valuable method of collectively managing airports that, taken individually, would not be viable.

Arguments against cross subsidization are based on the fact that airport charges should be cost-related; that users should not be charged for facilities they do not use; and that only those facilities used for international air services should be included in the cost basis for charges (Doc 9082, Section II, paragraphs 2 i), ii) and iii) refer). In that sense, cross subsidies from profitable to non-profitable airports within a network are questionable, although it is recognized that in some States it may be the only way to maintain airports that serve, for example, isolated regions. Opponents to the network approach also point out that if subsidies are to be provided for national planning purposes, these should rather come from the State than from users of other airports.

Another aspect is related to the operation and management of airports at an international, or multinational, level, including alliances between airports or airport groups. This is made possible by the operation and management of airports in different States by globalized airport companies. The main advantage of such a form of organization lies in the potential economies of scale, while the drawbacks may be found in a possible diversion of revenue and cross subsidies between airports in different States (a form of cooperation that may be acceptable to some developing States).

One conclusion that may be drawn from this controversial issue is that an equilibrium should be sought between the interests of airports and users, specifically including those of current and future end-users; and that in cases where cross subsidization within a national network is applied, full transparency is necessary. In the final analysis, it is for States to decide on what is in their best interest, taking the above advantages and disadvantages and their particular circumstances into account. In this respect, States should consider provisions of Doc 9082, which say that a State or a charging authority may recover less than its full costs in recognition of local, regional or national benefits received, as well as to the possibility of cross subsidization through revenues from non-aeronautical activities. With regard to international operation and management of airports, this form of organization needs to be exerted with caution and could be considered as acceptable as long as it brings lower charges through economies of scale.

CORPORATE GOVERNANCE

The change of ownership, control and/or management of an airport can have implications on its governance and performance. A number of recent studies and experiences indicate that a change of ownership and control is normally considered as a means to improve corporate governance and that better performance is achieved as a result of good corporate governance. The term corporate governance refers to overseeing the running of a company or an entity by its management and its accountability to shareholders and other interested parties.

Corporate governance becomes even more important where the control and management of an airport is separated from the ownership and in situations where an airport is more dependent on external capital for the financing of its activities and investments. For example, a sound corporate governance system could provide effective assurance for all interested parties, including shareholders and creditors, that management acts in the best interest of the airport and uses funds in an efficient way, thereby making it easier to raise capital. Conversely, without good corporate governance the management may seek to maximize its own interests at the expense of those of other interested parties, and there may be less transparency in the use of available funds.

Corporate governance principles and codes have been developed worldwide. Some of the most influential guidelines are the OECD Principles of Corporate Governance (2004) by the Organization for Economic Co-operation and Development. The application of the OECD principles and the results of recent studies on the commercialization and privatization of airports may serve as the basis for the establishment of the best practices needed to ensure good corporate governance of commercialized airports. These include:

- a) clearly defined objectives and responsibilities as set out in a legislation or license;
- b) an equitable treatment of shareholders and protection of shareholders' rights (where all or a part of the capital is held by private shareholders);
- c) an independent, professional supervisory board to provide overall direction to the management;
- d) empowered and accountable management to make timely decisions regarding finances, operations, technology, human resources, investments and services in line with corporate objectives and board directions;
- e) good relationships with all interested parties through consultation; and
- f) timely and accurate disclosure of information to enhance transparency.

The best practice of good corporate governance could equally apply to airports fully owned and directly controlled by government, as the performance of airports is related more to good governance than to the ownership and control structure. In many instances, however, a State authority does have inherent limitations that must be overcome (for example, cumbersome approval and lengthy procurement processes, and competition with other State priorities for investments).

INTERNAL ORGANIZATION

When establishing the internal organizational structure of an airport (or group of airports), the principal aim is to create a structure that enables the airport to meet its objectives and carry out its functions in the most efficient and cost-effective manner while maintaining a high standard of service.

Before defining or revising its internal organizational structure, particular attention will first be directed to the areas of responsibility of the airport (or group of airports), which are often described in the charter of the airport(s) or in documents of a similar character. The functions of an airport will vary according to its size, mix of traffic, areas of responsibility and business objectives and model. For example, some airports are responsible for air traffic control as well as for meteorological services, while at other airports such services may be provided by separate entities. Many airports are involved in security functions in varying degrees and in providing facilities for customs, immigration and health authorities. Ground-handling services for the airlines, including terminal handling or apron (ramp) handling, or both, are provided by some airports, while at others they are provided by the airlines or by specialized agents or companies. Certain airports also perform functions that exceed the scope of conventional airport activities, such as consultancy services, public works, construction, and real estate development.

At smaller airports, it may be more effective and convenient to have several functions handled by one department, whereas at major airports, many of them are likely to be handled by separate departments. The main functions of an airport are described below.

Air Traffic Operations

Concerned with the movement of aircraft within the airport and its vicinity, air traffic operations include air traffic control and related associated procedures, fire-fighting and rescue services, meteorological services, and the operation of pilot briefing offices, which are usually also responsible for the provision of aeronautical documentation and information. These services are often the responsibility of the State in which the airport is located.

Operation of Airport Facilities

This function covers the operation of the passenger and freight terminals, including air bridges, and runways, taxiways and aprons including ramp equipment, buses and other airport vehicles, and automobile parking. This function usually has a large staff for the various operating, cleaning, guarding and other functions involved, with certain services often provided through subcontractors.

Engineering, Construction Works and Maintenance

This function provides maintenance services for airport installations and equipment, and also performs civil engineering work at the airport. Maintenance ensures that airport buildings and installations are kept fully operational. They include the internal equipment of the air terminal (e.g. baggage conveyor belts, moving stairways, passageways, heating and air conditioning systems, power supply) and the external equipment (e.g. runway lighting, instrument landing system, telecommunication and meteorological equipment), as well as airport vehicles (e.g. buses, firefighting and apron vehicles) and ground-handling equipment (ground power units, aircraft stairs, and cargo and baggage handling equipment).

Engineering and construction services are often performed by outside consultants or contractors at airports that have not reached a size that enables them to efficiently use such services on a permanent and continuous basis.

Engineering includes the designing of new projects and programmes, including preliminary and final project specifications. An essential responsibility is to define the master plan for the development of the airport to its optimal capacity so as to efficiently meet growing traffic volumes. This would include the location of additional runways and passenger terminals, in the medium and long term, consistent with the planning and development objectives. The construction works department carries out part or all of the tasks, such as management of the operations, planning and supervision of the construction works, related to the ground facilities and the air terminals.

Ground Handling

This function concerns only those airports that provide all or part of the ground-handling services at the airport. The function may be separated into terminal handling (passenger check-in, baggage and freight handling, flight plan processing) and apron handling (aircraft handling, cleaning and servicing). If it is not organized as a separate function, it could be included under “operation of airport facilities” (see paragraph 2.51). This function generally requires a large number of personnel, which can be partly or wholly subcontracted.

Security, Immigration, Health and Customs

All these services are required and generally provided by the State. They should be accorded the full cooperation of airport management. At some airports, an airport police or security force may be responsible for certain or all airport security functions.

Administration and Finance

The administration and finance function is usually responsible for overall management of personnel and general administrative matters, including management of buildings and land and the supply and management of stocks. It would also be responsible for accounting, budgets, budgetary control, the assessment and collection of charges and other revenues, as well as making payments and, possibly, the operation of airport data processing systems. Also included would be matters relating to rentals and leases, concession contracts, drafting of the necessary agreements and other legal matters. Defining the airport’s long-term objectives and establishing development plans and investment programmes may be the responsibility of the finance function or a separate planning and development function.

Management control (which includes comparisons of the results achieved in relation to forecasts, budgets and plans, and the analysis of discrepancies) may also be separated from the finance function. Management information systems, which can be of significant assistance, tend to be operated by the administration and finance function. This may include the airport data processing system or may be operated as a separate function. The internal audit function, however, is usually independent and should report to a high level of management to ensure its impartiality.

Marketing and Public Relations

This function is aimed at promoting the airport to the aircraft operators and the general public as well as to potential users of airport services. This involves identifying typical features of the airport’s customers and their requirements, public and media relations, operating guided tours, dealing with complaints, preparing brochures describing the airport for the public, and maintaining the airport’s website.

Also included could be the development and management of commercial concessions, particularly at smaller airports where it would often form part of the administration or operation function. The development and management of commercial concessions and other non-aeronautical activities

becomes increasingly important as airport traffic increases; at larger airports, it may therefore be justified to organize this activity as a separate function.

Organizational structure

While various types of organizational structures can be used to ensure effective management command, control and internal communications for different types of operating entities, examples of some generic airport organization charts are discussed. Although each airport is unique and will take on its own unique organizational and governance structure, certain basic factors need to be considered when an airport's organization chart is to be prepared.

The establishment of the most suitable organizational chart for an airport (or group of airports) should take into account the following factors:

- the objectives and functions of the airport(s);
- the relationships between the various functions performed and functionaries at the airport(s);
- the number of airports and their geographical distribution, if they are operated as a group/network;
- airport size, which determines whether each of the various functions should be entrusted to a distinct department, or whether some of them could be grouped together in the same organizational unit or department;
- the type(s) of traffic (international, domestic, civil, general aviation, military joint user); and
- the degree of financial autonomy of the airport or airports concerned.

The organizational chart for an airport (or group of airports) indicates how the various airport functions are related, and in this way provides some guidance in the allocation and determination of budget of the facilities and services provided. The graphical presentation of the functional relationships that exist for the relevant organizational structure should take into account the following considerations:

one or more functions should be grouped together in each department;

- the functions grouped together should be related and have a common purpose;
- if the volume of traffic is low, the number of departments should be relatively limited. As the airport increases in size, its organizational charts tend to become increasingly complicated, but the multiplicity of departments should not result in any overlapping in responsibilities which would hamper the smooth operation of the airport;
- all departments should be closely coordinated, particularly as regards airport security; and
- regardless of the form of internal organization, airports are usually managed by a governing board (or board of directors), which is usually responsible for all important policy decisions regarding the airport, and a chief executive officer (or managing director, or director general). The chief executive officer is responsible for the day-to-day operation and administration of the airport and implements the decisions of the board.

CHAPTER IV: AIRPORT ORGANIZATION

GENERAL ORGANIZATIONAL STRUCTURE

The function and responsibilities of an airport will vary according to its size, type of traffic and areas of responsibility. An analysis of the airport management structure across the world confirms that majority of the structures are focused on one's appreciation of thrust areas and there are wide-ranging variations.

In certain cases, air navigation services are part of the airport management domain and in some cases they are part of the governments' regulatory function and operate separately. In certain cases, air navigation services are provided by entities tasked or contracted to provide such services

Airport Organization- Models

An analysis of airport organisation built across the globe indicates that the internal organisation structure is primarily focused to one's appreciation of thrust areas and the basic management approach. Organisation models therefore, are somewhat different in different countries. What is however, noticeable is that the internal structure in certain cases are influenced by airport Mission, Strategic Objectives, Corporate Setting and self- sufficiency objectives.

Bureaucratic models are structured according to functions with multi-layered structures with centralised authority(some models in the UK/USA). They are mostly process oriented and conformity is valid. Whereas, commercial models (some of the European/Canadian/Asia-Pacific are structured according to Profit Centres with a flatter pyramid. They are more of result-oriented and individual autonomy is provided which calls for a greater managerial expertise. In this model, creativity and entrepreneurship are rewarded. Greater autonomy allows better financial self-sufficiency and an overall improved self-sufficiency.

Airport Business Planning

Airport business planning ensures unity of action and it helps to develop a plan of action and, above all, it helps to align employees goals with that of the Airport organisation.

Airport Planning framework generally include Strategic Plan, Master Plan, Supporting Plans and the Business Plan. Strategic plan includes Vision and Mission Statements, Objectives, Strategies, Policies and Values. Supporting Plans include Commerce Plan, Retail Sales Plan, Capital Plans, Investment Plan and Financial Plan.

Strategic plan is long term based while the Business Plan looks at the short term concerns. Business plan generally indicates where to go and how to get there in business terms. Business Plan therefore, is yearly or the initial two or three years of a rolling plan. Business Plan helps the management to be responsive to the changing environment, it also ensures unity of action and that resources are utilized in support of objectives, besides, it also helps evaluation of airport performance and, above all it is a tool to communicate information to others.

Airport Vision, Mission and Values serve as important tools to project long-term Vision of what the airport is trying to achieve. Mission statements are specific, focused on markets, achievable and it motivates the airport employees as a whole. Vision and values are common to everyone while mission statements may be different for different departments/ verticals.

Strategic objectives are the end points of an organisation's Mission and they spell out what it seeks to achieve through its ongoing activities. Effective objectives are, therefore, specific, measurable and action commitments. Say, "to increase market share by One percent per year, when compared to our main competitors"; "to improve our return on investment by one percent per year".

Simultaneously, Organizational Strategies and Airport Strategies are derived out of the Strategic objectives. Policies are the broad guidelines which provide the guidance for decision-making

through out the airport organisation. Values, beliefs, norms, symbols and rituals, all form part of the organizational culture. They are the ideals pursued by the airport organisation and which govern how it conducts its business. Some of the Values identified by airports demonstrate their manifested outlooks.

Airports De Montreal claims its' Values are;

- Customer Satisfaction
- Efficiency and Profitability
- Integrity and Openness

Manchester Airport (UK) states its' Values are;

- Customer Satisfaction
- Excellence
- Profitability
- Environment
- Safety

Strategic Management helps managers to develop better understanding of business, encourages 'forward thinking' and improves channeling of efforts towards attainment of objectives. It also provides better coordination of organizational efforts, fixation of right priorities and exploitation of marketing opportunities.

Airport Development

Airport Development is an essential part of the airport management. While only few airports from the scratch ('Green field' airports)were built (Denver in USA, Kansai in Japan, Chap Lap Kok in Hong Kong, New Kuala Lumpur International Airport(KLI) in Malaysia, and in India, a new airport at Calicut was commissioned in 1988; Cochin International Airport Ltd was the first private participation, followed by Hyderabad and Bangaluru. Several new airports are being built in China and in other parts of the world.

Why is Airport Development a key aspect of airport management? The answer lies in the fact that while few airports are built as 'green field' airport, a large number of airports undergo refurbishment, reconstruction, modification or expansion. Modification, upgradation and expansion of facilities necessitate changes in the operational procedures, equipment and the airport systems, and they can be as expensive as new airport projects. Airport management has a very crucial role in the planning, initiating, executing and finally accepting such developmental projects. Planning is performed at several levels-national and state levels and finally, it must fit in as per the individual airport master plans.

Airport Master Plan

Airport Master plan is the long-term development concept of an airport and it displays the concept graphically and reports the data and logic upon which the plan is based. It supports the modernisation/development of the existing airport and creation of new airports. It helps to justify the plan technically and procedurally through an investigation of concepts and alternatives on technical, economic and environmental grounds. It facilitates presentation for public consideration in a convincing and candid manner, a plan which adequately addresses the issues and satisfies Local, State, and National Regulations. It acts as a reference document for future aeronautical demands and for references to local government bodies. Airport Master Plan therefore, is a master guide for the effective land use control and it establishes the framework for a continuing planning process besides, acting as a master reference document.. The principle phases of an airport

development project include; Preliminary Phase, Design Phase, Bidding/Negotiation Phase and Construction Phase. The detailed attention provided by the airport management in each of these Phases are very critical in the successful completion of the airport development projects. National /State environmental policy has a significant effect on airport planning and is advisable to undertake environmental impact study in early stages and throughout the planning process. Investigation of alternative developmental concepts and mitigation of environmental impacts extend the planning process beyond aeronautical and cost considerations.

Airport Planning Process, therefore includes Pre-planning considerations which would provide the framework for an effective and feasible airport master plan; Forecasting which would provide basic data for determining the needs and required capacity of an airport and basis for projection of airport revenues; Financial/Economic analysis establishes a programme for providing the necessary funding of the airport and Site Evaluation. Airport Planning covers, Air Side development (Runways and Taxiways, Aprons, Air and Ground Navigation and ATC), Terminal Building/ Cargo Facilities/Airport Operations and Support Facilities, Aircraft Fuel Facilities, Security Considerations and Land Side Development. ICAO Annex 14 provides the guidance on aerodromes and other ICAO publications include; Doc 9164-AN/902- Airport Planning Manual, Doc 9157.-Aerodrome Design Manual, Doc 9137- Airport Services Manual, Doc 9476-Manual of Surface Movement Guidance and Control, Doc 8973(Security Manual), and Doc 8991-Manual on Air Traffic Forecasting.

INTERNATIONAL FRAMEWORK UNDER ICAO

The International Civil Aviation Organization (ICAO) is a specialized agency of the United Nations. It codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth. Its headquarters are located in the Quartier International of Montreal, Quebec, Canada.

The ICAO Council adopts standards and recommended practices concerning air navigation, its infrastructure, flight inspection, prevention of unlawful interference, and facilitation of border-crossing procedures for international civil aviation. ICAO defines the protocols for air accident investigation followed by transport safety authorities in countries signatory to the Convention on International Civil Aviation (Chicago Convention).

The Air Navigation Commission (ANC) is the technical body within ICAO. The Commission is composed of 19 Commissioners, appointed by the Council. Commissioners serve as independent experts, who although nominated by their states, do not serve as state or political representatives. The development of Aviation Standards and Recommended Practices is done under the direction of the ANC through the formal process of ICAO Panels. Once approved by the Commission, standards are sent to the Council, the political body of ICAO, for consultation and coordination with the Member States before final adoption.

ICAO should not be confused with the International Air Transport Association (IATA), a trade organization for airlines also headquartered in Montreal, or with the Civil Air Navigation Services Organisation (CANSO), an organization for Air Navigation Service Providers (ANSPs) with its headquarters at Amsterdam Airport, Schiphol in the Netherlands. These are trade associations representing specific aviation interests, whereas ICAO is a body of the United Nations.

The forerunner to ICAO was the International Commission for Air Navigation (ICAN). It held its first convention in 1903 in Berlin, Germany but no agreements were reached among the eight countries that attended. At the second convention in 1906, also held in Berlin, 27 countries attended. The third convention, held in London in 1912 allocated the first radio call signs for use by aircraft. ICAN continued to operate until 1945.

Fifty-two countries signed the Convention on International Civil Aviation, also known as the Chicago Convention, in Chicago, Illinois, on 7 December 1944. Under its terms, a Provisional International Civil Aviation Organization (PICAO) was to be established, to be replaced in turn by a permanent organization when 26 countries ratified the convention. Accordingly, PICAO began operating on 6 June 1945, replacing ICAN. The 26th country ratified the Convention on 5 March 1947 and, consequently PICAO was wound up on 4 April 1947 and replaced by ICAO, which began operations the same day. In October 1947, ICAO became an agency of the United Nations linked to the United Nations Economic and Social Council (ECOSOC).

Standards

ICAO also standardizes certain functions for use in the airline industry, making it a standards organization. Standards are there for Rules of Air, operations, Licensing, Navigation, Aerodromes, Safety, Security etc.

Each country should have an accessible Aeronautical Information Publication (AIP), based on standards defined by ICAO, containing information essential to air navigation. Countries are required to update their AIP manuals every 28 days and so provide definitive regulations, procedures and information for each country about airspace and aerodromes. ICAO's standards also dictate that temporary hazards to aircraft are regularly published using NOTAMs.

ICAO defines an International Standard Atmosphere (also known as ICAO Standard Atmosphere), a model of the standard variation of pressure, temperature, density, and viscosity with altitude in the Earth's atmosphere. This is useful in calibrating instruments and designing aircraft.

ICAO standardizes machine-readable passports worldwide. Such passports have an area where some of the information otherwise written in textual form is written as strings of alphanumeric characters, printed in a manner suitable for optical character recognition. This enables border controllers and other law enforcement agents to process such passports quickly, without having to input the information manually into a computer. ICAO publishes Doc 9303 – Machine Readable Travel Documents, the technical standard for machine-readable passports. A more recent standard is for biometric passports. These contain biometrics to authenticate the identity of travellers. The passport's critical information is stored on a tiny RFID computer chip, much like information stored on smartcards. Like some smartcards, the passport book design calls for an embedded contactless chip that is able to hold digital signature data to ensure the integrity of the passport and the biometric data.

ICAO is active in infrastructure management, including Communication, Navigation, Surveillance / Air Traffic Management (CNS/ATM) systems, which employ digital technologies (e.g., satellite systems with various levels of automation) in order to maintain a seamless global air traffic management system.

Registered codes

Both ICAO and IATA have their own airport and airline code systems. ICAO uses 4-letter airport codes (vs. IATA's 3-letter codes). The ICAO code is based on the region and country of the airport—for example, Charles de Gaulle Airport has an ICAO code of LFPG, where L indicates Southern Europe, F, France, PG, Paris de Gaulle, while Orly Airport has the code LFPO (the 3rd letter sometimes refers to the particular flight information region (FIR) or the last two may be arbitrary). In most of the world, ICAO and IATA codes are unrelated; for example, Charles de Gaulle Airport has an IATA code of CDG and Orly, ORY. However, the location prefix for continental United States is K and ICAO codes are usually the IATA code with this prefix. For example, the ICAO code for LAX is KLAX. Canada follows a similar pattern, where a prefix of C

is usually added to an IATA code to create the ICAO code. For example, Edmonton is YEG or CYEG. (In contrast, airports in Hawaii are in the Pacific region and so have ICAO codes that start with PH; Kona International Airport's code is PHKO.) Delhi code is VIDP while Kolkata is known by VECC Note that not all airports are assigned codes in both systems; for example, airports that do not have airline service do not need an IATA code.

ICAO also assigns 3-letter airline codes (versus the more-familiar 2-letter IATA codes—for example, UAL vs. UA for United Airlines). ICAO also provides telephony designators to aircraft operators worldwide, a one- or two-word designator used on the radio, usually, but not always, similar to the aircraft operator name. For example, the identifier for Japan Airlines International is JAL and the designator is Japan Air, but Aer Lingus is EIN and Shamrock. Thus, a Japan Airlines flight numbered 111 would be written as "JAL111" and pronounced "Japan Air One One One" on the radio, while a similarly numbered Aer Lingus would be written as "EIN111" and pronounced "Shamrock One One One".

ICAO maintains the standards for aircraft registration ("tail numbers"), including the alphanumeric codes that identify the country of registration. For example, airplanes registered in the United States have tail numbers starting with N.

ICAO is also responsible for issuing alphanumeric aircraft type codes containing two to four characters. These codes provide the identification that is typically used in flight plans. The Boeing 747 would use B741, B742, B743, etc., depending on the particular variant.

Regions and regional offices

ICAO they are:

- Asia and Pacific (APAC) – Bangkok, Thailand
- Eastern and Southern African (ESAF) – Nairobi, Kenya
- Europe and North Atlantic (EUR/NAT) – Paris, France
- Middle East (MID) – Cairo, Egypt
- North American, Central American and Caribbean (NACC) – Mexico City, Mexico
- South American (SAM) – Lima, Peru
- Western and Central African (WACAF) – Dakar, Sénégal

AIRPORT COUNCIL INTERNATIONAL

Airports Council International (ACI) is the association of the world's airports. It is a non-profit organization, whose prime purpose is to advance the interests of airports and to promote professional excellence in airport management and operations. By fostering cooperation amongst airports, world aviation organizations and business partners, ACI makes a significant contribution to providing the traveling public with an air transport system that is safe, secure, efficient and environmentally responsible.

As the international association of the world's commercial service airports, ACI represents the collective positions of its membership, which are established through committees and endorsed by the ACI Governing Board. These views reflect the common interests of the global airports community.

ACI is the "voice of the world's airports" in interacting with world bodies and advocate for the global airports industry before the media and opinion leaders. International partner organizations include the International Civil Aviation Organization (ICAO) and other specialized UN organizations such as the World Health Organization and the UN Institute for Training and

Research. ACI is one of only a few organizations having observer status with ICAO and it also has consultative status with the United Nations' Economic and Social Council (UN/ECOSOC).

ACI Organizational Goals:

- Maximize the contributions of airports to maintaining and developing a safe, secure, environmentally compatible and efficient air transport system.
- Achieve cooperation among all segments of the aviation industry and their stakeholders as well as with governments and international organizations.
- Influence international and national legislation, rules, policies, standards and practices based on established policies representing airports' interests and priorities.
- Advance the development of the aviation system by enhancing public awareness of the economic and social importance of airport development.
- Maximize cooperation and mutual assistance among airports.
- Provide members with industry knowledge, advice and assistance, and foster professional excellence in airport management and operations.
- Build ACI's worldwide organizational capacity and resources to serve all members effectively and efficiently.

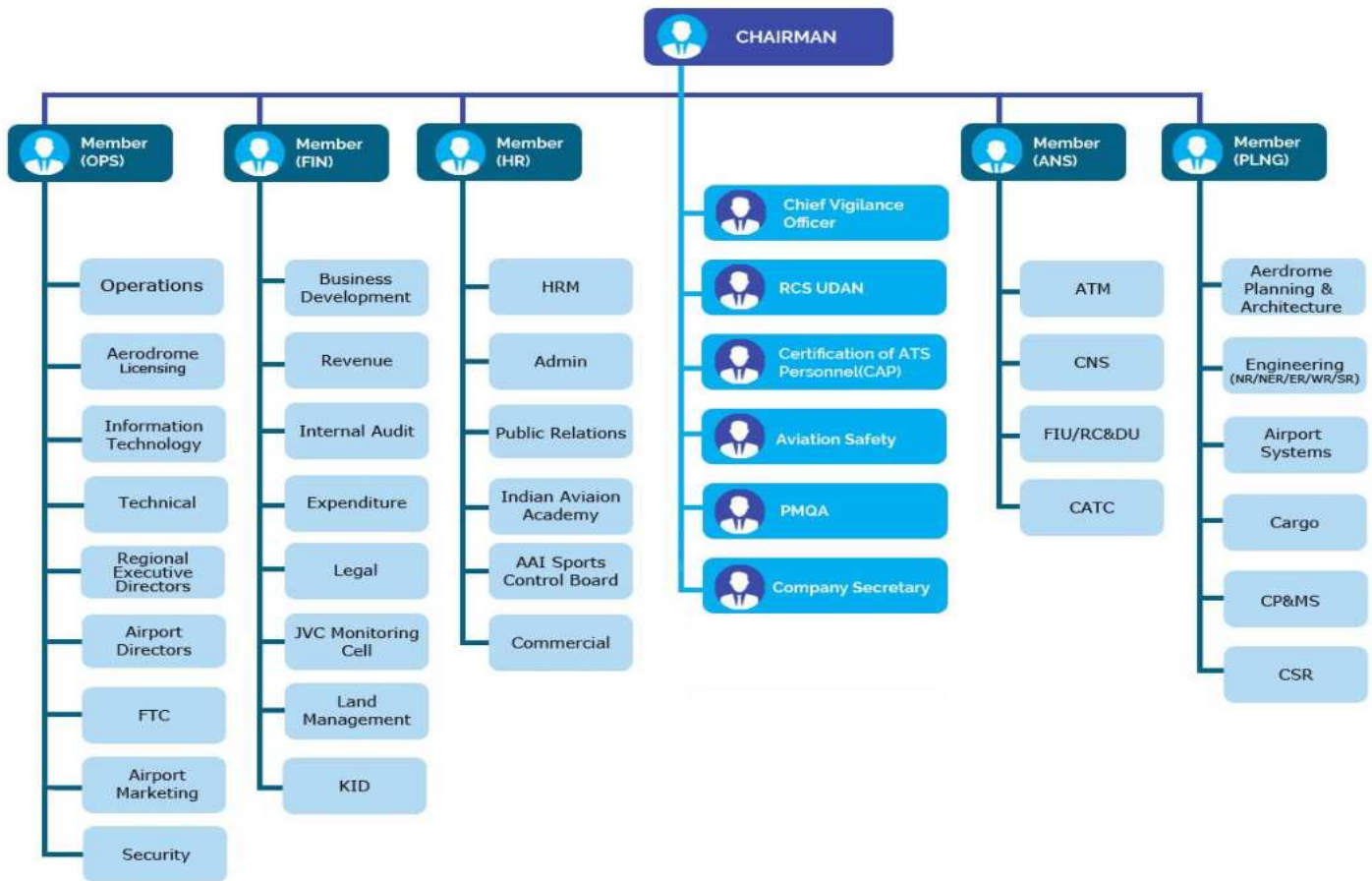
DOMESTIC FRAMEWORK IN INDIA

Organisation of Airports Authority

Airports Authority of India (AAI) was constituted by an Act of Parliament and came into being on 1st April 1995 by merging erstwhile National Airports Authority and International Airports Authority of India. The merger brought into existence a single Organization entrusted with the responsibility of creating, upgrading, maintaining and managing civil aviation infrastructure both on the ground and air space in the country.

AAI manages 127 airports, which include 11 International Airports, 08 Customs Airports, 81 Domestic Airports and 27 Civil Enclaves at Defense airfields. There are a total of 449 airports in India, out of which 33 airports are non-operational.

During the year 2017-18, AAI handled aircraft movement of 3357028 Nos. [International 2143968 & Domestic 1213060], Passengers handled 308753400 Nos. [International 65475516 & Domestic 243277884] The organization chart of AAI is shown in Fig 1.



The main functions of AAI are given below:

- construction, modification & management of passenger terminals,
- development & management of cargo terminals,
- development & maintenance of apron infrastructure including runways, parallel taxiways, apron etc.,
- Provision of Communication, Navigation and Surveillance which includes provision of DVOR / DME, ILS, ATC radars, visual aids etc.,
- provision of air traffic services,
- provision of passenger facilities and related amenities at its terminals thereby ensuring safe and secure operations of aircraft, passenger and cargo in the country.

Air Navigation Services

In tune with global approach to modernization of Air Navigation infrastructure for seamless navigation across state and regional boundaries, AAI has gone ahead with its plans for transition to satellite based Communication, Navigation, Surveillance and Air Traffic Management.

Security

The continuing security environment has brought into focus the need for strengthening security of vital installations. There was thus an urgent need to revamp the security at airports not only to thwart any misadventure but also to restore confidence of traveling public in the security of air travel as a whole, which was shaken after 9/11 tragedy. With this in view, a number of steps were taken:

- a) deployment of CISF for airport security,
- b) CCTV surveillance system at sensitive airports,
- c) latest and state-of-the-art X-ray baggage inspection systems,
- d) premier security & surveillance systems.
- e) Smart Cards for access control to vital installations at airports.
- f) Use of modern technologies like Artificial Intelligence at Airports.

Aerodrome Facilities

In Airports Authority of India, the basic approach to planning of airport facilities has been adopted to create capacity ahead of demand in our efforts. Towards implementation of this strategy, a number of projects for extension and strengthening of runways, taxi tracks and aprons at different airports has been taken up.

HRD Training

A large pool of trained and highly skilled manpower is one of the major assets of Airports Authority of India. Development and Technological enhancements and consequent refinement of operating standards and procedures, new standards of safety and improvements in management techniques call for continuing training to update the knowledge and skill of officers and staff. For this purpose AAI has a number of training establishments, viz.,

- a) NIAMAR in Delhi,
- b) CATC in Allahabad,
- c) Fire Training Centres at Delhi & Kolkata

There are meant for in-house training of its engineers, Air Traffic Controllers, Rescue & Fire Fighting personnel etc. NIAMAR & CATC are members of ICAO TRAINER programme under which they share Standard Training Packages (STPs) from a central pool for imparting training on various subjects. Both CATC & NIAMAR have also contributed a number of STPs to the Central pool under ICAO TRAINER programme. Foreign students have also been participating in the training programme being conducted by these institutions.

IT Implementation

Information Technology holds the key to operational and managerial efficiency, transparency and employee productivity. AAI initiated a programme to indoctrinate IT culture among its employees and this is most powerful tool to enhance efficiency in the organization. Induction of fourth generation tech solutions like AI and M is taken in a bigway.

Regulatory Authorities

There are various national and international regulatory authorities that control aviation in general and airports in particular in India. These are given below:

- a) Airport Authority of India (AAI)
- b) The Directorate General of Civil Aviation (DGCA)
- c) Airport Regulatory Authority of India (AERA)
- d) International Civil Aviation Organisation (ICAO)
- e) Airports Council International (ACI)
- f) Bureau of Civil Aviation Security (BCAS)

Airport Authority of India (AAI)

- a) The Airport Authority of India (AAI) is the operator at majority of airports.
- b) The relevant statutes are The Airports Authority of India Act, 1994 and The Airports Authority of India (Amendment) Act, 2003.
- c) It is the *de facto* regulator for civil airports.

Directorate General of Civil Aviation (DGCA)

- a) The overall functions of DGCA include regulation of air transport services to/from/within/over India by Indian and Foreign operators, registration of civil aircraft, formulation of air safety and airworthiness standards for civil aircraft registered in India and grant of certificates of airworthiness to such aircraft.
- b) It oversees the licensing of pilots, aircraft maintenance engineers, flight engineers and air traffic controllers.
- c) It also coordinates all regulatory functions with International Civil Aviation Organisation (ICAO).

Airport Economic Regulatory Authority of India (AERA)

The Airports Economic Regulatory Authority (AERA) is a statutory body constituted under the Airports Economic Regulatory Authority of India Act, 2008 (27 of 2008) notified vide Gazette Notification dated 5th December 2008. The AERA was established by the Government vide its notification no GSR 317 (E) dated 12.05.09 with its head office at Delhi.

The statutory functions of the AERA as enshrined in the Airports Economic Regulatory Authority of India Act, 2008 are as below:

- a) To determine the tariff for the aeronautical services taking into consideration.
 - i. The capital expenditure incurred and timely investment in improvement of airport facilities.
 - ii. The service provided, its quality and other relevant factors.
 - iii. The cost for improving efficiency.
 - iv. Economic and viable operation of major airports.
 - v. Revenue received from services other than the aeronautical services.
 - vi. The concession offered by the Central Government in any agreement or memorandum of understanding or otherwise.
 - vii. Any other factor which may be relevant for the purposes of this Act.
- b) To determine the amount of the Development Fees in respect of major airports.
- c) To determine the amount of the Passengers Service Fee levied under rule 88 of the Aircraft Rules, 1937 made under the Aircraft Act, 1934.
- d) To monitor the set Performance Standards relating to quality, continuity and reliability of service as may be specified by the Central Government or any authority authorized by it in this behalf.
- e) To call for such information as may be necessary to determine the tariff under clause (a).

- f) To perform such other functions relating to tariff, as may be entrusted to it by the Central Government or as may be necessary to carry out the provisions of this Act.

Regulatory short comings

Airport Authority of India (AAI)

- a) For those airports not under the mandate of AERA, it is both the operator as well as the regulator. An independent regulator is required.
- b) It has regulatory overlap in many areas with DGCA e.g. slot allocation, height of buildings in proximity to airports etc.

Airport Economic Regulatory Authority of India (AERA)

- a) AERA's mandate is limited to major airports
- b) It monitors service standards but has no powers of enforcement.
- c) Section pertaining to establishment of Appellate Authority is not notified.
- d) Slot allocation and route dispersal are economic issues and should come under AERA.

Directorate General of Civil Aviation (DGCA)

- a) Overlap with AAI needs to be addressed
- b) Serious capacity constraints in monitoring and regulating air safety issues.

MODULE II - AIRPORT ECONOMICS & FINANCIAL MANAGEMENT

CHAPTER I: ECONOMIES OF AIR TRAVEL: SUPPLY & DEMAND

Transportation is a market composed of suppliers of transport services and users of these services. Well-functioning transport markets should allow transport supply to meet transport demand so that transport needs for mobility are satisfied. An economic system including numerous activities located in different areas generates movements that must be supported by the transport system. Without movements infrastructures would be useless and without infrastructures movements could not occur, or would not occur in a cost efficient manner. This interdependency can be considered according to two concepts, which are transport supply and demand.

Transport Supply

Capacity of transportation infrastructures and modes, generally over a geographically defined transport system and for a specific period of time. Supply is expressed in terms of infrastructures (capacity), services (frequency) and networks (coverage). Capacity is often assessed in static and dynamic terms. Static capacity represents the amount of space available for transport (e.g. terminal surface) and dynamic capacity are the improvement that can be made through better technology and management. The number of passengers, volume (for liquids or containerized traffic), or mass (for freight) that can be transported per unit of time and space is commonly used to quantify transport supply.

Transport Demand

Transport needs, even if those needs are satisfied, fully, partially or not at all, similar to transport supply, it is expressed in terms of number of people, volume, or tons per unit of time and space.

Transport demand is generated by the economy, which is composed persons, institutions and industries and which generates movements of people and freight. A distinction can be made between consumptive and productive transport needs. Productive transport needs have a clear economic focus. For example, the transport of semi-finished products from one production site to the final production or assembly site creates added value in the production process by benefiting from the locational advantages of each of the production sites. Consumptive transport needs generate less visible added value. The location of resources, factories, distribution centers and markets is obviously related to freight movements. Transport demand can vary under two circumstances that are often concomitant; the quantity of passengers or freight increases or the distance over which these passengers or freight are carried increases. Geographical considerations and transport costs account for significant variations in the composition of freight transport demand between countries. For the movements of passengers, the location of residential, commercial and industrial areas tells a lot about the generation and attraction of movements.

Supply and Demand Functions

Transport supply and demand have a reciprocal but asymmetric relation. While a realized transport demand cannot take place without a corresponding level of transport supply, a transport supply can exist without a corresponding transport demand. This is common in infrastructure projects that are designed with a capacity fulfilling an expected demand level, which may or may not materialize, or may take several years to do so. Scheduled transport services, such a public transit or airlines, are offering a transport supply that runs even if the demand is insufficient. Infrastructures also tend to be designed at a capacity level higher than the expected base scenario in case that demand turns out to be is higher than anticipated. In other cases, the demand does not materialize, often due to

improper planning or unexpected socioeconomic changes. Transport demand that is met by a supply of transport services generates traffic (trucks, trains, ships, airplanes, buses, bicycles, etc.) on the corresponding transport infrastructure networks. The traffic capacity is generally larger than the actual transport demand since the average utilization degree of vehicles rarely reaches 100 percent. There is a simple statistical way to measure transport supply and demand for passengers or freight:

The passenger-km (or passenger-mile) is a common measure expressing the realized passenger transport demand as it compares a transported quantity of passengers with a distance over which it gets carried. The ton-km (or ton-mile) is a common measure expressing the realized freight transport demand. Although both the passenger-km and ton-km are most commonly used to measure realized demand, the measure can equally apply for transport supply.

For instance, the transport supply of a Boeing 747-400 flight between New York and London would be 426 passengers (if a Boeing 747-400 with optimal seating configuration is used) over 5,500 kilometers (with a transit time of about 6 hours depending on the direction). This implies a transport supply of 2,343,000 passenger-kms. In reality, there could be a demand of 450 passengers for that flight, or of 2,465,000 passenger-km, even if the actual capacity would be of only 426 passengers. In this case the realized demand would be 426 passengers over 5,500 kilometers out of a potential demand of 450 passengers, implying a system where demand is at 105% of capacity. There are several factors impacting the capacity of transport infrastructure, from the physical characteristics of the network, how it is operated and maintained to the presence of bottlenecks.

- a) Modal supply. The supply of one mode influences the supply of others, such for roads where different modes compete for the same infrastructure, especially in congested areas. For instance, transport supply for cars and trucks is inversely proportional since they share the same road infrastructure.
- b) Intermodal supply. Transport supply is also dependent on the transshipment capacity of intermodal infrastructures. For instance, the maximum number flights per day between New York and Chicago cannot be superior to the daily capacity of the airports of New York and Chicago, even though the New York - Chicago air corridor has potentially a very high capacity.

Transport demand tends to be expressed at specific times that are related to economic and social activity patterns. In many cases, transport demand is stable and recurrent, which allows a good approximation in planning services. In other cases, transport demand is unstable and uncertain, which makes it difficult to offer an adequate level of service. For instance, commuting is a recurring and predictable pattern of movements, while emergency response vehicles such as ambulances are dealing with an unpredictable demand that can be expressed as a probability. Transport demand functions vary according to the nature of what is to be transported:

- i. Passengers: For the road and air transport of passengers, demand is a function of demographic attributes of the population such as income, age, standard of living, race and sex, as well as modal preferences.
- ii. Freight: For freight transportation, the demand is function of the nature and the importance of economic activities (GDP, commercial surface, number of tons of ore extracted, etc.) and of modal preferences. Freight transportation demand is more complex to evaluate than passengers.

Supply/Demand Relationships

Relationships between transport supply and demand continually change, but they are mutually interrelated. From a conventional economic perspective, transport supply and demand interact until an equilibrium is reached between the quantity of transportation the market is willing to use at a given price and the quantity being supplied for that price level. Price changes not only affect the level of transport demand, but can also lead to shifts of demand to other routes, alternative transport

modes and or other time periods. In the medium or long term structural changes in the pricing of transport can affect location decisions of individuals and businesses. However, several considerations are specific to the transport sector which make supply / demand relationships more complex:

- a) Entry Costs: These are the costs incurred to operate at least one vehicle in a transport system. In some sectors, notably maritime, rail and air transportation, entry costs are very high, while in others such as trucking, they are very low. High entry costs imply that transport companies will consider seriously the additional demand before adding new capacity or new infrastructures (or venturing in a new service). In a situation of low entry costs the number of companies is fluctuating with the demand. When entry costs are high, the emergence of a new player is uncommon while dropping out is often a dramatic event linked to a large bankruptcy. Consequently, transport activities with high entry costs tend to be oligopolistic while transport activities with low entry costs tend to have many competitors.
- b) Public Sector: Few other sectors of the economy have seen such a high level of public involvement than transportation, which creates many disruptions in conventional price mechanisms. The provision of transport infrastructures, especially roads, was massively funded by governments, mainly for the sake of national accessibility and regional equity. Transit systems are also heavily subsidized to provide accessibility to urban populations and more specifically to the poorest segment considered to be deprived in mobility. As a consequence, transport costs are often considered as partially subsidized. Government control (and direct ownership) is also significant for several modes, such as rail and air transportation in a number of countries. The recent years have however been characterized by privatization and deregulation.
- c) Elasticity: The notion of price elasticity is at the core of transport demand and refers to the variation of demand in response to a variation of cost. For example, an elasticity of -0.5 for vehicle use with respect to vehicle operating costs means that an increase of 1% in operating costs would imply a 0.5% reduction in vehicle mileage or trips. Variations of transport costs have different consequences for different modes, but transport demand has a tendency to be inelastic. While commuting tends to be inelastic in terms of costs, it is elastic in terms of time. For economic sectors where freight costs are a small component of the total production costs, variations in transport costs have limited consequences on the demand. For air transportation, especially the tourism sector, price variations have significant impacts on the demand. There are thus differences among the obtained price elasticities, which raises questions about the transferability of the results to other locations and or other time periods. Hence, each case is characterized by a specific local environment in terms of modal choice options, budget/income of the transport user, spatial planning, price levels, etc. All these factors combined can make the behavior of transport users somewhat different across regions and settings.

The price elasticity of transport demand can influence the strategic behavior of economic actors. For instance, container shipping lines are faced with a highly inelastic demand due to the combined effect of a lack of close substitutes (i.e. the only alternative transport mode in the intercontinental transport of high value goods is air freight, but this market segment has a much lower cargo carrying capacity and prices are much higher) and the small impact of freight rates on total costs. For most shipments the total freight price only accounts for a very small portion of the shipment's total value; usually less than 5 percent. As container lines cannot influence the size of the final market, they try to increase their short run market share by reducing prices. As such, shipping lines may reduce freight rates without substantially affecting the underlying demand for container freight. The only additional demand can come from low value products which will only be shipped overseas if freight rates are very low (e.g. the market for waste paper and metal scrap). These 'temporary' markets disappear again once the freight rate is above a threshold level no longer allowing a profit on trading these products overseas. The fairly inelastic nature of demand for shipping services constitutes the core problem for the poor financial performance of container shipping lines.

Shipping lines have developed an intense concentration on costs and on negotiated long-term contracts with large shippers in view of securing cargo. As transport demand is a derived demand from individuals, groups and industries it can be desegregated into series of partial demands fulfilled by the adaptation and evolution of transport techniques, vehicles and infrastructures to changing needs. Moreover, the growing complexity of economies and societies linked with technological changes force the transport industry to constant changes. This leads to growing congestion, a reduction in transport safety, a degradation of transport infrastructures and concerns about environmental impacts.

Transportation Yield Management: Transport demand tends to be variable in time and space whereas transport supply is fixed. When demand is lower than supply, transit times are stable and predictable, since the infrastructures are able to support their load. When transport demand exceeds supply for a period in time, there is congestion with significant increases in transit times and higher levels of unpredictability. A growth of the transport demand increases the load factor of a transport network until transport supply is reached. Speed and transit times drop afterwards. The same journey can thus have different durations according to the time of the day. Conventionally, congestion tended to have limited impacts on the fare structure as many transport operators were state owned or highly regulated. With deregulation, transport companies were able to establish a level of service reflecting market forces, as well as being able to expand, or rationalize, their capacity. Subsidies were removed, implying that the fare structure would be the dominant source of income to provide for operating and capital costs of the transport service. A common issue is that while the transport supply is relatively well known, often a scheduled service, the transport demand remains predictable, but subject to volatility. Many transport providers, particularly airline companies, have responded to the complexity of predicting transport demand with yield management approaches.

Transportation yield management is the process of managing the usage price of a transport asset, such as the fare paid by users, in view of continuous changes in the demand. The goal of such an approach is to maximize profit in the context where the transport supply is fixed.

Yield Management depends on three conditions:

- a) A fixed transport capacity implying that transport demand is the only function that can effectively vary. For instance, the capacity of a scheduled flight or of a containership is fixed (known value) and cannot be readily changed without serious impacts on the quality of service.
- b) Unused transport capacity loses all of its utility, implying that transport suppliers cannot store for another time the services that have not been used. Once an aircraft or a ship has departed, its transport capacity is lost for the concerned airport or port. Any unused capacity is therefore a loss of potential revenue.
- c) Transport users are willing to pay different rates for the same capacity or service, implying that they value transportation differently based upon their priorities and time preferences. For instance, a business traveler needing to attend a meeting values differently the same airplane seat than a tourist would. The former would be willing to pay a high price to secure a seat on a specific flight while the latter tends to seek discounted values and would be unwilling to bid above a certain price threshold. Also, time dependent users of cargo services (e.g. perishable, electronics) are willing to pay more for the same capacity than those who are less time dependent.

Aeronautical revenues

Revenue to the airport from aeronautical uses by airlines, aircraft owners and FBOs, measured on a net basis after discounts and incentives. Includes charges such as aircraft landing and takeoff fees, aircraft parking charges, passenger service fees, security charges, and in the U.S., terminal rental

charges imposed in lieu of passenger charges. It includes ground handling user fees which are a significant source of aeronautical revenue at some airports.

Airport operating costs

Ordinary airport operating costs are expenses like personnel compensation and benefits, communications and utilities, repairs and maintenance, marketing, advertising and promotion, supplies and materials, contractual services, insurance, claims, and settlements etc. It includes administrative costs and allocated overhead costs and excludes non-operating costs such as debt service and depreciation.

CHAPTER II: EXPENDITURE AND REVENUE STRUCTURE IN AIRPORTS:

EXPENSE PROFILE

At the risk of overstatement, it must be emphasized that each airport is unique, and the following information is cast in only the most general terms.

Any airport's total expense is composed of (1) operating expense and (2) capital expense, with the major components frequently looking like this:

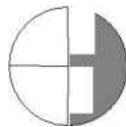
Operating Expense:	Salaries & Benefits
	Other (Utilities, Supplies, etc.)
	.
+ Capital Expense:	Depreciation
	Interest
=	Total Expense

The following pie chart illustrates the customary relationship of these major expense items at a typical medium-sized airport:

Sal. & Ben.

Dep. & Int.

Other



This chart represents a reasonably normal situation but should not be interpreted as an optimum model by which any specific airport should be judged. Its real value is its illustration of these important points

- * Airports are very capital intensive.
- * The largest category of operating cost is usually salaries and benefits.
- * Within the category marked "Other", utility expense (electric power and gas) is frequently the largest single item.

Any particular airport can vary significantly from this model for a variety of reasons, some of which

will be outlined later in this chapter.

REVENUE PROFILE

As difficult as it is to describe a typical airport's expense profile, the typical revenue profile is even more difficult to generalize. Total revenue should be sufficient to cover expense; however, there are as many ways of achieving this goal as there are airport managers.

An examination of several airport income statements will reveal that the revenue profile varies significantly by airport size. Larger airports (over 2,000,000 enplanements per year) are able to generate significantly more concession revenue than smaller airports; smaller airports frequently depend on general aviation users for a larger percentage of their revenue stream.

A common thread among many (but not all) airports is dependence on a single aviation market for a significant portion of airport revenue. *Single aviation market* refers to such market segments as:

- * Scheduled domestic airlines
- * Transient, corporate general aviation
- * Charter travel to a significant tourist destination

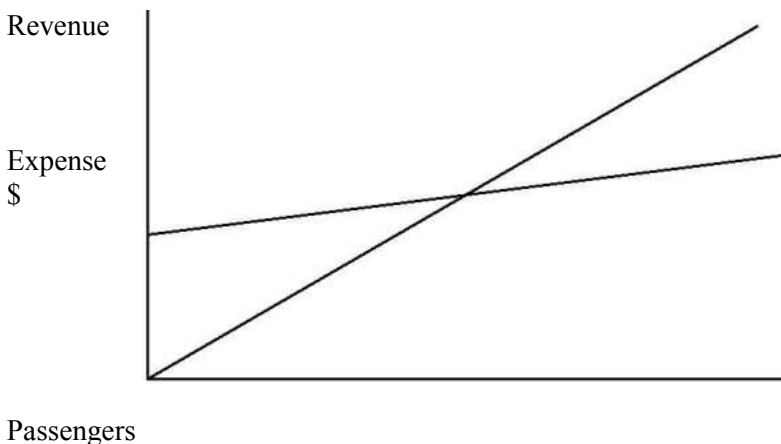
In some instances, the airport's revenue stream may be heavily dependent upon a single aviation *company* as is the case with many airline hubs

Notice that this chapter is organized by discussing expenses first, then revenues. This is backwards from common business logic wherein an entrepreneur first identifies a market need and estimates the potential *revenue* from a product that serves that need. If the product can be produced for less *expense* than the revenue it produces, the project is worth pursuing.

This backwards organization is deliberate and meant to reinforce the point that many airport owners traditionally determine expense first and then proceed to identify sources of income that will produce a break-even situation. This mindset is typical for a public service entity that provides an infrastructure product. It also explains why revenue profiles vary so much from airport to airport since different management philosophies will profoundly influence how an airport "goes after the money" it needs to recover its expenses.

RELATIONSHIP OF REVENUE AND EXPENSE

If the income statements of all U.S. air carrier airports were summarized on one diagram, it would look something like this:



Notice that revenue starts near zero since presumably no customers equals no income. Expense, on

the other hand, begins at a fixed amount whether or not any passengers walk through the front door. It costs a minimum amount of money to build and equip a new airport regardless of the potential market size. Like aircraft carriers or suspension bridges, it is not feasible to build half of an airport. Airport revenue increases as passenger traffic increases; however, the expense line rises more slowly due to the relatively fixed nature of airport costs. The two lines cross at the break-even point where revenues match expenses.

The F.A.A. and many independent researchers have attempted to define the expected break-even point for U.S. public airports and their answers range from 200,000 to 1,500,000 annual enplanements. From personal experience, somewhere near the midpoint of these two numbers (500,000 to 800,000) seems reasonable. As with previous generalizations, the reasons a particular airport may vary from this norm are more important than the norm itself.

REASONS FOR VARIANCE

Airports with less than 500,000 annual enplanements have been known to stand on a firm financial footing while some larger airports flounder. Possible reasons for these variations are as follows:

- * UNION Vs. NON-UNION LABOR : Some airports have higher personnel costs due to the local workforce culture (remember, personnel costs are a large component of total airport costs).
- * HIGH CONSTRUCTION COST ENVIRONMENT : Airports are always building or rebuilding facilities; therefore, poor soil conditions, harsh weather or long distance from raw materials can permanently increase an airport's cost base.
- * ONE BIG UNUSUAL ITEM : An airport may have an unusual revenue item (airport controls all fuel sales) or an unusual expense item (empty warehouse built as a speculative venture) that alters the financial profile. Once this item is removed from the analysis, the profile looks normal.
- * CITY Vs. AUTHORITY : City-owned airports may move some expenses "offshore" by not detailing the true cost of intergovernmental services such as police and fire. Conversely, airport revenues may be directed to other city departments by contracting out airport concessions to the management of other city departments.
- * AIRPORT LIFECYCLE : The financial life of most air carrier airports centers around the terminal building . Since any new terminal is built to serve its citizens for a number of years, it is deliberately overbuilt for conditions on its opening day. Accordingly, expenses will appear high relative to revenue. As passenger traffic (and revenue) increase over time the airport's financial profile will grow into a normal condition. In later years, if the operation continues after the terminal is fully depreciated, total expense may appear low relative to revenues (although an "eyeball examination" of the facility will convince the investigator that a large reinvestment will soon be required).

STRATEGIC IMPLICATIONS

As stated earlier, airports are extremely capital intensive. Comparing the total assets of most U.S. airports (found on their Balance Sheets) to their total annual revenue (found on their Income Statements) produces a ratio that averages near 10:1 (\$10 in assets are required to generate \$1 in annual revenue). For comparison:

- * The Forbes 500 as a group average 2:1
- * Electric utilities as a group average 3:1

Another way to view this issue is to examine total assets to total employees. In this case, the numbers are approximately:

*	U.S. Public Airports : \$1,000,000/employee
Electric Utilities :	800,00\$/employee
Forbes 500 :	350,00\$/employee

On a more human scale, consider that it is not unusual for a small-hub airport to hold \$100,000,000 in total assets on its Balance Sheet. Compare this figure to the total assets of local banks, real estate development companies, or municipal governments and a better understanding of

capital intensive comes to light. This leads to these important implications:

- * Management of depreciation is extremely important. Many airport professionals concentrate on the management of cash flow; however, depreciation is a real expense even if it doesn't appear so in the short run. Many surplus World War II airports were caught short by collecting only enough revenue to pay for salaries, utilities, and supplies. When the runways and taxiways reached the end of their useful lives, the cost of rehabilitation was astonishing and the local aviation market was simply unprepared to pay the necessary fees and charges to cover this expense. As an additional note, it should be mentioned that inflation is especially ruinous to capital intensive industries.
- * U.S. airports significantly undercharge for the use of their assets. They are able to do so because much of their capital expense is subsidized, either through outright gifts (F.A.A. grants), exemptions to taxes (e.g. property taxes) or reduced-interest financing (tax-exempt bond market). If U.S. airports were completely privatized and these subsidies were taken away, average airport fees could double or triple, and the assets/income ratio might approach that of electric utility companies.
- * If an airport organization is planning large cuts in its expense base, it has to begin with its capital expense, usually debt service or planned construction. After debt is refinanced and construction rescheduled, the next prime expense to examine is personnel cost (sorry to have to say that). Third comes the power bill and fourth comes everything else. In other words, cutting the travel budget or closing the employee lounge may be useful to establish the tone of management's intent, but it will not significantly impact the bottom line.

USEFUL PARAMETERS

Recently, a study of airport financial statements was conducted in order to define the typical financial structure of U.S. airports. Of the busiest 108 U.S. airports (which collectively board 95% of all passengers), representative samples were selected and their annual financial statements analyzed. Following are median figures for selected financial parameters:

* Current Ratio:	1.7
* Average Age of Accounts Receivable:	27 days
* Long Term Debt per Enplanement:	\$75
* Debt to Equity Ratio:	1.3 to 1
* Total Assets per Employee:	\$1.3M
* Total Assets per Enplanement:	\$140

These results correlate closely with similar data found in government and private industry databases.

CHAPTER III: FINANCIAL MANAGEMENT AT AIRPORTS

Concept of Financial Management in Airports

In ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082, Section I, paragraphs 9-10) the Council of ICAO endorsed the application of principles of best practices of good corporate governance¹ for airports. With the aim of promoting transparency, efficiency and cost-effectiveness, airport management should apply best practices in operation and management in all areas of an airport regardless of whether it is owned and operated by the public or private sectors, and of whether or not it is profitable.

Paragraph 9, Section I of Doc 9082 recommends that, to ensure the use of best practices of good corporate governance of airports, States should consider:

- objectives and responsibility of the entities;
- shareholders rights;
- responsibilities of the board;
- role and accountability of the management;
- relationships with interested parties; and
- disclosure of information.

This would involve, for example, that airports recognize aircraft operators, passengers and others doing business at airports as customers who want to be satisfied that services are provided to an appropriate standard of quality, in a timely and cost-effective manner. The airport development plan should document a two-way exchange of information and an in-depth consultation process between the airport operators and the users showing the relationship between the quality of service, the level of investment, and the level of charges.

Transparent accounts, published on a regular basis, should enable costs, revenues and (where appropriate) subsidies and cross subsidies to be clearly identified. At airports where all non-aeronautical revenues are taken into account when calculating aeronautical charges (the so-called "single-till" approach, which is described in Chapter 4, Part F, paragraph 4.121), there should be no differentiation between the income and costs from the two sources. Subsidization of aeronautical charges should not be regarded as a substitute for bearing down on operating costs. Where it is necessary for wider public interest reasons to subsidize airport operations, from public funds or from revenues generated by other airports in a common system (an airport network), the accounting system should clearly show this.

The State should objectively assess proposals for investments against financial and broader cost-benefit analyses, including evaluation of social needs, impact on national or local economy, and environmental effects. Proposals should also reflect safety and security requirements. The possible role of government, at the national and local level, in defining these criteria should be acknowledged in the proposals.

In addition to the considerations, the airport could also apply principles of best practices in many other areas, such as: budgeting, bank and cash management, presentation of financial statements, measuring performance and productivity and benchmarking, service level agreements, economic pricing, collection of charges and concessions and rentals.

A service level agreement (SLA) is a tool by which airports and aircraft operators define the level of service and the terms of engagement or rules that will govern the airport/users relationship on the agreed services. Guidance material describing the objectives, characteristics, implementation aspects and the various possible forms of an SLA is included in Appendix 2.

Financial accounting refers to the system according to which revenues and expenses are recorded and summarized so as to present an aggregate financial picture of the provision of airport services. How elaborate and detailed the financial accounts are depends on the extent of detail required and the size of the airport concerned. It is, however, essential from the outset to ensure that all accounting procedures are applied in accordance with recognized accounting rules, standards or conventions. Good internal controls as well as external auditing are also important.

Financial accounts may also be supplemented by management accounts which apply accounting techniques for the purpose of assisting all levels of management in planning and controlling all the different functions and services at an airport.

The basic purpose of financial control is to ensure that the resources used to operate airports are spent in an effective, timely, reliable and accountable manner. This involves monitoring and controlling the provision of services in financial terms to ensure that the expenses and revenues incurred in a particular year are in accordance with a previously approved budget.

Financial control and accounting are of course interrelated, since management cannot exercise financial control effectively without having at its disposal the data provided by a sound financial accounting system. It is therefore essential that any procedure being established to provide financial control be accompanied by a thorough examination of the accounting system to ensure that the latter can adequately provide the financial data necessary for this purpose.

Financial control essentially involves three steps: 1) a comparison of actual revenues and expenses with those planned; 2) where the two differ significantly, a determination as to whether the cause lies within the budget itself, in the management of the airport or is the result of external factors outside management's control; and 3) what corrective measures need to or can be taken.

Any substantial divergence from the original budget for a major specific revenue or expense item may also call for a review of the forecast outcome, to determine the extent to which any other items and the overall financial situation of the entity providing the airport concerned are likely to be affected. This will be particularly beneficial in cases where the shortfall could ultimately affect the operating efficiency of the airport.

At the end of each accounting period, which as a rule covers a one-year period, the entries in all individual financial accounts are totalled for presentation in two complementary forms or tables, namely the income statement (also referred to as revenue and expense statement or profit and loss statement) and the balance sheet. The former summarizes all revenues and expenses arising during a specified period, with the difference between the two totals being either a profit or a loss. The balance sheet summarizes assets and liabilities at a point in time. The profit or loss for a period goes to retained earnings on the balance sheet and, together with the balance in other equity accounts, provides the net worth of the airport.

An income statement and a balance sheet do not identify the movements in assets, liabilities and capital which have taken place during the accounting period. A statement of cash flows should be prepared to highlight movements in cash flows for the period concerned. This statement also provides information on the entity's liquidity position (this is addressed in Chapter 4, Part A). It should be noted that a statement of cash flows, when provided for a number of years, is of particular relevance and assistance when financing is being sought, because it shows the changes in the cash position of the airport, and can thereby influence the size and terms of the loan or financing being sought.

Economic Performance Management

Performance management involves engaging in activities to ensure that objectives are consistently being met in an effective and efficient manner. Since airports employ considerable resources in their day-to-day operations, performance shortfalls can result in suboptimal use of airport facilities and in additional costs to their users and society as a whole. In contrast, the good performance of airports will have a positive impact on other members of the aviation community including ANSPs and regional planning entities.

ICAO's policies on charges in Doc 9082 (Section I, paragraph 16) recommend that States ensure, within their economic oversight responsibilities, that airports develop and implement appropriate performance management systems³. The need for an appropriate performance management system is independent of the organizational format of the airports. This is because the performance of an airport is more related to its governance than to its ownership and control structure.

Performance management is a systematic and iterative approach within an organization that consists of defining a strategy and executing it through the alignment of resources and behaviors, so that the performance of the airport improves over time. Performance management should be part of the business plan of an airport. An airport will generally implement a performance management system through a series of steps as outlined below:

- identify Key Performance Areas (KPA's);
- define performance objectives taking into account the interests of aircraft operators, end-users and other interested parties;
- select performance indicators (and supporting metrics);
- establish performance targets taking into account the interests of aircraft operators, end-users and other interested parties;
- create and implement a plan, in cooperation with other members of the aviation community, to achieve performance targets;
- consider, and where appropriate, provide performance incentives;
- periodically assess actual performance results by using benchmarking, as appropriate; and
- publish performance reports on the results achieved.

ICAO's policies on charges in Doc 9082 (Section I, paragraph 16) recommend that providers focus on at least four KPAs (safety, quality of service, productivity and cost-effectiveness), it being understood that States may choose additional KPAs according to their objectives and particular circumstances, and that they select at least one relevant performance indicator and its target for each KPA.

An important feature of performance management is the feedback loop. The performance management process uses the results of assessments of actual performance to periodically adjust KPAs, performance objectives, targets and plans to achieve results, as appropriate.

In setting performance monitoring targets, the airport should consider the interests of various types of users, including end-users. As individual parties tend to have different expectations, opinions and priorities, the airport needs to adopt a process that seeks to reconcile these differences insofar as this can be done. However, in many cases there may be mutually exclusive requirements. Where differences cannot be reconciled, the airport operator should prioritize in the interests of current and future users (i.e. consider dynamic as well as productive efficiency) to ensure that adequate and appropriate provisions are being made in this regard. The regular consultation process with users, as outlined in Chapter 1, should include the presentation of performance monitoring results.

It is also important to recognize that a number of entities, such as approach/aerodrome control services providers, aircraft operators, ground handlers, catering companies, fuel suppliers, customs agencies and security companies, generally have a role in the aeronautical and/or non-aeronautical activities at the airport. All such entities contribute to the overall performance of the airport. As part of its role as manager and operator of the airport, an airport should, through the use of service level agreements (SLAs) and incentive/penalty systems, ensure that the various entities perform their functions in such a way as to optimize the outcome from the perspective of the users, including end-users.

There is no single global, all-encompassing application of the performance management process, but many simultaneous — and often interrelated — applications at more specialized and localized levels. The level and complexity of an appropriate performance management system depend on various factors, including the size of the airport, the nature of its customer base, the degree of competition between airports and their position in the market, the costs and benefits related to various options, and the legal, institutional and governance framework. It is important to ensure that the introduction of such a system will improve overall service quality from a customer perspective, and not artificially skew the business by seeking to optimize specific indicators.

Airport performance is frequently discussed in relative terms, which can be internal or external. Internal performance measurement means considering an airport's performance against itself over time (internal benchmarking, or self-benchmarking). External comparisons involve comparing airports with one another at a single point in time and through time (external benchmarking).

CHAPTER IV: PRICE REGULATIONS& AIRPORT CONCESSIONS

PRICE REGULATIONS

Introduction

Traditionally, airports have, rightly or wrongly, been perceived as monopolies. As such, airport with private governance structures may be subjected to price regulation to protect their customers from overly high prices due to the exercise of potential market power. Typically such regulation controls only the price of aeronautical and non-aeronautical services offered to their customers.

This section lists alternative models of regulation. It covers not only traditional forms of regulation but also incentive, trigger and self regulatory forms.

There are four main types of regulation:

- Rate of Return Regulation
- Cost of Service Regulation
- Price Cap Regulation
- Intervention Regulation

Each of these is discussed in turn, along with two other regulatory options: self regulation and regulation by contract. First, a general discussion of the types of airport charges is provided.

Types of Airport Charges

Aeronautical versus non-aeronautical fees

Airports have two broad categories of costs: aeronautical and non-aeronautical. Aeronautical costs are those associated with providing a) runway services, and b) terminal services for ticketing and boarding passengers. Non-aeronautical costs are those associated with other terminal services, commercial land development, etc. Airports charge fees to carriers and other users for the provision of these services.

At most airports, separate accounts are kept for aeronautical and non-aeronautical cost categories. There are several reasons for this. One is that industry conventions require that fees for aeronautical services, such as landing and terminal fees, cover no more than their respective costs. In the United States, the Federal Aviation Act provides for regulations which enforce this provision. In most other jurisdictions, it is industry convention (strongly enforced by the countervail power of air carriers) embodied in policies of ICAO, IATA and ACI which recommend that aeronautical fees be no greater than cost. Further, these policies recommend that carriers be consulted prior to implementation of any fees.

Typical Airport Charges

While each airport differs somewhat, most will assess the following types of fees and charges.

- *Landing and parking fees.* These are fees for use of the runway and other surfaces. Most airports charge fees based on the weight of the aircraft. Heavier aircraft pay more both because of the greater weight and because the fee per tonne of landed weight itself is often higher. In Canada, it is common for airport to have three “weight classes,” with the highest class capturing almost all jet aircraft. Landing fees are paid by passenger airlines, cargo airlines and non-commercial aircraft.
- *Terminal Fees.* These are fees for use of the “common areas” of the airport terminal, such as boarding gates and queuing space in ticketing areas. These fees are typically assessed on the basis of the number of seats on the aircraft. A few airports assess fees based on the number of on-board passengers, but this requires more detailed data collection. Only passenger carriers pay terminal fees. Cargo carriers and non-commercial users do not require terminal services. Other Terminal Fees. Some airports will have additional charges for terminal services. For example, the Vancouver International Airport has a “turn around fee” charged only to those carriers who use the transborder customs facility. This fee allows for cost recovery for space and facilities.
- *Security Charge.* Prior to transfer of airports to private operators, security services were provided at no charge by government security services. After transfer, these services were withdrawn and airports were required to provide their own security services. Most airports instituted a fee on air carriers to recover these costs. Generally this is a cost per seat or a schedule of fixed fees based on type of aircraft.
- *Emergency Response Fee.* A few airports have separated emergency response services costs into a separate category and assess a separate fee.
- *Airport Improvement Fees.* These fees are assessed by not-for-profit airport authorities on passengers. These fees do not have direct costs associated with them. Instead they are fees intended to generate cash current with or in advance of construction projects. While airport accounting practice varies somewhat, these fees are not generally considered to be aeronautical fees.
- *Commercial Fees.* These are charges for a large variety of non-aeronautical services. They include fees for space rentals for commercial activities, airline business class lounges, fees for advertising and other displays, land rentals for cargo and maintenance facilities, fees for provision of network/phone/electric services, curb use fees for commercial transportation vehicles, etc.

Scope of Price Regulation

Having described types of airport charges, I now turn to regulation of airport charges. In most jurisdictions in the world, only aeronautical fees are price regulated. Commercial services are considered to be provided in markets which have a degree of competition and thus regulation is not necessary. In Australia and New Zealand, for example, airport services are divided into contestable and non-contestable. The latter primarily embraces aeronautical charges. Court cases have tested the boundaries of what is and is not contestable, and have generally upheld that non-aeronautical services do not require price regulation.

Rate of Return Regulation

Historically, this has been the type of regulation used for privately owned electric and telecommunications utilities, as well as for pipelines. A firm is allowed to set prices so long as the overall corporate rate of return on the shareholder's capital investment does not exceed a "fair" rate of return. As the firm cannot set prices too far above economic costs it cannot exploit its monopolistic position.

In practice, utilities spend considerable effort with the regulatory process. There are two main areas of dispute. The first is what constitutes a fair rate of return. While initially this was a source of much debate, most regulators have set reasonable rates of return recognising the debt-equity ratio of the firm, the underlying riskiness of industry financial performance and what return is required to attract and sustain equity investment.

A second area of dispute is determining the capital investment. A major concern is whether capital investment is to be measured in historical costs versus replacement costs. The record in practice is a lack of consistency. Some industries and countries allow use of replacement costs while others do not.

Another second major concern involves whether new capital investments will be "allowed" into the "rate base." A utility would not want to invest several billion dollars in capital only to find that the regulator felt it was not necessary and thus a return on that investment not being allowed. Thus regulators are requested to approve all capital investments prior to the utility company's commitment of financial resources. This regulatory form is complex, unresponsive, and expensive. Any time the airport operator wishes to change a charge or fee, a detailed regulatory application must be developed and submitted.

An interesting twist is that some economists believe that over time the regulatory agency is captured by the utility. The concept is that over time the regulated spends so much time educating the regulator that the latter comes to adopt the "religion" of the utility company. The utility thus receives favourable decisions on a consistent basis.

Cost of Service Regulation

Historically, this has been the regulatory type used for airlines, rail and other transportation carriers. This is a much more intrusive regulatory format, as the regulator must approve every price change and, in some cases, service decisions.

As applied to transportation carriers, approval of each price change requires documentation of cost increases. If the carrier can demonstrate that its costs have risen, then the requested price increase is approved.

In practice, regulators are good at examining documentation of price increases, but poor at discerning whether the cost increase was required or not. Carriers were often able to pad costs or

over-invest without effective constraints on prices they could charge. It was somewhat like having an unlimited expense account: if you could produce a receipt, you would be reimbursed. Regulatory economists generally have been of the view that cost of service regulation results in inefficient (high cost) operations by carriers. Deregulation was largely concerned with restoring cost efficiency pressures to those industries.

This regulatory form is expensive, unresponsive to changing market conditions, and at least in the view of some economists, has not served consumers particularly well.

Price Cap Regulation

In the past few decades, a new set of approaches toward price regulation have arisen. These attempt to provide an effective discipline on firms with monopoly power, but at a lower regulatory cost, and in a form which preserved incentives for firms to be cost efficient.

The most widely known, and now widely adopted regulatory type is price cap regulation.²³ This format has two dimensions. The first is the cap itself. The format allows a firm to increase prices whenever there is inflation or an increase in costs. Prices can be increased up to the cap. Usually the cap is set at inflation, less a provision for efficiency gains expected to be achieved by the firm. This is usually shown as $CPI-X$ or $RPI-X$, where CPI stands for the consumer price index (or retail price index, as it is called in the U.K.) X represents efficiency gains. Most firms become more efficient at what they do over time. Thus even if your unit labour costs rise, because fewer labour hours are required to produce the same output, you don't have to increase your prices as much as the inflation rate.

The second dimension of price cap regulation is the price basket. The price cap does not have to apply to all goods the firm sells. Some goods are allowed to have greater price increases than the cap – provided other goods have price increases under the price cap. It is only the average increase in prices of all goods in the “price basket” which must not exceed the price cap. This allows the firm considerable flexibility to change prices within its product or service line without the need for regulatory approval. It enables desirable long term shifts in relative prices of different services which cost based regulation might prevent.

Price caps have typically been set for periods of time such as 5 years. Once every five years, the regulator does an audit and review. It then sets a new price cap for the next five years. Thus the firm is free of regulator proceedings and costs for a considerable period. So long as the firm stays within the cap, it is free to change prices at will.

This regulatory method is low cost for both the firm being regulated as well as the government regulator. It provides a high degree of flexibility for a price regulated firm. It also provides incentives for innovation and efficiency. If the firm figures out a way to lower costs, it is not forced to lower its prices until the next five year review. The review process also recognises the need for above inflation price increases to cover the costs on new capital investment negative. Second, industries and the conditions of competition changed. In the rail sector, for example, the emergence of competition from trucking and publicly financed roads removed much of the market power of rail carriers. Third, some economists believed that in the long term regulatory capture took place, leading to regimes in which regulation served producers and not consumers.

Two popular versions of the price cap approach in use at various airports around the world are the single-till price cap and multi-till price cap.

Single-till price cap. In this version, all airport activities are included together when applying the price cap. This includes activities for which the airport operator faces competition as well as

activities which are non-contestable. Effectively, any gains made in contestable activities must be transferred in full to the aeronautical users.

The strictest version of this regulation is referred to as residual pricing and incorporates the costs and revenues of all of the airport's activities. Total operational costs, both aeronautical and non-aeronautical, are subtracted from the non-aeronautical revenues. The difference, or residual cost, is then divided by the number of aircraft landing units yielding the aeronautical fee. With residual pricing, all gains accrue to aeronautical users (removing all incentives from the airport operator), and all financial risk of operating the airport is shifted to the aeronautical users, with the airport company bearing little risk.

Multi-till price cap: Under the multi-till approach the aeronautical areas of airport operation are not subsidised by the non-aeronautical sources of revenue. This retains incentives to develop commercial activities at the airport, and more consistent with economic principles in congested conditions. This model is not favoured by the airlines as it generally results in higher charges

Trigger Regulation

This is a regulatory format which relies on the threat of regulatory intervention to constrain monopolists from unfairly increasing prices. With trigger regulation, the government has a power to intervene and set prices. However, there is no exercise of the regulatory powers until a complaint is received and determined to require a response. The concept relies on firms "behaving themselves", knowing that unreasonable price increases would not be allowed.

There are considerable advantages of this regulatory format. Neither the firm or the regulatory incurs costs of regulatory procedures (unless the trigger is pulled). The firm has considerable freedom for setting and changing prices. The firm has incentives to be efficient, as it is able to keep all or a portion of its efficiency gains.

Typically trigger regulation will have some provision to prevent indiscriminate use of the trigger. Some variations on this are:

- There are minimum and costly application requirements. This prevents nuisance complaints.
- If the regulator finds for the target firm, then the applicant who had invoked the trigger pays for the costs of the regulatory procedure.
- Final offer arbitration is used. The applicant must submit their best proposal for what the price should be. The defendant then has time to respond. The arbitrator can only choose one of the "offers", and cannot "split the difference. Here the applicant could end up with nothing.
- The applicant must show material harm before the application will be considered. This prevents use of the trigger for minor disagreements on prices.
- The applicant must show "public interest", a costly burden.

Self Regulation

Here the industry or firm adopts a set of standards or code of conduct which is acceptable to customers. Provided the firms stays reasonably within the code, customers will neither dispute price changes or pressure governments for a regulatory regime.

This is the most flexible and least costly regulatory mechanism. The challenge is to find a set of standards which the customers find acceptable yet provides the firm with the required flexibility. As well, for this to be effective, all firms in the industry must discipline themselves to adhere to the code, otherwise the one exception runs the risk of inducing a formal regulatory regime.

Airport pricing guidelines by ICAO and ACI are examples of codes which can be used for self regulation. (These specify, for example, that prices must be based on costs.) The ICAO/ACI price guidelines are very powerful in that they have become convention throughout the world. Deviations from these principles are rare. In part, this is because air carriers have strong interests in seeing that all airports adhere to the cost based principles contained in the guidelines. An airport which deviates is the target of massive pressures from the airlines collectively in order to ensure continued worldwide compliance with the principles.

Airlines have significant countervail powers vis a vis airports. They are, for example, able to delay or deny payment. Often, airlines have veto powers over airport capital programs. In the US, the bond guarantees provided by the airlines give them veto over capital programs through majority-in-interest clauses. In Canada, many airports have entered into agreements with air carriers (through the Air Transport Association of Canada) for collection of airport improvement fees (AIFs) on airline tickets. These agreements give carriers initial veto power over airport authority capital programs, which allow delay of capital programs by up to 3 years. In fact, the countervail power of the air carriers is so strong that when Air Canada and Canadian merged, the Competition Bureau required that the AIF veto powers be reduced so as to prevent a single carrier from controlling airport capital decisions.

Regulation by Contract

An often overlooked mechanism for constraining monopoly power is by contract between the firm and its customers. This type of “regulation” is possible where a firm has a small number of customers, and these customers are able to enter into a long term contract. Airports may be excellent candidates for this type of relationship. Many airlines enter into long term contracts for terminal services or usage. The approval process for major capital programs and their accompanying changes to rates and charges provides an opportunity to enter into long term contracts regarding rates and charges.

The concept here is that airport users (airlines) enter into contracts with full knowledge of the economics and dynamics of the industry. If a customer freely enters into a long term contract with a service provider, then that contract would normally contain pricing provisions which would prevail for the duration of the contract. Typically these will include provisions for cost adjustments.

In such cases, there is no need to protect the customer by imposing a government price regulation regime. The same end is achieved by contractual agreement.

Price Regulation of Airports: Practice

Price Cap Regulation in the U.K.

The United Kingdom has been the earliest and strongest user of price cap regulation for a whole range of industries. When the British Airports Authority and Manchester Airports were privatized in 1987, price cap regulation was immediately applied to their activities. Note that for BAA separate price caps are established for each airport.

Smaller airports in the U.K. are subject to trigger regulation. At present they are unregulated. However, upon complaint or on the initiative of the Government, the price cap regulation regime may be applied. Currently there is some consideration of extending regulation to some of the smaller airports.

The UK regulatory regime for airports is characterized by the following:

- A regulatory determination is made once every five years, at the beginning of the five year period. Once the determination is made, airports have complete pricing freedom, provided they stay within the cap.
- The regulatory determination is a public process conducted by the Monopolies and Mergers Commission (now the Competition Commission). Any interested party may make representation to the MMC.
- The MMC makes recommendations to the Civil Aviation Authority. It is the CAA which actually regulates the prices of the airports. The CAA may accept, reject or vary the MMC recommendations. In practice, the CAA has made some variations in the MMC recommendations.
- The price cap is set at the Retail Price Index less an adjustment for productivity. In recent years, the productivity adjustment (the X in RPI-X) has been quite large and exceeds the inflation rate. This results in a requirement for the airports to lower prices.
- At the five year review the airports are allowed special price increases to deal with a) new capital and b) other extraordinary items. Thus when a new terminal or runway is planned, the CAA allows the airport to increase its prices above RPI-X to reflect the increased cost of the new facilities. An example of an extraordinary adjustment is an upward adjustment in prices to compensate BAA when intra-Europe duty free sales is no longer allowed.
- The price cap only applies to airfield and terminal charges. Retail, land rents, etc. are not regulated during the five year period.
- However, when the five year reviews are done, non-aeronautical revenues are considered. This means that during the five year period, the airport company is free to charge what it will for concessions, parking, etc., and it is allowed to keep any and all profits. At the end of the five years, if non-aeronautical revenues have grown, then there will be a downward adjustment in aeronautical fees for the next five years. In other words, non-aeronautical fees are never regulated, but if they are profitable, once every five years landing fees will be reduced by the amount of increased profits from non-aeronautical activities.
- There is no regulation of the prices of BAA subsidiaries. BAA has entered into a wide range of businesses via subsidiaries, including purchasing and developing off airport land, investing in and/or operating other airports, consulting, etc. Here is an example: in October 1997, the CAA made its ruling on the price cap for Manchester for the third 5-year period (1998-2003):
- airport charges are limited to RPI-5% in each of the next five years
- this was computed as RPI-11.5% but with an offset of 6.5% per year for the loss of intra-EU duty free sales. This was a slight variation from what the MMC recommended. (MMC recommended RPI-6.6% for first year and RPI-5 for years 2-5).

A final comment: during the MMC five year reviews there are large numbers of submissions. A frequent theme is “lack of consultation”. This has been dealt with by requiring the airport companies to submit a report to the CCA every year on consultations.

Revisiting Price Cap Regulation for Airports

In the recent past, a number of eminent transportation economists have been calling into question the desirability of price cap regulation at airports. The debate was stimulated by Michael Beesley. As the economic advisor to the government of Margaret Thatcher, Beesley played a key role in the design of the privatization of airports in Britain and establishment of the accompanying price cap regulation regime. In 1999, Beesley claimed that he had reconsidered price cap regulation of airports and concluded that it was distorting the market and providing seriously incorrect price signals.

David Starkie, another prominent UK transportation economist, undertook to study the matter and has recently published a major peer reviewed paper on the subject. Starkie too concludes that price cap regulation, as applied in the UK, is bad economics and undesirable.

A key to understanding the alleged perversions of price cap regulation in the UK is the use of the single till approach, which is reviewed every 5 years. The London airports are required by the single till to reduce their charges by the amount of commercial (non-aeronautical) revenues earned. The consequence is that prices to airlines at these airports have declined continuously. So strong has been the price decline, that it is expected that at the next review landing fees could be ordered to be set at zero.²⁸ But London Heathrow and Gatwick are two of the most congested airports in the world, especially the former. A zero price for use is the wrong price signal to give to carriers at a severely congested facility. This is very bad economic policy.

Both Beesley and Starkie conclude that prices at the London airports should be rising with congestion, not declining. The issue then becomes one of whether an alternative pricing approach should be used, such as dual till. With dual till price regulation, the airport operator is limited in how high its aeronautical fees can rise based on inflation and productivity, but there is no “give back” of non-aeronautical revenues earned. These revenues are considered to be provided in competitive markets and thus do not need to be regulated.

Starkie, however, investigates the economics of airports further. He observes that the degree to which non-aeronautical revenues can be earned is primarily dependent on the number of airport passengers. The economic model he puts forth is one of casual complementary demands. The demand for non-aeronautical service offerings depends on the demand for aeronautical services, but not vice versa. If the quantity demanded of the latter can be increased (i.e., if there are more passengers using the airport) then demand for non-aeronautical services (such as parking, food/beverage/retail, land development for airport services such as catering, etc.) will increase proportionately.

Starkie says that airports have natural incentives to stimulate aeronautical demand, in part by constraining their aeronautical prices. Regulation is not needed.

Starkie then looks at the issue of whether rents can be earned. He distinguishes the two broad types of rents: those arising from monopoly exploitation and those arising from increasing land values. The former are regarded by economists as undesirable while the latter are desirable (as they reflect increasing productivity and value of the land). An operator who undertakes conduct which increases the level of non-aeronautical airport traffic is creating land rents. The only issue is who reaps the land rents: the landlord, the operator (if different from the landlord), the airline or the passenger. But this is an issue of the distribution of income and not one of economic efficiency. Economic regulation of industries arose as a remedy for addressing economic inefficiencies, and was never intended (and is not suitable for) addressing income distribution issues.³¹

The solution put forth by Starkie (and by Beesley) is that airports in the UK should no longer be price regulated.

AIRPORT CONCESSIONS & ITS IMPACT ON REVENUES

Many airports rely on their concessionaires in order to generate a significant part of their non-aeronautical revenues. The aim of this paper is to identify the principal features of airport concessions. In order to achieve the above aim, the paper is divided as follows. First an overview of the airport operating revenue sources is detailed. This provides the context for following section which outlines the factors influencing concessions revenues. This is followed by a detailed examination of the process for successful letting of concessions and various contract terms. The

fourth section analyzes the example of Dubrovnik Airport with regard to various components of a contract between the tenant or lessee and the airport authority. The survey consists of data that was gathered via an interview with airport legal services adviser in December 2007 at Dubrovnik Airport. Finally certain conclusions emerging from the previous mentioned sections are drawn.

Airport Revenue Structures

Traditionally commercial issues have been a peripheral concern to the needs of aeronautical operations. The aim of the airport authority has been to process passengers as quickly and efficiently as possible. However, two different approaches must be emphasized, the traditional view of an airport, i.e. that it exists to ensure the efficient movement of passengers between one destination and another, and an alternative approach, which views airports within a broader framework of economic change and commercial opportunity. This change of emphasis represents one of the most significant contemporary developments to affect the industry.

The so -called “commercial-oriented airport approach” suggests that the airport evolves to become a more sophisticated market entity that may be described as “multipoint service-provider firm”.

The capital required to develop and maintain an airport is generated from two sources: aeronautical charges and non-aeronautical or commercial revenues (Table 1). Aeronautical charges are levied on airlines by the airport operators for using their facilities and include landing and apron charges and passenger fees.

Table 1.

Airport operating revenue sources

Aeronautical	Non-aeronautical
Landing fees	Concessions
Passenger fees	Rents
Aircraft parking fees	Direct sales (shops, catering and other services provided by the airport operator)
Handling fees (if handling is provided by the airport operator)	Car park (if provided by the airport operator)
Other aeronautical fees (air traffic control, lighting, airbridges etc.)	Recharges (for gas, water, electricity etc.)
	Other non-aeronautical revenue (consultancy, visitor and business services, property development etc.)

Over the last two decades, the trend has been for commercial revenues to grow at a faster pace than aeronautical revenues, as European airports have greatly expanded their retailing outlets, as well as other service offerings.

Factors Influencing Concession Revenues

Concession in its original context means the payment that the airport authority charges the owner or manager of an operation to conduct commercial activities in the airport, whereas rent or lease refers to the right to occupy certain defined premises or a specific area of realty. In general, however, concessions confer all commercial activities to sell goods and services in the airport, and sometimes the meaning of concession, rent and lease is used indiscriminately.

Currently, most airports all over the world are striving to generate more concession revenues. Therefore, it is very significant for every airport to bear in mind the principal determinants of concession performance.

These include the following:

- total traffic handled by an airport,
- total amount of space allocated for retailing and other commercial activities,
- characteristics of passenger traffic and buying behaviour of those passengers,
- operations and management of concession,
- characteristics of contract and rental fees,
- marketing strategy
- pricing strategy.

In practice, many airports use concession revenues to cross-subsidize aeronautical operations. The common explanation for the phenomenon is that airports appear to face a constraint on aeronautical charges either because of airline opposition to increase in aeronautical charges or because their own governments hold back or limit such increases.

Selection of Concessionaires and Contract Terms

As previously mentioned, concession revenues are those generated from non-aircraft related commercial activities occurring within terminals and on airport land. Concession business includes running or leasing out shopping concessions of various kinds, car parking and rental and banking and catering, with terminal concessions and car parking and rental being the most important of these. Many airports generate a much higher proportion of their income from concession activities than from aeronautical operations.

Typically the concessionaire pays a fixed rental, plus additional income to the airport once a predetermined profit or turnover level has been reached by the concessionaire. Some agreements, usually those devised by the airport to encourage increased retail presence, are entirely based on the profit/turnover of the concession. These agreements can vary from outlet to outlet at the same airport depending upon location, nature of business, forecast turnover and whether or not the outlet is new.

The process for successful letting of concessions is summarized as follows:

- develop portfolio strategy,
- define market strategy for each concession,
- determine space and location requirements,
- proactively market the airport to potential concessionaires,
- prepare design concepts and specifications for contracts,
- tender/negotiation/selection process,
- monitor and review concessionaire performance,
- work with concessionaires on improvements and redevelopment.

Like average aeronautical charges, average concession revenues per passenger decline with volumes. Concession revenues per departing passenger are lower at hubs, probably because of a high share of connecting passengers, who do not consume rental car and parking services. More concentrated airports make less concession revenue per passenger, possibly because vertical relations imply that a bigger share of such revenues accrues to airlines.

The duration of each concessionaire agreement and the financial conditions attached to each will vary by airport and retailer. It is unusual to have specified rentals for different parts of the terminal and unlike the majority of concessionaire contracts in the domestic market, rent reviews are uncommon over the duration of the contract. The length of the contract is dependent upon a number of criteria. One of the most important is the level of investment required from the retailer. If little investment is required then a contract is often short term. If any significant level of investment is required from the retailer then a contract of five years would be considered the minimum.

The following section examines various components of a contract between the tenant or lessee and the airport authority using the example of Dubrovnik Airport.

The Case of Dubrovnik Airport

Dubrovnik Airport is located approximately 20 kilometers from Dubrovnik city centre. It is a secondary airport and in 2007 handled 1,143,168 passengers from a mixture of scheduled, charter and low-cost services. In terms of total passenger volume, with 1.1 million passengers it ranked third amongst the ten international airports in Croatia in 2007. The main scheduled airline is Croatia Airlines, the country's major flag carrier. Dubrovnik Airport is 55 per cent owned by the state, with the remaining 45 per cent divided between different levels of local authority.

Dubrovnik Airport is the example of an organization focused on maximizing commercial revenues. The commercial department has different sections with the staff of various disciplines. It is responsible for renting out of office spaces, cargo areas, warehouses, retail services (advertising, car rental, banks). Still, there are some important features to be pointed out. The trade and catering manager is in charge of retail operations, while the general services department is concerned with promoting and marketing the airport. Although not all commercial activities are under the aegis of commercial department, as one would expect, there is a strong relationship among departments, in particular between the commercial and general services

The primary source of information for the following illustration was the interview undertaken with the legal services adviser of Dubrovnik Airport in December 2007. According to the airport legal adviser, with regard to the components of the contract concluded for airport concessions, different strategies have been implemented by the commercial department depending mostly on the concession purpose and the location of the facilities (Table 2.).

Components of the contract	Features
Contract type – concession fee	Fixed Percentage of the total annual sales Mixed method of the minimum guaranteed rate and percentage of the total annual sales Number of passengers in arrival/departure/domestic/international/total
Contract period	1-5 years
Recontract type	Priority to the existing operator Open and competitive bid
Recontract period	Same as previous contract period Less than previous contract period More than previous contract period

This issue is very much affected by the Airport's ownership structure that made it obliged to act according to the Croatian Law on Lease which sets special rules for the certain types of the business lease, for example, offices, office buildings, garages and garage parking place. Open and competitive bids procedure is a legal procedure in the above cases and public tender has to be issued. An initial fee is usually set as a minimum fee that has to be offered by tenderers. In other cases of lease, for example, advertising for posters, light boxes, the lease contract is regulated according to the Croatian Law on Obligations.

With regard to contract type, four above mentioned approaches are used. In applying both the minimum guaranteed rate and the percentage of sales methods, the airport compares two figures, and then requests for the higher of the two.

The contract period is generally known to be 3-10 years for duty-free shops and food and beverage stores, and 5 years for retail and convenience stores. The airport legal services adviser indicated some details of the contract period, i.e., 1 year for the parking contracts, for the rent-a-car and travel agencies and 3-5 years for the office lease, food and beverages and retail.

Whatever the length of the contract period it is important, if an airport aims to maximize concession revenues, that no contracts are renewed automatically on expiry.²⁰ With reference to recontract type, it is worth pointing out that special priority is given to existing operator. As a matter of fact, according to the Croatian Law on Lease, the lessor is obliged to offer the existing lessee renewal of the contract 60 days the latest before the contract expires, under the same or different terms provided that lessor had settled all debts to the airport. The airport adviser also emphasized that that stipulation referred only to the facilities described as business lease in the mentioned Act so it didn't apply to the outside parking lease, for instance.

Finally, in the case of recontracting, the new contract period can be the same as the existing contract period, as well as shorter or longer than the current one. In conclusion, it is accurate to underline that the performance of the contract strategies within airport concessions has become of crucial importance in the generation of commercial revenues.

Conclusions

In this paper, a few points have been made. A perception of airport concessions cannot be separated from the wider developments occurring within air transport industry.

First, it is important to focus attention on commercial activities of an airport in such a way that these activities are given the importance they are worthy of, since they may be bringing about very high percentage of an airport's total revenues. This is reasonable, and significant, due to the fact that many airports generate a much higher proportion of their income from commercial activities than from aeronautical operations.

Second, given the role that commercial activities play in the revenue generally, and concessions in particular, the contract strategies of airport concessions remain of vital importance.

Third, the majority of airports have some form of concession arrangement and the generation of revenue by this method is regarded as one of the most widely accepted forms of commercial contract. Airport management must be aware of the fact that the fee revenue from the concessionaires is a field over which it has ascendancy through the contractual agreements that it enters into for its concessions. Consequently, the procedure used in choosing concessionaires has considerable influence on airport's commercial revenues.

CHAPTER V: AIRPORT NETWORK COMPETITION

Challenging the Traditional View: Competition Between Airports

The traditional view is that airports are natural monopolies. If this were true, then there would be little an airport can do to create new demand for airport services or to divert demand from other airports.

This view is incorrect. There are many markets where airports provide services in competitive markets, and when taken collectively, for many airports the majority of their services are in competitive markets.

Connecting Traffic. At most major airports, 35-50% of total traffic is making a connection. For almost all connecting traffic there are alternative connecting points. A traveler flying from Los Angeles to Nepal can get there via Singapore (and other Asian connecting points) or London (and other European points). A traveler from Albany to Los Angeles can get there via New York (LGA), Chicago, Detroit, etc. A traveler from Lansing to Des Moines similarly has a choice of connecting hubs. A very large percentage of the small and medium sized communities in the U.S., Canada, Australia, New Zealand, etc., are served by more than one airline, and in many of these cases, the competitive service is via alternative hubs. In Canada, there are choices as well. A traveling from Winnipeg to London may utilize a direct seasonal charter service, a connection via Toronto, or a Connection via Minneapolis. A traveler in Penticton may get to Toronto via a connection in Vancouver or in Calgary.

Cargo Traffic. Cargo traffic, often comprising up to 15% of an airline's or airports traffic base, is also competitive. Today, much of the courier traffic to the Greater Toronto region flies to the Hamilton Ontario airport, and is trucked to/from Toronto. The private sector Alliance Airport outside of Dallas is yet another example. If cargo rates for direct service from Tokyo to Amsterdam are too high, or if capacity is limited, then the cargo can be flown via Hong Kong, Vancouver, San Francisco, etc. Air cargo is notorious for being "gateway competitive", and airports must view much of their cargo traffic, even O-D cargo traffic, as being subject to competition.

Surface Diversion to Other Airports. Residents of London Ontario are within driving distance of airports in London, Windsor, Hamilton and Detroit. Should local air services be limited, prices too high, or the airport experience undesirable, then the travelers will either drive or bus to the bigger airports. Interestingly, Milwaukee had recently taken to calling itself "Chicago's third airport", a clear indication that it perceives airport traffic as having some competitive opportunities via ground transportation.

Prior to Canada-U.S. open skies, Vancouver (YVR) had only a single authorized air route to the U.S. east of the Rocky Mountains. A consequence was that roughly one-half of the total Vancouver-U.S. market was traveling by car or bus to the Seattle-Tacoma airport (SEA). This was a trip of roughly 3.5 hours (plus an uncertain border crossing). The superior service (at that time) out of SEA resulted in a major competitive diversion of traffic from YVR. Open skies has dramatically changed that traffic pattern. Non-stop services out of Vancouver have allowed it to recover the surface diversion, and no longer are DC-10s operated on the 25 minute SEA-YVR route.

Diversion to Other Modes. The opening of the TGV (train a grande vitesse) resulted in a major loss of traffic, both for the Paris and Lyon airports *and their air carriers*, on this primary route. The success of price and service competitive Southwest Airlines in diverting traffic from auto/bus to air is a reverse example of the competitive impact of other modes.

Destination Competition. Airports even compete in some types of destination markets. Nice and Marseilles compete as to which airport will be the port of embarkation for Western Mediterranean cruise ships. Similar levels of air service are available. Cruise line decisions as to embarkation point will often depend on factors such as how well integrated the airport is with the port. To improve its competitive position, its new international terminal is the first in the world designed to incorporate cruise ship logistics right into the airport process. Further, the airport has developed common use check-in facilities at the various cruise ship terminals, to better facilitate returning cruise passengers.

Yet another example of destination competition is in the convention market. Convention planners consistently rank air service to a community as one of the top two criteria in choosing a site for a convention. Through programs of air service development, airports can have effects on convention locations. Canada-U.S. open skies has had a major impact on a number of cities on both sides of the border in developing convention business.

Retail/Food/Beverage. The one area where many would claim airports have a monopoly is in retail/food/beverage service. After all, if a passenger is in airport for a few hours and gets hungry, it is unlikely that he or she will take a cab into town to purchase a meal. However, careful market research reveals that this view of airport retail markets is naive. Surveys conducted at airports reveals that the average passenger in the terminal is an airport patron roughly five times per year. These repeat customers come to know what products and services are offered at the airport and what prices are charged. Further, these passengers engage in planning.

Consider an example. A business executive working downtown has a 1:30pm flight. He or she faces a decision as to whether to a) get a bite to eat downtown prior to going to the airport, or b) go to the airport a bit early, check-in, then get some lunch. This decision is made knowing what prices are charged, what types of food are available, etc. A diabetic would plan to eat downtown if they are not aware of any healthy food choices at the airport. “Rip-off” prices induce travelers to plan ahead and eat prior to coming to the airport. Even connecting passengers have choices. At the Vancouver Airport, for example, it was discovered that connecting Japanese business travelers do make choices of connecting airports based on prices of duty free cognac and availability of Japanese food.

The success of the British Airports Authority (BAA) and others with “street pricing” underscores the competitive nature of airport retail/food/beverage. This pricing policy requires retailers to charge no more for goods and services at the airport than they do at outlets elsewhere in the city. The policy resulted in a dramatic increase in sales and greater profits for BAA. If the market for retail/food/beverage were in fact a natural monopoly, then the former (very high) airport prices should have generated the maximum profit possible. Street prices should have resulted in lower profits. The fact that profits increased must imply that the market is competitive.

In the vernacular of the economist, the success of street pricing in increasing revenues and profits unambiguously shows that the retail/food/beverage markets have elastic demands. Monopoly prices are always in the inelastic range of consumer demand, and reducing prices must lower revenues and profits. The increase in revenues and profits when BAA lower prices for food/beverage/retail proves that these are not monopolies, but rather are competitive with other choices that travelers can make. This is an excellent case of how incorrect theoretical reasoning (airports as monopolies) led an entire industry (airports) to adopt uneconomic pricing policies with the consequence that profits and revenues were lower than was possible.

Conclusion: Airports operate in some competitive markets. Putting these points together, I argue that airports provide services in many markets which are competitive. While there certainly are some airports and some services of all airports which leave no other choice for a traveler, there are airport services which are demonstrably subject to competition. For many airports (and especially for the largest airports) connecting and cargo traffic comprise over half the economic base of the airport and these are clearly airport competitive services. Even large segments of the retail/food/beverage services are subject to significant competition.

6.2 The Four P's of Marketing

Now let us turn to the issue of marketing. Students of programs in business administration are taught the four P's of marketing:

- Product
- Price
- Promotion
- Physical distribution

The first area of marketing is defining the market to produce and sell. For an aircraft manufacturer, this might entail the decision as to whether to produce a stretched longer range version of the 747 (Boeing), whether to produce any future large aircraft at all (McDonnell Douglas), whether to offer a complete family of aircraft products (Airbus), or whether to produce aircraft which utilize "western" engines (Tupolev).

Price is the second dimension of marketing. Here the marketing decision is made as to what price the chosen products will be sold at, or alternatively, what price segments of the market to pursue. Pricing too high could result in loss of sales to less expensive products which are reasonable substitutes. For example, if a burger chain prices too high, it may lose sales to other lower price burger chains, to alternative products (e.g., sub sandwiches) or lead to a substitution to meals at home.

Promotion, the third area, deals with creating awareness of the product and price with potential consumers. Some claim that promotion itself can create "image" value, such as the image created by advertisements for certain sports cars.

The last "P", physical distribution has to do with getting the product to the consumer. A manufacturer may have a great product, at a great price, have succeeded in creating awareness in the consumer, and gets the consumer to commit to a purchase, but if the product cannot be delivered where and when the consumer wants it, the sale will be lost. Traditionally this has been thought of as "place" value, but today the time value must also be considered. Physical distribution is relevant not only to manufacturing industries, but also to service industries. For example, in the airline industry, the product is made available to the consumer where and when he/she wants it via computer reservation systems.

6.3 Airports and the Four P's

Airports must apply the four P's to their commercial business, just as any other enterprise would. Whether or not there is significant runway capacity affects the product the airport has to offer, as does the design, capacity and expandability of the terminal. Prices charged by airports affect the level of their traffic. High landing fee tourism destinations find that in low seasons carriers have a stronger incentive to cut back services than to low landing fee airports, such as Bermuda. The well known promotion of Schiphol airport as a connecting point, business meeting centre, shopping centre, etc., has had very positive impacts on its level of traffic over time.

6.4 Airport Network Complementarity

Having discussed how airports are subject to competition and compete with each other, let us

now consider network complementarity. Airports are nodes in networks -- logistical networks for moving people and goods in geographic space. A node cannot function without other nodes in the network. Thus airports are mutually dependent.

However, this complementarity and dependence may not be symmetric. This is because of airport competition. A specific example may be useful. Fort St. John and Dawson Creek B.C. are communities in the beautiful Peace River region with separate airports, roughly one hour driving time apart.³⁸ A major market for each is Vancouver. Each of Fort St. John and Dawson Creek *require* access to Vancouver to be of full service to their respective (and somewhat overlapping) travelling publics. Vancouver, on the other hand, does not *require* access to *each* of these airports. Access to both is desirable, of course, but if Vancouver only has a network to link to one, part of the other's market can be diverted through the one available link. In the parlance of the economist, Fort St. John and Dawson Creek are *partial* substitutes for each other in the network.

A question which arises is whether the large airports in the aviation networks have a pricing advantage. For example, suppose that a traveller is willing to pay up to \$25 in total airport fees for a trip to/from the Peace River region to Vancouver. Beyond \$25, the traveller will decide not to travel. Will the Vancouver airport be able to charge all or most of the \$25 and leave the Peace River airports with little or no ability to impose charges? The answer depends on the degree to which the Peace River airports are substitutes for each other in the mind of the travelling public. Consider the case where only one airport exists in the region.³⁹ In this case, Vancouver will be limited in its ability to charge the full \$25 willingness to pay. Vancouver requires the existence and continuing operation of the one Peace River airport in order to be able to serve the traveller. If it charges a too high a portion of the \$25 such that the Peace River airport is not sustainable, then it (Vancouver) will lose all the revenue. Similarly, the Peace River airport must leave enough of the \$25 to enable Vancouver to be sustainable.⁴⁰

A challenge comes about when there are two airports serving overlapping catchment areas. The two regional airports may attempt to use price to compete for those passengers who are willing or able to utilise either airport. In this case, the competing airports will be limited in their ability to undertake capital programs, thus undermining long term capital sustainability.

As well, there is the issue as to whether the combined financial needs of the three airports (Vancouver and the two Peace River airports) exceed the collective willingness to pay of the travellers on the route.

It should be pointed out that the agent for resolving issues of competition and complementarity between airports may well be the airline(s). An airline will likely have better information on the three nodes and demand for service along the links than any of the airports. If there is a dominant carrier, it could decide to rationalize the network to fewer nodes. While it may lose some traffic which was unique to the specific node that was terminated, the overall cost savings may provide a net benefit. This, of course, is not necessarily undesirable. Communities whose airports have highly overlapping catchment areas may need to address how their regions should best be served. These are cost and optimization issues which are beyond the scope of this paper.

Airport Competition in Turbulent Times

Airports have responded to modern changes worldwide. Airports are increasingly more commercially focused. Their ownership and governance has been transformed over the last few decades. According to ACI's database, 420 airports worldwide have some form of private equity participation. Many are publicly owned. Total private ownership is also a feature of many airports worldwide. Airports now undertake greater marketing and route development activities. For example, 96 per cent of all European airports, small or large, are actively marketing their airports to

the airlines. And there is evidence of increased marketing spend. Airports have also, through incentive schemes and targeted investment, sought to differentiate their products so as to cater for different airline types. New airports have also entered the market. And, at others, there have also been significant increases in capacity. This is all evidence of airports both spurring competition and responding to it in a market where customers have choice.

In an increasing number of markets worldwide, airports in all size categories are affected by at least one of these constraints:

- a) local departure choice;
- b) transfer choice;
- c) buyer power of the largest carrier; and
- d) high volatility of passengers.

These constraints are increasing, and market power therefore weakening across the board. This applies to all categories of airports, with many of the largest airports subject to significant competition for transfer passengers as well as to airline buyer power deriving from choice of hub by multi-hub carriers. Amongst smaller airports, constraints emanate more from passenger departure choice and airline buyer power, as well as, in some cases, destination switching.

Airports of all sizes and categories are therefore subject to many competitive constraints, increasing over time; and the cumulative impact of these competitive constraints is likely to be significant in many cases. While this cannot amount to a determinative view on the market power possessed by airports, there is sufficient evidence to challenge the old presumption of airports having significant market power. Rather, the starting point as elsewhere in the economy should be that the existence of market power needs to be proved rather than assumed. There is increasing competition among airports at a regional, national and worldwide basis. Airports are increasingly seeking ways to attract airline customers, including financial packages and marketing schemes. Some airlines are well placed to exploit an airport's need to avoid traffic losses, thus giving airlines a significant edge in negotiations with airports. At some airports a single airline or airlines within a single alliance may control over 75 per cent of the passenger traffic.

Cargo traffic can make up a major proportion of an airport's traffic base. ACI estimates that cargo accounts for approximately 17% of annual airport revenue. Cargo traffic is highly price sensitive and can easily shift to alternative routings and hence highly competitive. Airports are part of the overall tourism package offered by a destination. Quality, cost and scope of service offered at by an airport impacts on the overall attractiveness of a destination.

Factors influencing emergence of Secondary Airports:

- Congestion at the Primary Airport.
- Degraded level of service
- Decreasing attractiveness of primary airport
- Lack of connectivity
- Overall mediocre quality of service at airport

Strategies for Airport Competition

(a) Passenger Facilitation

- Reduce processing and connection time
- Baggage Processing – RFID
- Flexible Airport Design
- Service Quality
- Operate late night flights
- Cargo Traffic pricing

- (b) Airport Facilities
 - Advertise on lower cost
 - More convenient parking
 - Integrated Marketing Approaches
 - Branding the Airport
 - User Development Fee Pricing

Pricing Policy & its Impact on Airport Competition

Airlines strongly oppose the use of charges and taxes for revenue-raising purposes. Charges should reflect cost-recovery principles while taxes require a strong economic justification.

Excessive or new taxes and charges on the airline industry do have an economic cost. The airline industry – and the global connections it provides – creates substantial value for its customers, stakeholders and the wider economy. Higher taxes and charges can damage or restrict this value – to the long-term cost of all parties.

Situation

The airline industry can be seen as an easy-target for new taxes, sometimes with no direct relation to the industry itself (e.g. Solidarity Tax). At the same time, insufficient regulation or competitive pressure can lead to excessive airport and ANSP charges, above the level that can be justified by the level of cost incurred and/or the quality of service provided.

IATA Position

Taxes and charges do have a significant economic cost – not just for airline users but also for the wider economy. As such, the imposition and level of charges and taxes must be economically justified. If governments consider constraining or taxing air transport for policy reasons (e.g. environmental), they must note that they could also be sacrificing the economic development benefits that the industry creates.

Even marginally small changes can have a significant impact on the wider economic value created by the airline industry. In many cases, lower taxes and charges would be of more direct benefit, boosting both airport and ANSP revenues and wider economic benefits due to higher traffic levels.

Key Considerations

The key considerations are given below:

- a) Air transport is a vital component for economic development and growth. It creates significant value for its users and other stakeholders – including governments. But it also generates substantial wider economic benefits by allowing firms to be more productive and efficient and by encouraging higher investment. Unjustified taxes and charges place these benefits at risk.
- b) Marginally small changes can still have a significant economic impact. The high sensitivity of airline passengers to the price of a ticket is widely documented³. The price elasticity of short-haul leisure passengers has previously been estimated at 1.5 (i.e. traffic will increase by 15% if prices fall 10%). However, this is probably the lower bound of a potential range in markets that are liberalized and/or face strong price-competition from no-frills airlines.
- c) Using the example of Toronto airport demonstrates that lower taxes and charges can be both financially and economically optimal.
- d) IATA and the airline industry should be consulted before any proposals for any new charges, taxes or increases. The information required includes an impact assessment on industry costs, traffic levels and overall economic benefits.

Charges for Airports and Air Navigation Services

Tariff Structure of Airports Authority of India

The charges levied by Airports Authority of India (AAI) are under two broad heads viz.,

- a) Air Navigation Services (ANS) and
- b) Airport Services.

Subsequent to formation of Airports Economic Regulatory Authority of India (AERA), the airports under AAI have been classified as

- a) Major Airports and
- b) Non Major Airports for levy of Airport Charges.

The tariffs for major Airports are fixed and regulated by AERA and for all other airports Ministry of Civil Aviation (MoCA) functions as regulator also.

The major Airports under AAI are as given below:

- a) Kolkata
- b) Chennai
- c) Trivandrum
- d) Ahmedabad
- e) Calicut
- f) Jaipur
- g) Lucknow
- h) Guwahati
- i) Goa (Civil Enclave-Intl.)
- j) Srinagar (Civil Enclave-Intl.)
- k) Pune (Civil Enclave – Custom Airport)

The Tariff structure of airport services is Airport Specific in respect of the major Airports. The Tariff rates for the first control period (F.Y. 2011-12 to 2015-16) have been approved by AERA in respect of Chennai and Kolkata Airports. In respect of the other major Airports the existing tariff rates are applicable.

The airport service tariff for the above mentioned major airports would be revised as and when the same are approved by AERA. In respect of the non-major Airports the existing tariff of airport charges applicable to Domestic Airports will continue to be applied even though some of them are declared as International Airport.

TARIFF – AIR NAVIGATION SERVICES

(I) Route Navigation Facility Charges (RNFC)

a) RNFC for Landing Flights:

$$\text{RNFC} = \text{Rs.} (R \times D \times W)$$

$$R = \text{Rs.} 4620/-$$

$$D = \sqrt{(GCD/100)} \text{ with GCD cap as } 1200 \text{ NM}$$

$$W = \sqrt{(AUW/50000)} \text{ with AUW cap as } 2,00,000 \text{ Kilograms}$$

Abbreviations used:

R=Service Unit Rate

D=Distance Factor

W=Weight Factor

GCD= Great Circle Distance in NM

AUW = All Up Weight of aircraft in Kilograms

b) RNFC for Overflying = Rs.(R x D x W) + Rs. 4,400/-

(II) TERMINAL NAVIGATIONAL LANDING CHARGES (TNLC)

a) Major International Airports including Goa International Airport (Civil Enclave)

Weight of Aircraft

Below 10,000 kgs. @ Rs 1087.90

10,000 kgs and above @ Rs 6546.10

Note:

- i. TNLC mentioned above is applicable at Delhi; Mumbai; Chennai; Kolkata; Trivandrum; Bangalore (BIAL); Hyderabad (Shamshabad - HIAL); Goa and Cochin.
- ii. ii) TNLC at 5 International Airports, i.e., Kolkata, Delhi, Mumbai, Chennai, Trivandrum to be reduced by 25% of the current rates for Domestic Flights.

TARIFF – AIRPORT SERVICES

I. MAJOR AIRPORTS

1. Landing, Parking and Housing charges

1.1. Landing.

Rate per landing

	International flight	(other than International flight)
Weight of Aircraft		
Upto 100 MT	Rs. 578.90 per MT	Rs. 294.80 per MT
Above 100 MT	Rs. 57890/- + Rs.777.80 per MT in excess of 100 MT	Rs. 29480/- + Rs.396.10 per MT in excess of 100 MT

Note:

- a) Charges shall be calculated on the basis of nearest Metric Ton (MT) (i.e.1,000 kg) of the aircraft.
- b) A surcharge of 25% will be levied on landing charges for supersonic aircraft.

- c) A minimum fee of Rs. 5,000 shall be charged per single landing for all types of aircraft/helicopter flights, including but not limited to domestic landing, international landing and general aviation landing, however this will not apply to training flights operated by Flying Clubs.
- d) Weight of aircraft means maximum takeoff weight (MTOW) as indicated in the Certificate of Airworthiness filed with Director General of Civil Aviation (DGCA).
- e) All domestic legs of International routes flown by Indian Operators will be treated as domestic flights as far as air side airport user charges are concerned, irrespective of the flight number assigned to such flights.

Housing and Parking Charges Weight of Aircraft

	Parking Charges	Housing Charges
	Rate per MT per Hour	Rate per MT per Hour
Upto 100 MT	Rs. 8.00 per MT	Rs. 15.70 per MT
Above 100 MT	Rs. 800/- + Rs. 10.50 per MT per hour in excess of 100 MT	Rs. 1570/- + Rs.21.00 per MT per hour in excess of 100 MT

Note:

- a) No Parking Charges shall be levied for the first two hours. While calculating free parking period, standard time of 15 minutes shall be added on account of time taken between touch down time and actual parking time on the parking stand. Another standard time of 15 minutes shall be added on account of taxing time of aircraft from parking stand to take off point. These periods shall be applicable for each aircraft irrespective of the actual time taken in the movement of aircraft after landing and before takeoff.
- b) For calculating chargeable parking time, any part of an hour shall be rounded off to the next hour.
- c) Charges shall be calculated on the basis of next MT.
- d) Charges for each period parking shall be rounded off to nearest Rupee.
- e) Whilst in contact stands, after free parking, for the next two hours normal parking charges shall be levied. After this period, Housing Charges shall be levied.
- f) In respect of tickets issued in foreign currency shall be levied in US Dollars.
- g) Collection charges: if the payment is made within 15 days of receipt of invoice, then collection charges at INR 5.00 per departing passenger shall be paid by AAI.
- h) Transit/Transfer passengers: A passenger is treated in-transit/transfer only if the onward journey is within 24 hours from the time of arrival at airport and the onward travel is part of same ticket. In case 2 separate tickets are issued (one for arrival and one for departure), the passenger does not include passenger on return journey.

Fuel Throughput Charges

The Fuel Throughput charges shall be payable as under: Charges per Kilolitre of Fuel is Rs. 1341.44.

Passenger Service Fee (Security) @ Rs. 130/- per departing passenger

- (a) Passenger Service Fee (Facilitation) i.e. Rs 77/- per departing pax.
- (b) PSF (Facilitation) is payable in respect of Passenger Tickets purchased.
- (c) \$ 3.25 (US\$ Three and twenty five cents only) per passenger in respect of the tickets issue against Dollar Tariff.

- (d) Collection charges: if the payment is made within 15 days of receipt of bills, then collection charges at 2.5% of PSF per passenger is payable. No collection charges shall be payable if the operator fails to pay the PSF to AAI within the credit period and in case of part payment.
- (e) No collection charges are payable to casual operator/non scheduled operators.
- (f) Exemption of airlines from paying PSF from Sky Marshals.
- (g) For conversion of US\$ into INR the rate as on the 1st day of the month for 1st fortnightly billing period and rate as on 16th of the month for the 2nd fortnightly billing period shall be adopted. If the payment is made within 15 days of receipt of bills, then collection charges at 2.5% of PSF per passenger is payable.

OTHER CHARGES

- (i) PASSENGER SERVICE FEE: (revised w.e.f. 1st April,2009)
 - (a) Rs. 207/-(Rupees two hundred seven only) per embarking passenger at international/Domestic AAI airports including Civil Enclaves except Kolkata & Chennai Airports.
 - (b) \$ 5.18 (US\$ Five and eighteen cents only) per passenger in respect of the tickets issue against Dollar Tariff.
 - (c) Collection charges: if the payment is made within 15 days of receipt of bills, then collection charges at 2.5% of PSF per passenger is payable. No collection charges shall be payable if the operator fails to pay the PSF to AAI within the credit period and in case of part payment. Airlines to make full payment of PSF collection to AAI and raise a separate invoice for the collection charges on PSF to AAI.
 - (d) No collection charges are payable to casual operator/non scheduled operators.
 - (e) Exemption of airlines from paying PSF from Sky Marshals.

MODULE III - AIRPORT OPERATIONS AND SERVICE QUALITY

CHAPTER I: AIRPORT PLANNING & DEVELOPMENT

The planning of an airport is such a complex process that the analysis of one activity without regard to the effect on other activities will not provide acceptable solutions. An airport encompasses a wide range of activities which have different and often conflicting requirements. Yet they are interdependent so that a single activity may limit the capacity of the entire complex. In the past airport master plans were developed on the basis of local aviation needs. In more recent times these plans have been integrated into an airport system plan which assessed not only the needs at a specific airport site but also the overall needs of the system of airports which service an area, region, state, or country. If future airport planning efforts are to be successful, they must be founded on guidelines established on the basis of comprehensive airport system and master plans.

The elements of large airports are divided into two major components, the airside and the landside. The aircraft gates at the terminal buildings form the division between the two components. Within the system, the characteristics of the vehicles, both ground and air, have a large influence on planning. The passenger and shipper of goods are interested primarily in the overall door-to-door travel time and not just the duration of the air journey. For this reason access to airports is an essential consideration in planning.

The problems resulting from the incorporation of airport operations into the web of metropolitan life are complex. In the early days of air transport, airports were located at a distance from the city, where inexpensive land and a limited number of obstructions permitted flexibility in airport operations. Because of the nature of aircraft and the infrequency of flights, noise was not a problem to the While increasingly dense residential development has resulted from this economic stimulation, one must not overlook the effects of the unprecedented suburban spread during the post-World War II era, resulting from the backlog of housing needs and a period of economic prosperity.

Radical developments in the nature of air transport have produced new problems. The phenomenal growth of air traffic has increased the probability of unfavorable community reaction, but developments in the aircraft themselves have had the most profound effect on airport community relations. The greater size and speed of aircraft have resulted in increases in approach and runway requirements, while increases in the output of power plants have brought increases in noise. Faced with these problems the airport must cope with the problems of securing sufficient airspace for access to the airport, sufficient land for ground operations, and, at the same time, adequate access to the metropolitan area.

TYPES OF AIRPORT STUDIES

Many different types of studies are performed in airport planning. These include studies related to facility planning, financial planning, traffic and markets, economics, and the environment. However, each of these studies can usually be classified as being performed at one of three levels: the system planning level, the master planning level, or the project planning level.

The Airport System Plan

An airport system plan is a representation of the aviation facilities required to meet the immediate and future needs of a metropolitan area, region, state, or country. The National Plan of Integrated Airport Systems (NPIAS) is an example of a system plan representing the airport development needs of the United States. The Michigan Aviation System Plan is an example of a system plan representing the airport development needs of the state of Michigan, and the Southeast Michigan Regional Aviation

System Plan is a system plan representing the airport development needs of a seven county region comprising the Detroit Metropolitan area.

The system plan presents the recommendations for the general location and characteristics of new airports and heliports and the nature of expansion for existing ones to meet forecasts of aggregate demand. It identifies the aviation role of existing and recommended new airports and facilities. It includes the timing and estimated costs of development and relates airport system planning to the policy and objectives of the relevant jurisdiction. Its overall purpose is to determine the extent, type, nature, location, and timing of airport development needed to establish a viable, balanced, and integrated system of airports [1, 8]. It also provides the basis for detailed airport planning such as that contained in the airport master plan.

The airport system plan provides both broad and specific policies, plans, and programs required to establish a viable and integrated system of airports to meet the needs of the region. The objectives of the system plan include

- The orderly and timely development of a system of airports adequate to meet present and future aviation needs and to promote the desired pattern of regional growth relative to industrial, employment, social, environmental, and recreational goals.
- The development of aviation to meet its role in a balanced and multimodal transportation system to foster the overall goals of the area as reflected in the transportation system plan and comprehensive development plan.
- The protection and enhancement of the environment through the location and expansion of aviation facilities in a manner which avoids ecological and environmental impairment.
- The provision of the framework within which specific airport programs may be developed consistent with the short- and long-range airport system requirements.
- The implementation of land-use and airspace plans which optimize these resources in an often constrained environment.
- The development of long-range fiscal plans and the establishment of priorities for airport financing within the governmental budgeting process.
- The establishment of the mechanism for the implementation of the system plan through the normal political framework, including the necessary coordination between governmental agencies, the involvement of both public and private aviation and non-aviation interests, and compatibility with the content, standards, and criteria of existing legislation.

The airport system planning process must be consistent with state, regional, or national goals for transportation, land use, and the environment. The elements in a typical airport system planning process include the following:

- Exploration of issues that impact aviation in the study area
- Inventory of the current system
- Identification of air transportation needs
- Forecast of system demand
- Consideration of alternative airport systems
- Definition of airport roles and policy strategies
- Recommendation of system changes, funding strategies, and airport development
- Preparation of an implementation plan

Although the process involves many varied elements, the final product will result in the identification, preservation, and enhancement of the aviation system to meet current and future demand. The ultimate result of the process will be the establishment of a viable, balanced, and integrated system of airports.

Airport Site Selection

The emphasis in airport planning is normally on the expansion and improvement of existing airports. However if an existing airport cannot be expanded to meet the future demand or the need for a new airport is identified in an airport system plan, a process to select a new airport site may be required. The scope of the site selection process will vary with size, complexity, and role of the new airport, but there are basically three steps—identification, screening, and selection.

- Identification: criteria is developed that will be used to evaluate different sites and determine if a site can function as an airport and meets the needs of the community and users. One criterion will be to identify the land area and basic facility requirements for the new airport. Part of this analysis will be a definition of airport roles if more than two airports serve the region. Other criteria might be that sites are within a certain radius or distance from the existing airport or community, or that sites should be relatively flat. Several potential sites that meet the criteria are identified.
- Screening: Once sites are identified, a screening process can be applied to each site. An evaluation of all potential sites that meet the initial criteria should be conducted, screening out those with the most obvious shortcomings. Screening factors might include topography, natural and man-made obstructions, airspace, access, environmental impacts, and development costs. If any sites are eliminated from further consideration, thorough documentation of the reasons for that decision is recommended. The remaining potential sites should then undergo a detailed comparison using comprehensive evaluation criteria. While the criteria will vary, the following is typically considered:
 - a. Operational capability—airspace considerations, obstructions, weather
 - b. Capacity potential—available land, suitability for construction, weather
 - c. Ground access—distance from the demand for aviation services, regional highway infrastructure, available public transportation modes
 - d. Development costs—terrain, land costs, land values, soil conditions, availability of utilities.
 - e. Environmental consequences—aircraft noise, air quality, groundwater runoff, impact on flora and fauna, existence of endangered species or cultural artifacts, historical features, changes in local land use, relocation of families and businesses, changes in socioeconomic characteristics
 - f. Compatibility with area-wide planning—impact on land use, effect on comprehensive land-use plans and transportation plans at the local and regional levels
- ➔ Selection: the final step is selecting and recommending a preferred site. While a weighting of the evaluation criteria and weighted ratings or ranking of the alternative sites is often used in selecting a site, caution must be used in applying this technique since it introduces an element of sensitivity into the analysis. The process should focus on providing decision makers with information on the various sites in a manner that is understandable and unbiased.

The Airport Master Plan

An airport master plan is a concept of the ultimate development of a specific airport. The term development includes the entire airport area, both for aviation and non-aviation uses, and the use of land adjacent to the airport. It presents the development concept graphically and contains the data and rationale upon which the plan is based.

Master plans are prepared to support expansion and modernization of existing airports and guide the development of new airports. The overall objective of the airport master plan is to provide guidelines for future development which will satisfy aviation demand in a financially feasible manner and be compatible with the environment, community development, and other modes of transportation.

More specifically it is a guide for

- a) Developing the physical facilities of an airport
- b) Developing land on and adjacent to the airport
- c) Determining the environmental effects of airport construction and operations
- d) Establishing access requirements
- e) Establishing the technical, economic and financial feasibility of proposed developments through a thorough investigation of alternative concepts.
- f) Establishing a schedule of priorities and phasing for the improvements proposed in the plan
- g) Establishing an achievable financial plan to support the implementation schedule
- h) Establishing a continuing planning process which will monitor conditions and adjust plan recommendations as circumstances warrant.

Guidelines for completing an airport master plan are described by ICAO and in the United States by the FAA. A master plan report is typically organized as follows:

- ➔ Master plan vision, goals, and objectives—establishes the vision and overarching goals for the master plan as well as objectives that will guide the planning process and help ensure that the goals are achieved and the vision is realized.
- ➔ Inventory of existing conditions—provides an overview of the airport’s history, role in the region and nation, growth and development over time, description of its physical assets (airfield and airspace, terminal, ground access, and support facilities), and key industry trends.
- ➔ Forecast of aviation demand—future levels of aircraft operations, number of passengers, and volume of cargo are forecasted for short, intermediate, and long-range time periods. Typically forecasts are made for 5, 10, and 20 years on both annual as well as daily and busiest hours of the day.
- ➔ Demand/capacity analysis and facility requirements—compares the future demand with the existing capacity of each airport component and identifies the facility requirements necessary to accommodate the demand.
- ➔ Alternatives development—identifies, refines, and evaluates a range of alternatives for accommodating facility requirements. If the existing site cannot accommodate the anticipated growth, a selection process to find a new site may be necessary.
- ➔ Preferred development plan—identifies, describes, and defines the alternative that best achieves the master plan goals and objectives. Figure 4-3 illustrates the development plan for the Chicago O’Hare International Airport.
- ➔ Implementation plan—provides a comprehensive plan for the implementation of the preferred development plan, including the definition of projects, construction sequence and timeline, cost estimates, and financial plan.
- ➔ Environmental overview—provides an overview of the anticipated environmental impacts associated with the preferred development plan in order to understand the severity and to help expedite subsequent environmental processing at the project specific stage.
- ➔ Airport plans package—documents that show the existing as well as planned modifications are prepared and the more notable is the airport layout plan (ALP). It comprises drawings that include the airfield’s physical facilities, obstruction clearance and runway approach profiles, land-use plans, terminal area and ground access plans, and a property map. Specific guidelines for the airport layout plan in the United States are identified by FAA.
- ➔ Stakeholder and public involvement—documents the coordination efforts that occur among the stakeholders throughout the study.

The Airport Project Plan

A project plan focuses on a specific element of the airport master plan which is to be implemented in the short term and may include such items as the addition of a new runway, the modification of

existing of runways, the provision of taxiways or taxiway exits, the addition of gates, the addition to or the renovation of terminal building facilities, or the modification of ground access facilities.

The overall objective of the airport project plan is to provide the specific details of the development which will satisfy immediate aviation needs and be consistent with the objectives and constraints identified in the airport master plan. More specifically it is a detailed plan for

1. Developing the specific physical facilities at an airport including the architectural and engineering design for these facilities
2. Determining the environmental effects of this development through the construction and operational phases
3. Determining the detailed costs and financial planning for the development
4. Establishing a schedule for the construction and phasing of the specific items of development in the plan

Land-Use Planning

A land-use plan for property within the airport boundary and in areas adjacent to the airport is an essential part of an airport master plan. The land-use plan on and off the airport is an integral part of an area wide comprehensive planning program, and therefore it must be coordinated with the objectives, policies, and programs for the area which the airport is to serve. Incompatibility of the airport with its neighbors stems primarily from the objections of people to aircraft noise. A land-use plan must therefore project the extent of aircraft noise that will be generated by airport operations in the future. Contours of equal intensity of noise can be drawn and overlaid on a land-use map and from these contours an estimate can be made of the compatibility of existing land use with airport operations. If the land outside the airport is underdeveloped, the contours are the basis for establishing comprehensive land-use zoning requirements.

Although zoning is used as a method for controlling land use adjacent to an airport, it is not effective in areas which are already built-up because it is usually not retroactive. Furthermore jurisdictions having zoning powers may not take effective zoning action.

Aircraft operations into and out of the airport may be made unnecessarily complex to minimize noise encroachment on incompatible land uses. Despite these shortcomings the planner should utilize zoning as a vehicle to achieve compatibility wherever this approach is feasible.

Airports become involved in two types of zoning. One type is height and hazard zoning, which is mainly to protect the approaches to the airport from obstructions. The other type is land-use zoning.

The extent of land use in the airport depends a great deal on the amount of acreage available. Land uses can be classified as either closely related to aviation or remotely related to aviation. Those closely related to aviation use include the runways, taxiways, aprons, terminal buildings, parking, and maintenance facilities.

Non-aviation uses include space for recreational, industrial, and commercial activities. When considering commercial or industrial activities, care should be taken to ensure that they will not interfere with aircraft operations, communications equipment, and aids to navigation on the ground. Recreational facilities such as golf courses may be suitable within the immediate proximity of the airport boundary or certain agricultural uses are also appropriate as long as they do not attract birds. When there is acreage within the airport boundary in excess of aviation needs, it is sound fiscal planning to provide the greatest financial return from leases of the excess property.

Thus the land-use plan within the airport is a very effective tool in helping airport management make decisions concerning requests for land use by various interests and often airports delineate areas on the airport property for the development of industrial parks.

The principal objective of the land-use plan for areas outside the airport boundary is to minimize the disturbing effects of noise. As stated earlier the delineation of noise contours is the most promising approach for establishing noise-sensitive areas. The contours define the areas which are or are not suitable for residential use or other use and, likewise, those which are suitable for light industrial, commercial, or recreational activity. Although the responsibility for developing land uses adjacent to the airport lies with the governing bodies of adjacent communities, the land-use plan provided by the airport authority will greatly influence and assist the governing bodies in their task of establishing comprehensive land-use zoning.

Environmental Impact Assessment

Environmental factors must be considered carefully in the development of a new airport or the expansion of an existing one. In the United States, this is a requirement of the Airport and Airway Improvement Act of 1982 and the Environmental Policy Act of 1969.

Studies of the impact of the construction and operation of a new airport or the expansion of an existing one upon acceptable levels of air and water quality, noise levels, ecological processes, and demographic development of the region must be conducted to determine how the airport requirements can best be met with minimal adverse environmental and social consequences. Aircraft noise is the severest environmental problem to be considered in the development of airport facilities. Much has been done to quiet engines and modify flight procedures, resulting in substantial reductions in noise. Another effective means for reducing noise is through proper planning of land use for areas adjacent to the airport.

For an existing airport this may be difficult as the land may have already been built up. Every effort should be made to orient air traffic away from noise-sensitive land development.

Other important environmental factors include air and water pollution, industrial wastes and domestic sewage originating at the airport, and the disturbance of natural environmental values. In regard to air pollution, the federal government and industry have worked jointly toward alleviating the problem, and there is a reason to believe that it will probably be eliminated in the near future as an environmental factor. An airport can be a major contributor to water pollution if suitable treatment facilities for airport wastes are not provided. Chemicals used to deice aircraft are a major source of potential ground water pollution and provisions need to be made to safely dispose of this waste product. The environmental study must include a statement detailing the methods for handling sources of water pollution.

The construction of a new airport or the expansion of an existing one may have major impacts on the natural environment. This is particularly true for large developments where streams and major drainage courses may be changed, the habitats of wildlife may be disrupted, and wilderness and recreational areas may be reshaped.

The environmental study should indicate how these disruptions might be alleviated.

In the preparation of an environmental study, or an environmental impact statement, the findings must include the following items:

1. The environmental impact of the proposed development
2. Any adverse environmental effects which cannot be avoided should the development be implemented

3. Alternatives to the proposed development
4. The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity
5. Any irreversible environmental and irretrievable commitments of resources which would be involved in the proposed development should it be implemented
6. Growth inducing impact
7. Mitigation measures to minimize impact

In the application of these guidelines attention must be directed to the following questions. Will the proposed development

1. Cause controversy
2. Noticeably affect the ambient noise level for a significant number of people
3. Displace a significant number of people
4. Have a significant aesthetic or visual effect
5. Divide or disrupt an established community or divide existing uses
6. Have any effect on areas of unique interest or scenic beauty
7. Destroy or derogate important recreational areas
8. Substantially alter the pattern of behavior for a species
9. Interfere with important wildlife breeding, nesting, or feeding grounds
10. Significantly increase air or water pollution
11. Adversely affect the water table of an area
12. Cause excessive congestion on existing ground transportation facilities
13. Adversely affect the land-use plan for the region

The preparation of an environmental impact statement based upon an environmental assessment study is an extremely important part of the airport planning process. The statement should clearly identify the problems that will affect environmental quality and the proposed actions to alleviate them. Unless the statement is sufficiently comprehensive, the entire airport development may be in jeopardy.

Economic and Financial Feasibility

The economic and financial feasibility of alternative plans for a new airport or expansion of an existing site must be clearly demonstrated by the planner. Even if the selected alternative is shown to be economically feasible, then also it is necessary to show that the plan will generate sufficient revenues to cover annual costs of capital investment, administration, operations, and maintenance. This must be determined for each stage or phase of development detailed in the airport master plan.

An evaluation of economic feasibility requires an analysis of benefits and costs. A comparison of benefits and costs of potential capital investment programs indicates the desirability of a project from an economic point of view. The economic criterion used in evaluating an aviation investment is the total cost of facilities, including quantifiable social costs, compared with the value of the increased effectiveness measured in terms of total benefits. The costs include capital investment, administration, operation, maintenance, and any other costs that can be quantified. The benefits include a reduction in aircraft and passenger delays, improved operating efficiency, and other benefits. The costs and benefits are usually determined on an annual basis.

There are a number of techniques for comparing benefits with costs. Most of them consider the time value of money based on an appropriate discount rate which reflects the opportunity cost of capital.

The discount rate is a value by which a unit of money received in the future is multiplied to obtain its present value or present worth. In other words a cost incurred in 2010 has a different economic value from that of the same item incurred in 2015.

If the time value of money is not considered, the ratio of benefits to costs is made for each year by merely dividing the benefits in a particular year by the cost of the project in that year. A project is considered economically feasible when the ratio of the benefits to costs is greater than unity, that is, the benefits exceed the costs. The larger the ratio, the more attractive is the project from an economic standpoint.

A ratio can also be obtained by comparing the present value of benefits with the present value of costs. This approach recognizes the time value of money. Another approach is to plot the net present value (NPV) for each year against time. The net present value is defined as the present value of benefits minus the present value of costs.

In the early years of airport development, substantial capital improvement programs were financed at the local level by sale of general obligation bonds backed by the taxing power of the community.

As air transportation became mature and the requirements of the community for capital spending programs increased, airports began to utilize revenue bonds as a source of financing. A financial feasibility study is therefore an analysis to determine if bonds are marketable at reasonable interest rates. It also includes the feasibility of other forms of financing. The analysis requires a thorough evaluation of the revenues to be developed by a proposed improvement and the corresponding costs. Usually this is done in a traffic and earnings study performed over the planning horizon. In such a study, the forecast of demand is utilized and rates and charges established for the various revenue categories. This results in annual revenue projections. To make revenue bonds attractive to buyers a typical airport revenue bond should show an expected coverage by net revenues (gross revenues minus costs) of at least 1.25 times the debt service requirements.

If the analysis indicates that the revenues will be insufficient, revisions in the scheduling or scope of the proposed development may have to be made or the rates and charges to the users of the airport may require adjustment.

Continuing Planning Process

A continuous airport planning process is necessary in order to respond to the needs of air transportation in a changing environment.

Changes in aviation demand, community policies, new technology, financial constraints, and other factors can alter the need for and the timing of facility improvements. Current data must be continually collected and assessed relative to airport needs, operations and utilization, environmental impact, and financial capabilities. The staging of airport improvements assists in the reevaluation of continuing needs at the points in time when implementation decisions are required.

In the airport planning process, the overall objective of establishing and maintaining a continuous process is to ensure that the airport system plan and airport master plan remain responsive to public needs. As a result, the airport system plan and airport master plan should be formally reviewed and updated at least every 5 years. Specific objectives associated with the continuous airport planning process include [8]

1. Surveillance, maintenance, inventory, and update of the basic data such as aviation activity and socioeconomic and environmental factors relating to the existing airport system and master plan
2. Review and validation of data affecting the airport system and master plan

3. Reappraisal of the airport system and master plan in view of changing conditions
4. Modification of the airport system and master plan to retain its viability
5. Development of a continuous mechanism for ensuring the interchange of information between the system planning and master planning processes
6. Provision of a means for receiving and considering public comment in order to maintain and ensure the public awareness of the role airports play in the transportation system of an area
7. Redefinition of air transportation goals and policies
8. Integration of airport system planning into a multimodal planning process
9. Analysis of special issues
10. Publication of interim reports and formal plan updates

CHAPTER II: SERVICE QUALITY MANAGEMENT

Service Quality Management reflects the performance of an airport to deliver an increasingly high standard of service in multiple areas, ranging from airport cleanliness to minimization of wait times, to the provision of a wide range of attractive retail opportunities.

Some measures of service quality are based on passenger surveys, as they reflect overall passenger perceptions. Some delay measures may be driven by airport capacity limitations.

Service quality indicators focus both on how passengers perceive the level of service provided by the airport, and on objective measures of service delivery.

Service Quality Indicators

The indicators are given below:

1. Practical Hourly Capacity
2. Gate Departure Delay
3. Taxi Departure Delay
4. Customer Satisfaction
5. Baggage Delivery Time
6. Security Clearing Time
7. Border Control Clearing Time
8. Check-in to Gate Time

ACI set out a Guide to Airport Performance Measures for the above indicators.

1. Practical Hourly Capacity—

Definition.

Maximum aircraft movements per hour assuming average delay of no more than four minutes, or such other number of delay minutes as the airport may set.

Applicability. To all airports

Drivers.

Practical hourly capacity is largely a function of runway capacity which is determined by the number of runways, their configuration and separation, taxiway access and capacity, air traffic system restrictions, weather and terrain, type and mix of aircraft, arrival/departure mix. Many of these factors are fixed until new infrastructure is added.

Benchmarking.

Useful for internal benchmarking as part of the process of determining whether additional airfield capacity is required. There is no consensus on the best measure of runway capacity, which is a fundamental airport metric along with terminal capacity. *Practical Hourly Capacity (PHC)* is a useful measure because it incorporates a level of service requirement. The standard definition of PHC uses a maximum delay of 4 minutes, although individual airports may calculate PHC based on other maxima, such as 8 minutes, depending on individual circumstances and air carrier planning criteria. Runway capacity, expressed in movements per hour, is generally higher during optimum conditions than during IFR conditions when radar separation between aircraft is required. The magnitude of the difference varies from airport-to-airport depending on the airfield configuration and other drivers listed above. Other measures of runway capacity include declared runway capacity and maximum hourly capacity.

Quality of Service Monitoring Objectives

- To increase the transparency of airport operators' performance and
- To discourage them from excessively increasing prices and/or lowering standards of aeronautical services.

In monitoring and evaluating these *aspects* both objective and subjective data are used.

While subjective data may be more difficult to quantify than objective data, it provides additional context for assessing an airport operator's performance.

Unlike the objective data, the subjective data is not specified in the Airports Regulations or the Airports Act. Subjective data is gathered from a range of airport users including: passengers, airlines and landside operators. Subjective data *is gathered* through surveys of airlines and through surveys and consultation with landside operators. The monitored airport operators also voluntarily conduct surveys of passenger perception of the quality of airport services and facilities, and provide the survey results as part of their annual reporting.

Airport Activities

For the purpose of its quality of service monitoring program, airport activities are classified into four main categories:

- a) passenger-related services and facilities associated with, for example, check-in, gate lounges and baggage processing
- b) aircraft-related services and facilities associated with, for example, the runway, apron and taxiway system, gates, aircraft parking and ground service equipment and freight facilities
- c) landside-related services and facilities associated with, for example, kerbside pick-up and drop-off
- d) management performance and responsiveness

Performance Indicators for Airport Service Quality Management

1. **Core** – these are the core measures used to characterize and categorize airports, such as the number of passengers and operations. Although airports may have little control over these core indicators, especially in the short term, they are important indicators of overall airport activity, and important drivers and components of other indicators

2. **Safety and Security** – these are the most important airport responsibilities, and therefore they are categorized separately

3. **Service Quality** – this increasingly important area reflects the evolution of airport management from having a primary focus on facilities and operations to having a strong customer service focus in an increasingly competitive environment.

4. **Productivity/Efficiency** – these measures are closely related/ overlapping measures of an airport's performance. They are sometimes separated into productivity measures, which track output

on a non-cost basis—e.g., passengers per airport employee or departures per gate—and efficiency measures, which track output on a cost basis—e.g., total or operating cost per passenger.

5. Financial/Commercial – this includes measures relating to airport charges, airport financial strength and sustainability, and the performance of individual commercial functions.

6. Environmental – this evolving area has become a strong focus for airport managements striving to minimize environmental impacts.

Performance Indicators (PIs) included within each KPA

These indicators are important determinants of the financial health of the airport, the airport's regional economic impact, and the quality of air transportation offered at the airport. Changes in Core indicators are primarily the result of airline decisions which are largely beyond the control of airports. In most cases, airports have only a limited ability to influence core indicators by establishing favourable airport charges, offering efficient and passenger-friendly infrastructure and services, effectively marketing themselves to airlines and passengers, and sometimes offering financial incentives or marketing support for new service. Core indicators are critical drivers of many other performance indicators. Core indicators also are critical drivers of some aspects of service quality, particularly delays, as airports approach saturation.

A full list of the key indicators included within each area is provided below:

Core

1. Passengers
2. Origination and Destination Passengers
3. Aircraft Movements
4. Freight or Mail Loaded/Unloaded
5. Destinations—Nonstop

Safety and Security

1. Runway Accidents
2. Runway Incursions
3. Bird Strikes
4. Public Injuries
5. Occupational Injuries
6. Lost Work Time from Employee Accidents and Injuries

Service Quality

1. Practical Hourly Capacity
2. Gate Departure Delay
3. Taxi Departure Delay
4. Customer Satisfaction
5. Baggage Delivery Time
6. Security Clearing Time
7. Border Control Clearing Time
8. Check-in to Gate Time

Financial/Commercial

1. Aeronautical Revenue per Passenger
2. Aeronautical Revenue per Movement
3. Non-Aeronautical Operating Revenue as % of Total Operating Revenue
4. Non-Aeronautical Operating Revenue per Passenger
5. Debt Service as Percentage of Operating Revenue
6. Long-Term Debt per Passenger
7. Debt to EBITD Ratio
8. EBITD per Passenger

Productivity/Cost Effectiveness

These indicators of airport efficiency measure the resources used to produce a certain volume of activity, e.g., departures per gate or total passengers per airport employee.

Indicators

1. Passengers per Employee
2. Aircraft Movements per Employee
3. Aircraft Movements per Gate
4. Total Cost per Passenger
5. Total Cost per Movement
6. Total Cost per WLU
7. Operating Cost per Passenger
8. Operating Cost per Movement
9. Operating Cost per WLU

Productivity/cost effectiveness indicators are closely watched and important, but must be used carefully, especially for external benchmarking. Many are particularly sensitive to critical input factors that may be largely beyond the airport's control and are likely to vary from airport to airport. *Aircraft Movements per Gate*, for example, may depend largely on the airlines' scheduling practices—a network carrier may operate relatively few banks of flights at one of its international hubs, while a point-to-point low cost carrier may operate flights nearly continuously from early morning until late at night. These scheduling practices will impact gate utilization even in highly efficient multi-user terminals with common use gates under airport control.

Environmental

Environmental indicators are used to track an airport's progress in minimizing the environmental impacts of its operations.

Indicators

1. Carbon Footprint
2. Waste Recycling
3. Waste Reduction Percentage
4. Renewable Energy Purchased by the Airport (%)
5. Utilities/Energy Usage per Square Meter of Terminal
6. Water Consumption per Passenger

This evolving area has become a strong focus in recent years, with some important indicators still being developed. Environmental indicators may cover a wide range of subjects, including emissions, noise, minimization of energy and water usage, environmentally sound building practices, environmental violations, use of renewable sources, and other areas.

Carbon Footprint

Definition

The carbon footprint is the total set of greenhouse gas (GHG) emissions caused by activities at the airport within the airport's control, expressed in terms of the amount of carbon dioxide or its equivalent in other GHG emitted.

Excludes emissions caused by airline/tenant operations and the public. Emissions from sources within the airport's control, such as airport vehicles, heating and cooling equipment, lighting and other electrical uses. Emissions vary with total energy consumption, use of cleaner and more efficient energy sources, use of lower emission vehicles, emission control technology, and climate factors.

CHAPTER III: AIRPORT SAFETY & SECURITY

History of Airport Security

In the early days of civil aviation, the greatest concerns were related to the safety of flight and there was little concern over airport or aviation security. Aviation security first became an issue in 1930 when Peruvian revolutionaries seized a Pan American mail plane with the aim of dropping propaganda leaflets over Lima. Between 1930 and 1958, several hijackings were reported, mostly committed by eastern Europeans seeking political asylum. The world's first fatal aircraft hijacking took place in July 1947 when three Romanians killed an aircrew member.

The first major act of criminal violence against a U.S. air carrier occurred in November 1955, when Jack Graham placed a bomb in baggage belonging to his mother. The bomb exploded in flight, killing all 33 people on board. Graham had hoped to collect on his mother's insurance policy, but instead was found guilty of sabotaging an aircraft and sentenced to death. A second such act occurred in January 1960, when a heavily insured suicide bomber killed 11 aboard a National Airlines flight. As a result of these two incidents, demand for baggage inspection at airports began.

With the rise of Fidel Castro in Cuba in 1959 came a significant increase in the number of aircraft hijackings, first by those wishing to escape Cuba, then by those hijacking U.S. aircraft to Cuba. Over the next several years, the number of hijacking incidents increased and peaked in the late 1960s. Hijacking became a terrorist act for negotiation with a government body or airline. A program requiring airlines to screen passengers who fit a hijacker profile began in the late 1960s, but hijacking continued so stronger action was taken. The first airport security regulations were implemented in the United States in 1972 and screening of all passengers and their carry-on items began in January 1973.

Under the provisions of Federal Aviation Regulations Part 107—Airport Security, all airports were required to prepare and submit a security program to the FAA that would include the following elements:

- Identification of an air operations area (AOA), that is, those areas used or intended for landing, takeoff, and maneuvering of aircraft
- Identification of those areas with little or no protection against unauthorized access because of lack of adequate fencing, gates, doors, or other controls
- A plan to upgrade the security of air operations with a timetable for each improvement project

Airports were required to implement an airport security plan and were required to have all persons and vehicles that are allowed in the AOA suitably identified. Airport employees allowed in the AOA were subject to background checks prior to receiving proper identification and permission to enter the air operations area.

These measures paid off and the number of hijackings decreased significantly. In June 1985, Lebanese terrorists diverted a TWA flight leaving Athens for Beirut. One passenger was murdered during this two-week ordeal. This hijacking and an upsurge in Middle East terrorism resulted in several U.S. actions including the use of federal air marshals on flights. On December 21, 1988, a bomb destroyed Pan American flight 103 over Lockerbie, Scotland, and all people aboard the London to New York flight were killed. Investigators found that a bomb concealed in a radio-cassette player had been loaded on the plane in Frankfurt, Germany. Security measures were immediately put into effect for U.S. carriers at European and Middle Eastern airports after the Lockerbie bombing and one was the requirements to x-ray or search all checked baggage and

reconcile boarded passengers with their checked baggage, in a process known as positive passenger baggage matching. Legislation in the United States also called for increased focus on developing technology and procedures for detecting explosives and weapons. Throughout the 1990s, FAA sponsored research on new equipment to detect bombs and weapons and made several improvements to upgrade security screening procedures at airports.

The most significant event in our generation was the hijacking and crashing of aircraft into the World Trade Center and Pentagon Building on September 11, 2001. In response to this event, the Aviation and Transportation Security Act was signed which made several radical changes to airport security in the United States. The Transportation Security Administration (TSA) was formed to develop and enforce new security guidelines for aviation in the United States. In 2003, the TSA along with the Coast Guard, Customs Service, and Immigration and Naturalization Service, was formally moved into the new United States Department of Homeland Security. All regulations regarding the security of airport and other civil aviation operations in the United

States are now a TSA responsibility and are published under Title 49 of the Code of Federal Regulations (49 CFR—Transportation). TSA employees were hired and given responsibilities of all passenger and baggage screening at commercial service airports.

Since 2001, there have been a number of additional attempts to perform terrorist acts on the commercial aviation system around the world. As a result, security policies at the world's airports are constantly changing, primarily in reaction to these ever evolving threats.

During the last ten years 82 per cent of the world's jet aircraft fleet accidents occurred during take off and landing phases and accounted for 58 per cent of all onboard fatalities and all third party fatalities. Over the next 20 years annual passenger traffic is set to grow by as much as 168 per cent. The need to increase airport capacity in an era of decreasing public tolerance of the environmental effects such as noise, air pollution and third party risk of airports, lead actors in the air transport domain to devise new technologies and innovative ways of operating airports and aircraft. However, developments give rise to concerns about the emergence of new hazards and difficulties in containing existing hazards in and around airports.

There are effective ways of managing and containing the risks which require initiatives at European level. A common framework for management of the risks outlined is proposed and the following recommendations for action by the European Union are made:

- Mandatory airport licensing including a requirement to establish, maintain and ensure adherence to an integrated safety management programme.
- Mandatory collection of data on ground -based incidents, with appropriate emphasis on organizational and corporate culture factors.
- Mandatory inclusion of third party risk in Environmental Impact Statements for airports.
- The development of common standards for the safety assessment of operations.
- Further research to bridge current gaps in knowledge.

Aims

The aim of this briefing document is to establish that there is an issue which needs to be addressed at European level in relation to the management of safety in and around airports. This issue arises because of the interaction of a number of different trends (in technology, traffic and environment). The interaction of these recent trends poses an increase in identifiable risk. Another reason for specific immediate attention to airport safety lies in the emerging evidence, primarily created in the wake of the 747 crash in Amsterdam in 1992, which shows that the risk to the population living around the airport due to possible aircraft accidents, is comparable to the risk around chemical plants, which are strictly regulated in that regard. And finally, recent events (Dusseldorf 1996 and

Heathrow 1997) show that the safety of large numbers of occupants of terminal buildings may be jeopardized in case of an emergency (for example, fires).

While the concerns mentioned address different groups of people, the risks involved share common causal domains which are why the actions recommended in this document will in many cases improve the safety of very large groups of people. The precise identification of the parameters of this risk may be relatively uncertain because appropriate data (accidents, incidents, audits, etc.) are not systematically collected on processes relevant to safety, specifically in and around airports. Furthermore, the institutional framework of accountability for safety is diffused between airport authorities, airlines, civil aviation authorities and other airport users in a way which does not facilitate an effective response to the safety issues which are emerging. This document will seek, therefore, to identify the safety parameters of these emerging trends in and around airports, outline the type of countermeasures which need to be instituted, identify the need for further research to clarify gaps in the evidence, and make appropriate recommendations in the light of existing evidence.

Review of safety in and around Airports

Emerging trends

Rapidly increasing traffic volumes and forecasts of continued growth into the next decades put a strain on airport capacity. Airbus Industrie, for example, predicts an average annual passenger traffic growth rate of 5.0 per cent during the next 20 years, which means that during this time traffic will increase by 168 per cent (1). At the same time, public tolerance of the environmental effects of air traffic around airports such as noise, air pollution and third party risk would appear to have decreased. These conflicting trends lead airports, airlines, air traffic control organisations and the aircraft and equipment industry to devise new technologies and innovative ways of operating airports and aircraft in order to meet both the capacity demands and the environmental limitations. Safety is not the objective of these developments; it is a mere constraint. Consequently, new hazards emerge and existing hazards become difficult to contain unless adequate attention is given to safety aspects in this combination of emerging trends.

In addition, a new dimension, third party risk, presented itself as a safety concern in a growing number of European countries. Airports are hubs in the air transport system. Consequently, their presence causes a convergence of air traffic over the area surrounding the airport. For the population living in the vicinity of an airport this implies involuntary exposure to the risk of aircraft accidents. Although the probability of an accident per flight is very small (typically in the order of 1 in one million), local risk levels around airports are higher than one might expect. This is caused by the fact that, while the probability of an accident per take-off or landing is very small, the number of landings and take-offs is often very large (typically several hundred thousand). The resulting annual probability of an accident at a typical large airport is therefore much greater than the small probability of being involved in an aircraft accident as a passenger.

In addition, accidents tend to happen during the take-off and landing phases of flight and hence close to an airport. Safety data from studies show that approach and landing phase accidents account for a significant proportion of fatal air transport accidents. From Table 1 it can be seen that 82 per cent of the world jet aircraft fleet accidents between 1988-1997 occurred in these flight phases and accounted for 58 per cent of all fatalities (2). Historical data confirms that aircraft accidents involving considerable numbers of third party victims occur several times a year. Probably the best known example is the tragic accident of a Boeing 747 in suburban Amsterdam in 1992. Recent accidents occurred in Taiwan (Taipeh), Russia (Irkoetsk), Paraguay and Zaire (219 3rd party

victims). This environmental effect is of growing significance to airports safety responsibility and decision making on airport development and land-use planning for airport regions.

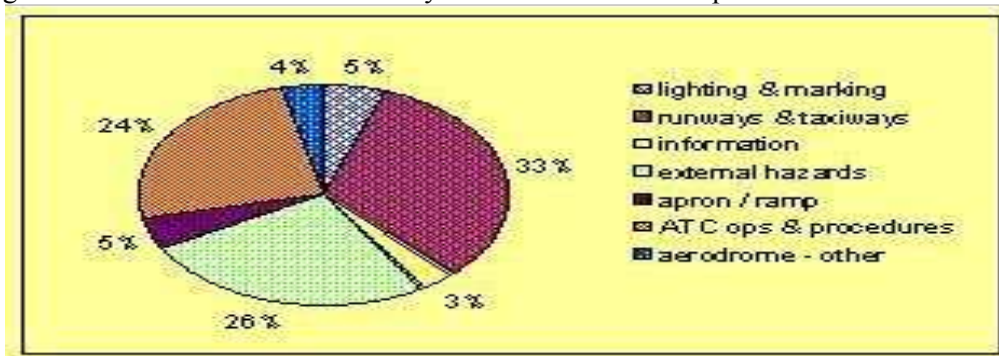
Table 1: Accidents and Onboard Fatalities by Phase of Flight, Worldwide Commercial Jet Fleet 1988- 1997 Source: Boeing Commercial Airplane Group

	Accident (100 per cent)	Fatalities (100 per cent)	Exposure (Percentage of flight time based on flight duration of 1.5 hours) (100 per cent)
Taxi, load, parked	8	0	-
Takeoff	16	6	1
Initial climb	5	5	1
Climb (flaps up)	7	23	14
Cruise	9	9	57
Descent	2	10	11
Initial approach	6	17	12
Final approach	11	26	3
Landing	36	4	1

Airports play an important role in the safety of air traffic. A recent analysis of accidents showed that around 30 per cent of these accidents involved at least one airport related factor in the causal chain leading up to the accident (3). Airport related factors in this case are taken as those factors which are specific to the airport environment but are not necessarily owned by the airport (and may thus include issues such as snow, fog, inadequate ATC guidance, etc.). The relative importance of airport causal factors may be estimated from their relative frequency of occurrence in causal chains of accidents in the above-mentioned dataset. To this end, the 76 different airport related causal factors found, were grouped into seven categories. These categories are:

- Lighting and marking (approach lighting, sign lighting, stop bar lighting, etc.)
- Runways and taxiways (runway length, obstructions, taxiway surface condition, etc.)
- Information (aerodrome hazard notifications, weather reports, runway information, etc.)
- External hazards (snow, fog, turbulence, wake vortex, etc.)
- Apron and ramp (apron/ramp congestion, apron/ramp surface condition, etc.)
- ATC operations and procedures (approach procedures, communication phraseology use, separation judgement, etc.)
- Aerodrome - other (aerodrome structures, VASI/PAPI, etc.)

Figure 1: Results of the above analysis: distribution of airport related causal factors.



This analysis demonstrates that all parties interacting around the airport are part of the problem and consequently part of the potential solution. Gaining further insight into the causal background of risk around airports is hampered by the fact that there is little systematic collection of accident and incident data concerning air transport incidents occurring or originating on the ground, either in ground operations or maintenance. Within the accident information which is being collected, a general lack of attention to the organizational factors and corporate culture factors in data collection taxonomies is present which further impedes deeper insight.

Recent European accident investigations have, for example, highlighted major deficiencies in the safety systems of many organizations in European airports; two examples of these include the incident at Daventry in 1995 and the accident in Edinburgh in 1991 which highlighted organizational and regulatory failures in the maintenance domain and in ground handling operations respectively.

The evidence presented here sheds light on the safety problems associated with airports and provides information on the broad categories of accident causal factors which are currently a threat to safety at airports. It is expected however that new developments and changes in traffic volume will have an influence on the nature of these accident causal factors. This briefing will examine how these factors will change as a result of new developments, in particular technological and operational, and in view of the predicted growth in traffic volume.

The Institutional Framework

The regulatory framework in Europe

European airports are regulated in accordance with ICAO standards. Airports in many European countries are not licensed however, primarily because they are or used to be state-owned/operated. The absence of licensing systems with a periodical renewal process does not facilitate strict regulatory oversight.

In addition, the regulations regarding airports prescribe, in accordance with ICAO Annex 14, what an airport should have as equipment and infrastructure. National authorities regulate adherence to these standards. At European level requirements are needed regarding the way in which the airport should be operated and how safety should be managed. Some countries, notably the UK (CAP 642), the Netherlands and the Nordic countries have established national regulations concerning the management of safety and are considering a harmonisation of their regulations in this regard.

The organisational framework

Airports are complex multi-organisational systems, with diverse safety standards and practices. Frequently, there is a lack of integration amongst airport users with regard to these safety standards and practices. In view of the multi-organisational nature of risks in the operation of airports, the lack of a mechanism to integrate the safety standards and practices of the different actors in and around the airport has a detrimental effect on safety. Such a mechanism is difficult to establish since the respective actors in the overall airport organisation are subject to different regulatory regimes. These include aircraft maintenance, flight operations, ground handling including fuelling, security services, airside services and air traffic control. Even where some of these processes are frequently done by the same organisation, they are usually subject to different management systems, different training standards and exhibit a different safety culture.

Airport safety priorities

The following critical safety issues need to be addressed in order to prevent an increase in the airport-related safety deficiencies which may result from operational and technological developments.

Safety concerns resulting from operational developments

a. The wind and turbulence environment of airports

The wind and turbulence environment at airports is a matter of growing concern. Airports tend to attract corporate real estate. Offices and other buildings are increasingly being located in the immediate proximity of runways. The wind turbulence caused by these buildings has been such that in some cases aircrews have temporarily lost control of the aircraft shortly before touchdown or shortly after lift-off resulting in serious incidents. Due to the large monetary value of building space at airports, the pressure to allow such building activities will continue to grow. The current ICAO obstacle clearance criteria do not provide adequate protection. A lack of understanding of the turbulence aerodynamics and aircraft dynamic responses to turbulence upsets hampers the development of appropriate regulation.

b. Wake vortex

Wake vortex constraints govern the minimum required distance (separation) between aircraft lined up in sequence on the approach to the runway. During peak capacity operations, this distance effectively determines runway capacity and thus airport capacity. Capacity constraints lead air traffic control organisations and airports to considering a reduction in separation minima from the current minima under certain conditions. At the same time, increasing use of parallel runways or other combined use of runway configurations and the future arrival of Very Large Aircraft gives rise to a possibly worsening wake vortex environment at airports. These developments do increase the risk of loss-of-control accidents in the final approach and landing phase. Wake vortex modelling is currently being researched as is the use of ground based or airborne sensors to identify and locate wake vortices and the development of associated procedures. These developments must be examined with a view to developing certification standards.

c. Safety of noise abatement procedures

Environmental constraints, and in particular the noise issue, are increasingly becoming the limiting factor in airport capacity. This, in turn, leads to airports and ATC organisations to develop advanced arrival and departure procedures such as Continuous Descent Approaches, Reduced Flap Approaches, Delayed Gear Approaches, etc. Such procedures may bring about a reduction in safety margins and therefore need close scrutiny. In addition, there are workload concerns and error proneness concerns. Also, the pressure to maximise noise preferential runway utilisation leads to the consideration of relaxed crosswind limitations by airport and ATC organisations which may put aircrews close to controllability limitations. In addition controller workload concerns with regard to the advanced procedures must be carefully considered, particularly when utilising mixed modes.

The safety implications of new technologies

1. Enhanced and Synthetic Vision systems

Head up displays are increasingly finding their way onto civil flight decks as a cheap alternative to autoland systems to allow operations under reduced weather minima. Although such systems are attractive alternatives to conventional systems, verifiability poses a serious safety concern. The same is true for Enhanced and Synthetic Vision Systems (E&SVS). These systems offer a potential safety improvement, but when utilised to reduce operational minima may pose safety problems. In view of the fact the investment in such systems by operators is likely to be made only if, in addition to a potential safety benefit, a financial return can be generated through less cancelled flights and the associated competitive edge, the safety implications should be reviewed. A safety concern related to these technologies lies in the fact that emergency response units may have trouble locating an accident aircraft on the airport in zero visibility conditions.

2. Very Large Aircraft

The introduction of Very Large Aircraft will give rise to problems of compatibility with the existing design and infrastructure in many airports. Such aircraft are likely to require more ground service equipment at stands than current aircraft. Problems of access to ground service equipment in congested airport apron environments may increase the risk of aircraft damage, which has the potential to compromise flight safety.

Disaster management plans

Air accidents frequently occur near, rather than at, airports. Therefore integrating the activities of local and airport emergency services becomes a major issue for planning. ICAO requires major accident simulations and exercises on regular annual basis. However this requirement does not encompass planning for potential accidents outside the airport limits. Furthermore recent experience of major disasters has highlighted the importance of planning to manage the traumatic aftermath of major disasters for survivors, relatives and operational personnel. Recent US regulations place requirements on airlines to draw up plans and commit resources to dealing effectively with the traumatic aftermath of aviation disasters (Federal Family Assistance Plan for Aviation Disasters). Consideration should be given to how such a scheme could be instituted in Europe. Planning for an effective response to disaster at or near an airport places a particular requirement for co-ordination between emergency services, for both short term and long term response; it should encompass such aspects as the accessibility of potential accident sites near the airport to emergency vehicles. Experience has also shown the critical importance of effective and comprehensive debriefing following emergency exercises. Such debriefing should include all staff who have a role in the disaster response and is essential if the organisation is to evaluate its preparedness and to learn how to improve its disaster planning.

Managing risk

A common framework for risk management

A common, high safety standard at an airport cannot be achieved by any single actor since the level of safety at the airport is to a large extent governed by the interaction of multiple organisations. An integrated safety management system involving all organisations operating at the airport is thus required. Integrated Safety Management System is the norm. In this system, the airport itself, the main airlines, a representative of all other airline operators, ground handling providers, refuelling services, and the air traffic control organisation work together to improve safety. To that end, parties have established a Terms of Reference, have regular meetings and use a common Operational Airport Information System. All participating organisations are connected to this system and enter information on air and ground incidents into a common database. This information exchange, the regular meetings and common objectives provide the necessary premises for the early identification of safety bottlenecks, the design of achievable corrective measures and their effective implementation. Consideration needs to be given to how this approach could be developed on a European level.

A common methodology for risk assessments

In order to promote fair competition and equally high levels of safety across Europe, there should be a common frame of reference for the assessment of new procedures and technologies with regard to safety. While current regulations provide adequate guidance for airworthiness assessments of systems, they do not adequately support the procedural aspects of the safety assessment of new technologies and advanced procedures. In fact, a commonly accepted method which specifically addresses the human operator and the procedural aspects in an appropriate manner does not yet exist. Promising developments in this field are ongoing in the European Air Traffic Control Harmonisation and Integration Programme (EATCHIP) activities of EUROCONTROL are being adopted. Those and other initiatives should be supported.

A common framework for managing the risks to third parties

Increasing traffic volumes stretch the air transport infrastructure to its limits and require a considerable increase in available airport capacity. Increases in airport capacity usually necessitate new or improved runways and terminals, and changes in route structures and traffic distributions. Such developments bring about the need to prepare environmental impact statements that also address the issue of third party risk. This has led to considerable progress being established in

methods and models for the calculation of third party risk around airports. The results of these calculations often carry a high political charge and form (part of) the basis of far -reaching and very costly infrastructural developments. In order to secure the well being of citizens, also in support of fair competition among airports, strong regulatory mechanism is necessary. A further reason for urgent action is the fact that apart from legislation on noise, there is still relatively little national airport legislation and in particular legislation on land use around airports. The establishment of risk tolerability criteria for land use planning purposes as well as common risk assessment methodologies should be pursued.

Areas requiring further research

Effective policy making on several of the safety concerns identified is impeded by a lack of essential knowledge. In order to bridge those gaps in knowledge the following issues require further research:

- The establishment of common methods and tolerability criteria for third party risk.
- The development of adequate methods and models to incorporate the role of human operator and procedural aspects in formal safety assessments.
- The safety aspects of new technologies such as enhanced and synthetic vision systems, Head Up displays for civil cockpits.
- Airport wind and turbulence environments and their dynamic effects on aircraft in take -off or landing
- The operation of safety systems in a multi-organisational environment
- Methods of analysis of organisational precursors of accidents and incidents
- Evaluation of planning for disasters

Recommendations for action

In order to effectively address the safety priorities discussed above, the following actions by the European Commission are recommended.

- Mandatory airport licensing including a requirement to establish, maintain and ensure adherence to an integrated safety management programme.
- Mandatory collection of data on ground -based incidents, with appropriate emphasis on organisational and corporate culture factors.
- Mandatory inclusion of third party risk in Environmental Impact Statements for airports.
- The development of common standards for the safety assessment of operations.
- Research support on the issues identified above.

Montreal Protocol on Suppression of Unlawful Acts of Violence at Airports serving International Civil Aviation 1988

The Protocol aimed to supplement the Convention for Unlawful Acts against Safety of Civil Aviation. Recognizing the growing nature and complexities of crimes that were taking place on board and the inability of the parent convention to deal with the same the Protocol was concluded.

The Protocol adds to the definition of "offence" given in the Montreal Convention of 1971 unlawful and intentional acts of violence against persons at an airport serving international civil aviation which cause or are likely to cause serious injury or death and such acts which destroy or seriously damage the facilities of such an airport or aircraft not in service located thereon or disrupt the services of the airport; the qualifying element of these offences is the fact that such an act endangers or is likely to endanger safety at that airport. These offences are punishable by severe penalties, and Contracting States are obliged to establish jurisdiction over the offences not only in the case where the offence was committed in their territory but also in the case where the alleged offender is present in their territory and they do not extradite him to the State where the offence took place.

CHAPTER IV: GROUND HANDLING AT AIRPORT

We can distinguish two major types of ground handling procedures which are designated as either terminal or airside operations. We will focus on airside operations as the complexity of tasks and the diversity of required equipment are great. First, we should define the whole range of operations that ground handlers deal with. The following list is an indicative for common commercial flights¹:

Ramp services

- Supervision
- Marshaling Start-up
- Moving/towing aircraft
- Safety measures

On-ramp aircraft services

- Repair of faults, fueling, wheel and tire check Ground power supply
- Deicing, cooling/heating
- Toilet servicing, potable water, demineralized water Routine maintenance
- Non-routine maintenance
- Cleaning of cockpit windows, wings, nacelles and cabin windows

Onboard servicing

- Cleaning
- Catering
- In-flight entertainment
- Minor servicing of cabin fittings Alteration of seat configuration

External ramp equipment

- Passenger steps Catering loaders
- Cargo loaders, mail and equipment loading

Obviously, ground handling management has to deal with very diverse tasks. Preferably, these operations are performed simultaneously to decrease ground time and thus to increase aircraft productivity. Airlines pay heavy price for the delays that their aircrafts experience. Therefore, they strongly emphasize the time-efficiency of ground operations provided either by themselves, by the airport authority or independent companies. It makes the task even tougher for ground handlers whose efficiency relies on technology-advanced equipment, coordination of staff and information support systems.

¹ *Airport Operation, Second Edition*, written by Norman Ashford, H.P. Martin Stanton & Clifton A. Moore(p160)

Equipment

In terms of ground handling equipment, we find out that available products are numerous. It would not be very relevant to analyze thoroughly every company with all their products. Here is an indicative list of equipment which gives a good overview of what a typical airport authority needs to operate ground handling³. The list below summarizes what equipment is basically required

Tow-bars: they make it possible to tow a given aircraft by a tractor which is clipped to the bar. The main advantage is that you need only one type of tractor to tow all types of aircrafts. The main disadvantage is the high number of staff required to fix the bar to the aircraft.

Push-back tractors: it is a good alternative to tow aircrafts as tow-bars are not always required. On the other hand, these devices are much more expensive than universal tractors coupled with tow-bars.

Forklifts: they are used to carry palettes especially when ground handling operations deal with freight.

GPU: these units provide aircrafts with electric energy. They can be either mobile or static. As the legislation is becoming very restrictive in terms of gas emissions at airports, the utilization of autonomous energy source as APU becomes very limited. Therefore, GPU are used more and more often. The energy source of mobile units is mostly diesel.

Loader: They are used to carrying heavy loads between 3.5 and 14 tones. This can include baggage containers.

Dollies

Belts: they are used mostly to carrying smaller loads and baggage when they are not packed in containers.

Tractors

Transporteurs: they facilitate the transport of containers.

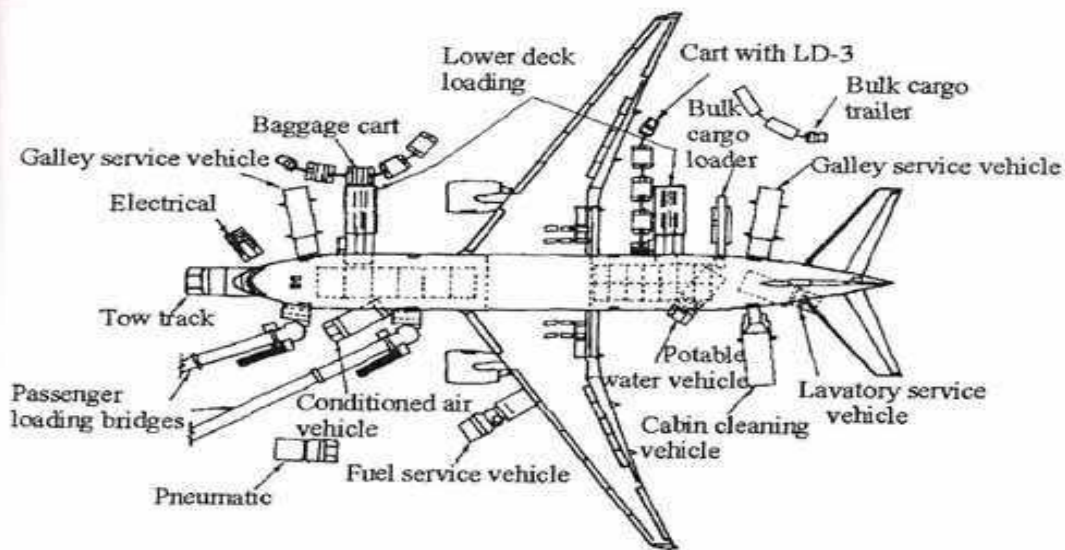
Text Bots: use of textbots is catering up very fast.

This brief description of what equipment ground handlers need shows that these activities require huge investments. Equipment is very diverse and the required number of each device is high. It illustrates how difficult it can be for independent handlers to penetrate a market. Airlines prefer dealing with only one ground handling service provider for a given flight so independent handlers are required to buy all this equipment which represents a great amount of money.

Operational analysis

Layout of operations

As we can see on figure 7, ground handling is a multi-task procedure. Since managers want to save some money for the airlines they work for, they endeavor to perform simultaneously as many operations as they can.



The B-777 being serviced during a turnaround with the help of ground support systems and mobile equipment Fig 7

Source: Boeing 777 Airplane Characteristics for Airport Planning

This layout raises the important issue of equipment damages that can occur during operations. The equipment density around the aircraft is very high and may lead to frequent incidents. In fact, a survey was conducted by ACI in November 1998 with 313 participating airports. The survey reported 671 incidents during handling of 2 133 398 movements, giving a rate of one incident per 3180 movements⁴. It shows that the frequency of accidents is low but a further analysis proved that a majority of accidents could have been avoided if fixed ground systems would have been used. On figure 8 below, all equipment to equipment damage and parts of equipment to facilities damages as well as damage to/by moving aircraft would have been avoided.

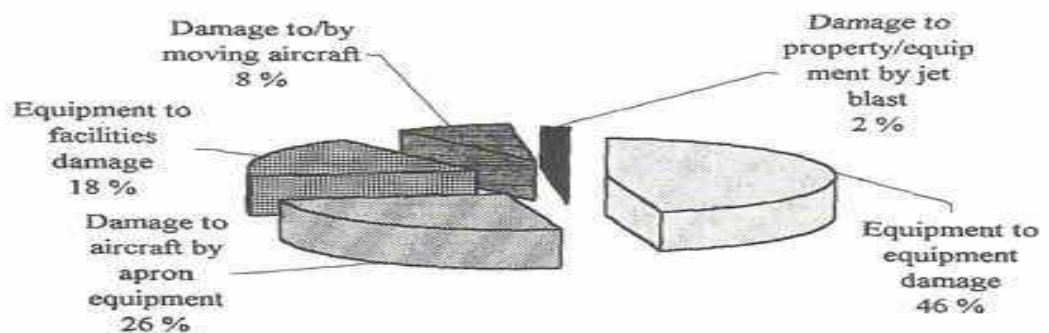


Fig 8

Apron incidents/accidents – causes of damage (1994-98)

Source: ACI Survey on Apron Incidents/Accidents (November 1998)

These results illustrate the trade-off between fixed systems and mobile units that ground handlers and mostly airport authorities have to deal with. On one hand, mobile units are more adaptable, they require less investment but they may cause severe damages. On the other hand, fixed ground systems are safer and reduce gas emissions, but they cost a lot of money and they are not as adaptable to any type of aircraft as mobile units. In conclusion, the equipment listing shows that a large stock of mobile units is necessary to ensure the tremendous flexibility required in ground handling.

Timing

Table 1 below is an example of the B747 servicing at an end station turnaround. As we can see, many tasks are performed simultaneously given the layout of operations above. The turnaround time is about 60 minutes but this time can be much shorter in the case of regional jets. Usually, ground handling operations are supposed to be finished within 20 minutes which leaves no room for error.

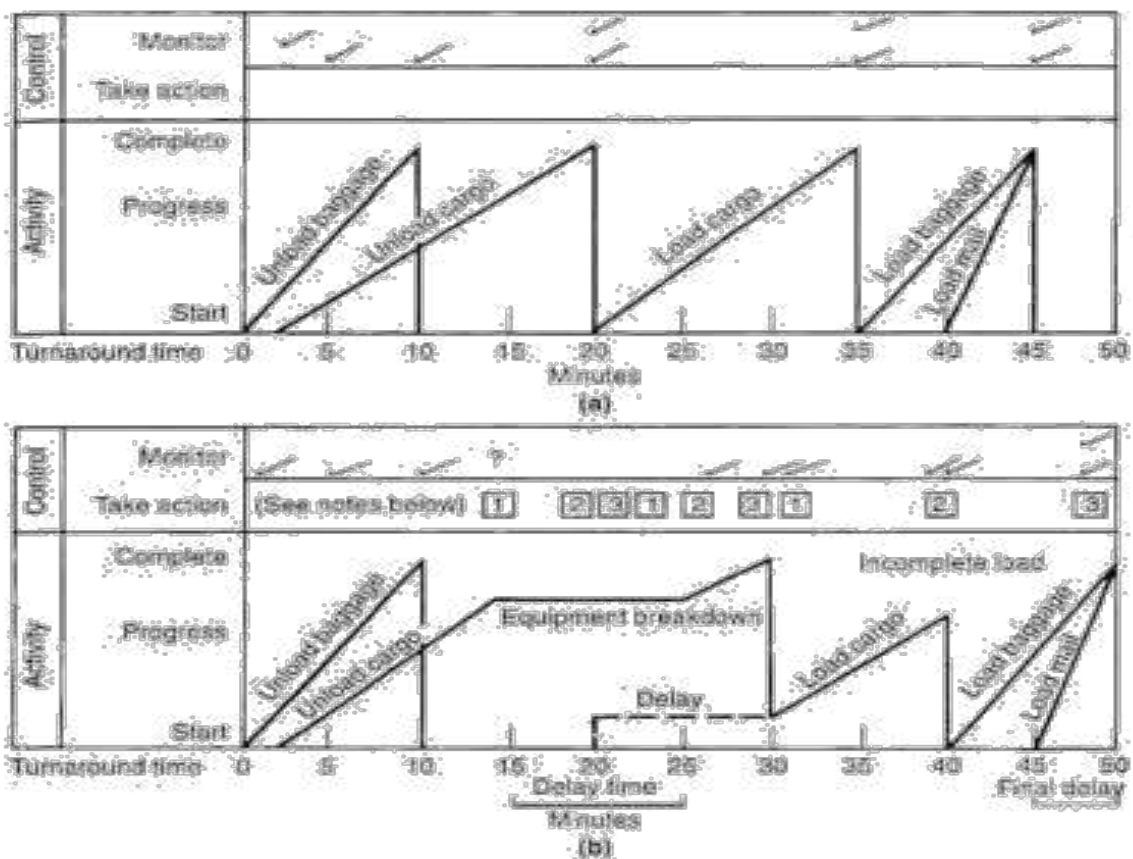
An example of the B-747 servicing at an end station turnaround

Activity	Time [min]	10	20	30	40	50	60
Position passenger bridges	1						
Supply power	1						
Deplane passengers	11						
Unload aft lower lobe	14						
Unload main deck cargo	25						
Service lavatories	30						
Service galleys	30						
Service cabin	29						
Service potable water	14.5						
Fuel aircraft	28						
Board passengers	18						
Unload FWD lower lobe	10						
Load main deck cargo	28						
Load FWD lower lobe	10						
Load aft lower lobe	14						
Start engines	3						
Power supply removal	1						
Remove bridges	1						
Push back	2						

Table 1

Management and organizational issues

The tighter the operational schedule is, the more important the operational management is. Table 2 shows that ground handlers have sometimes to deal with uncertainty. If a breakdown occurs because of an equipment failure, the operation manager has to make a choice depending on the importance of the interrupted operation. If the flight does not rely on this operation, the manager may decide to cancel or to shorten it. Particularly, we think about freight and mail loading. Indeed, delays experienced by the aircraft may cost more money than loading can make. Moreover, managers take care of coordinating all workers on tarmac in order to ensure safety of staff and equipment and to be time-efficient.



Effect of breakdown and delay on a typical flight turnaround. (a) Activity normal, no control action. (b) delay through breakdown control required. Action 1. Assess the nature of the problem and how long the problem (breakdown of the cargo loader) will take to sort out. Action 2. Take corrective action immediately or Table 2. Inform the crew and ask engineer to come to the aircraft immediately or call up a replacement loader. Action 3. Advise all those other sections/activities that will be affected by the breakdown and give them instructions as necessary (e.g. notify movement control of a delay, tell passenger service to delay boarding, etc.)

For a typical 767-200 arriving flight, staff are engaged between T-15 and T+45 in minutes. For a typical 767-200 departing flight, staff are engaged between T-60 and T+15. Usually, the team is composed of 4 workers and one manager. Each worker has specific driving licenses and ground handling managers have to make sure their teams can operate the required equipment.

Finally, we can notice that the small number of team members provides the flexibility that ground handlers need most.

Ground handling deals with very complex operations. Even though heavy equipment is required to perform the tasks during a turnaround, flexibility is the key point to reach maximum efficiency. Therefore, adaptability skills of all workers and managers are crucial.

Case Study of Ground Handling Operations in United States

In this second part, the objective is to provide an overview of the current ground handling market in the US. As compared to the rest of the world, the American market is very unique because only a small proportion of these operations are performed by independent companies. Most of the ground handling performed in the US is managed by the airlines themselves while European airports used to have a monopoly over this market⁵.

We extracted all data from form 41. Quarterly, it reports all operational and financial data of American airlines.

Labor analysis

Based on our analysis of airlines' employees, we found out that legacy and low fare carriers differed greatly with regard to their ground handling staff. On the one hand, legacy carriers have important cargo activities. On the other hand, low fare carriers do not focus on these marginal revenues. As a result, they have either no or very small staff. It can be seen on figure 10. We can assume that

legacy carriers have much more valuable opportunities to perform cargo operations as many of them operate international flights. Then, it must be easier to organize cargo handling when you operate a hub and therefore you have priority over all other carriers. Since cargo operations require more time and more space, an airline operating at its hub must be in a better environment to perform this kind of operations.

However, we can notice that the relative proportion between passenger handling staff and general A/C and traffic handling staff is a constant throughout the airline industry and is equal to about 2.

Proportion of Types of Personnel

Aggregate results

■ Empl Gen A/C & Traff. Hndl.

Per.

■ Empl Passenger Hndling

Personnel

■ Empl Cargo Handling Personnel

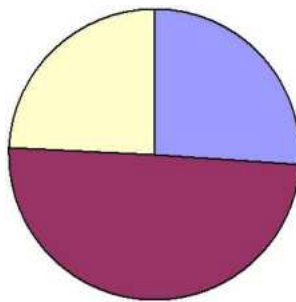
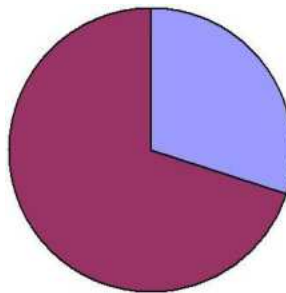


Fig 9

Proportion of Types of Personnel Southwest

Fig 10



Market volume

Similar to the trends of the American airline industry, the ground handling market increased tremendously from 1995 to 2002. After 9/11, legacy airlines which carry the vast majority of the traffic cut capacity which resulted in a decrease in ground handling operations. On figure 11, these two trends are obvious and it shows that the ground handling market can be changing as quickly as the airline industry.

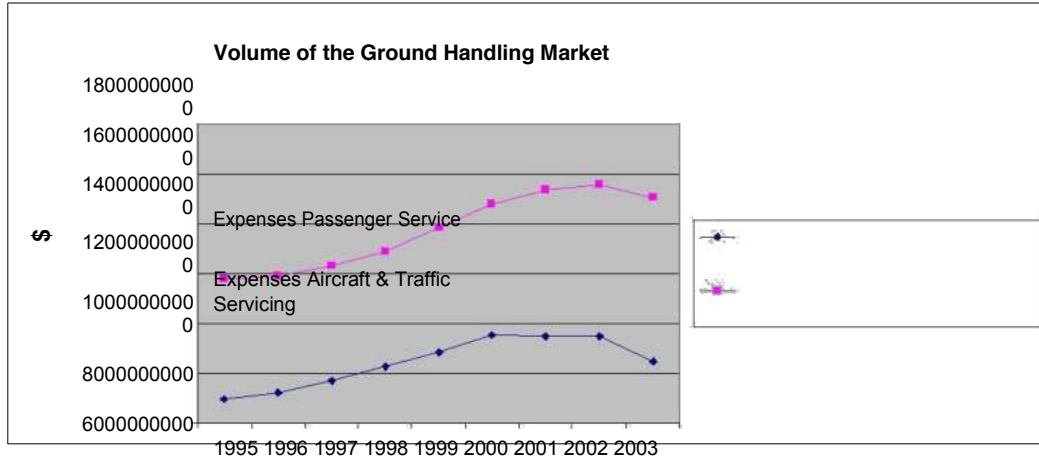


Fig 11

Figure 12 shows how airlines reacted after the airline industry downturn following 9/11. It shows that aircraft servicing per ASM increased from 1995 to 2002. At this time, airlines were willing to improve ground handling efficiency. Therefore, they invested large amounts of money which certainly resulted in reducing turnaround time and improving level of service. After 9/11, they stopped focusing on time-efficiency to focus on cost-efficiency as the whole industry faced major financial difficulties. Since they could cut costs on passenger service, they did. Apparently, it was more difficult and maybe not very reasonable to cut on aircraft servicing as a huge proportion of aircraft productivity relies on ground handling. Finally, aircraft servicing expenses per ASM remained constant while passenger servicing expenses decreased tremendously. Figure 13 illustrates the same trend by showing changes in property and equipment related to ground handling per ASM.

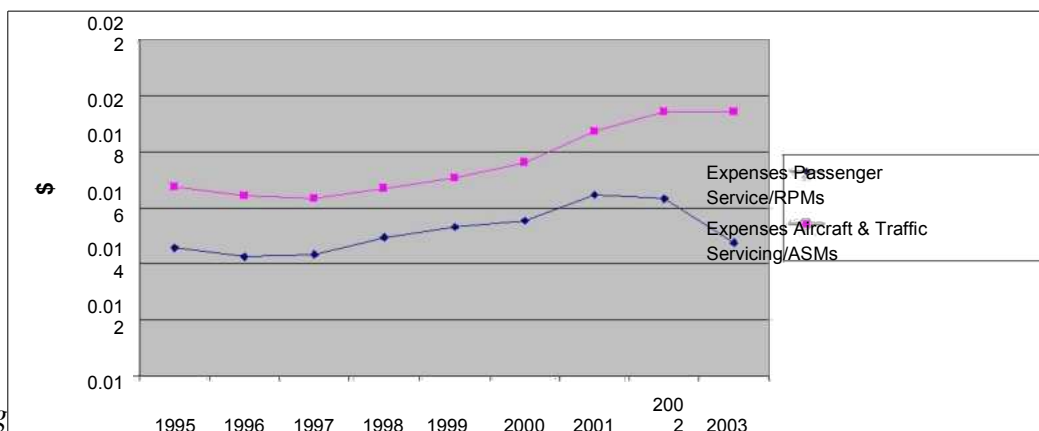


Fig 12

P&E- Ground/ASMs

0.025

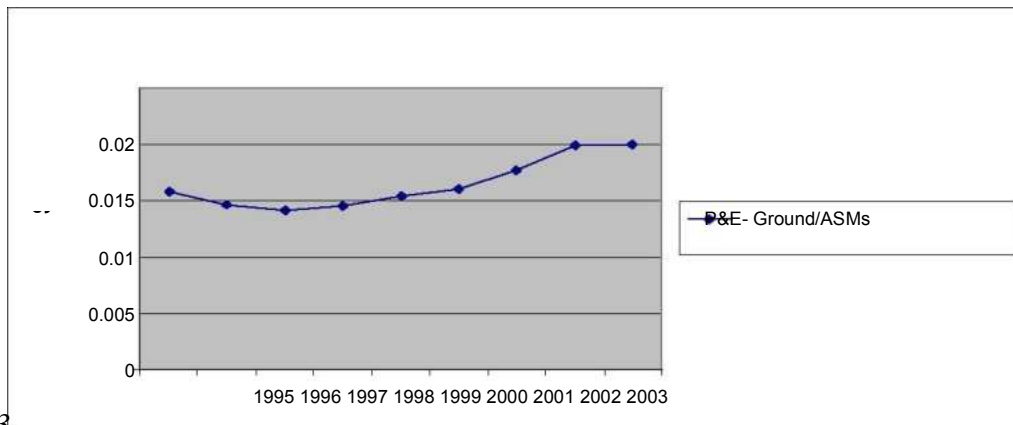


Fig 13

Specific expenses

As we can see on figure 14, airlines have started cutting all expenses related to onboard services since 2000. Facing the intense competition of low fare carriers, legacy carriers had no choice and cut these expenses to lower unit costs. As a result, they first cut jobs and renegotiate contracts of flight attendants. Then, they reduce food and other in-flight services tremendously. On figure 15, it is even more obvious when these expenses are compared to RPM. We can notice that the decrease has been strengthened by the post 9/11 downturn of the airline industry.

Finally, we infer that airlines are not willing to spend large amounts of money in food expenses any more. This trend is unlikely to change as the competition of low fare carriers which provide a very low in-flight level of service is not weakening.

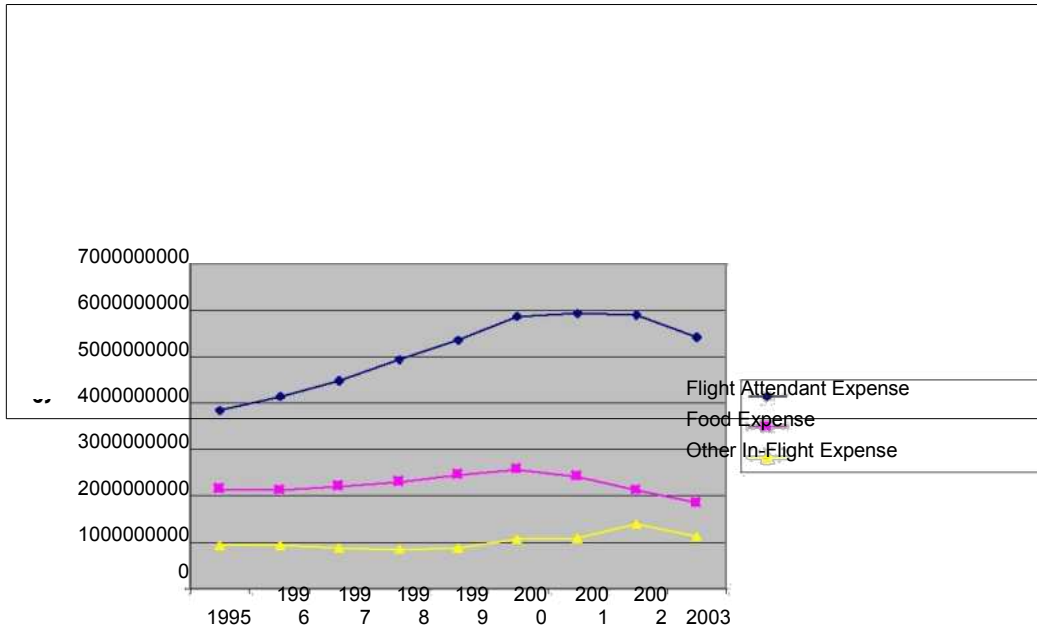


Fig 14

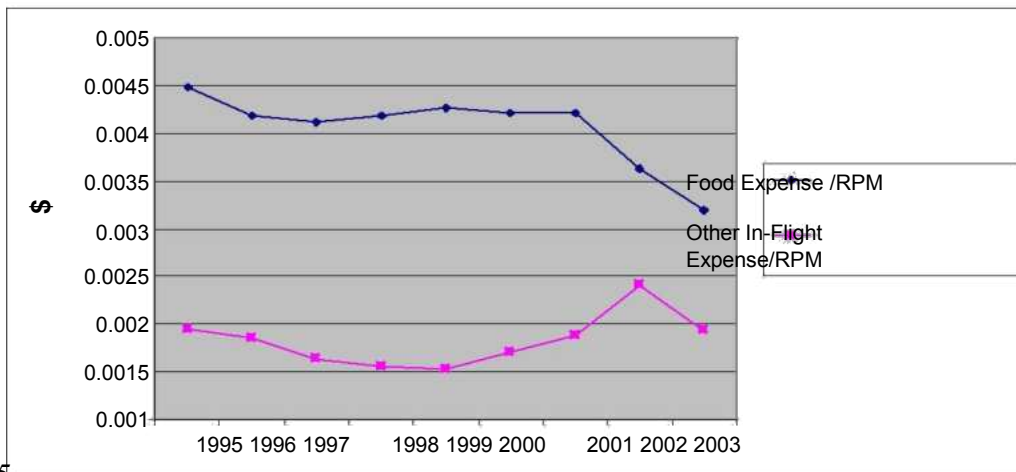


Fig 15

Conclusion

Ground handling costs a lot of money to the airlines. They are willing to limit these expenses but there is a trade-off between cost-efficiency and time-efficiency. Indeed, a very efficient ground handling management can improve aircraft productivity and generate more revenues. Therefore, we see that aircraft handling costs per ASM remained constant even though airlines are facing major difficulties. However, other expenses related to food and services like in-flight entertainment are drastically reduced as they are not necessary and customers are less demanding.

CHAPTER V: PASSENGER MANAGEMENT AT AIRPORTS

Check-In Process

Checking in is a key process which is to be followed in airports. Currently there are numerous methods through which the passengers can check in for their flights apart from using the traditional desk check-in.

Alternate forms of check-in initially involved self-check in services at kiosks airports and then remote methods like mobile services and internet. With regards to the check-in kiosks these started approximately 15 years ago at the airports. They were primarily installed by the airports for their own use i.e. the propriety kiosks. This was an inevitable development as the airline industry saw as to how the self-service technologies in other industries such as banking had lowered the costs, increased productivity and reduced customer waiting time. At the same time better use of scarce space was made at the airports. This was followed by the development of the common use self check-in (CUSS) kiosks which allowed the airlines to share self-service resources. There had been a similar trend with traditional check-in desks where common use terminal equipment (CUTE) had been introduced in the early 1980s. the earliest CUSS kiosks were installed in Vancouver and Narita airports in 2002. In 2006 around 29% of all passengers used some type of self-check-in kiosks and this was expected to rise to 49% by the end of 2008. The usage of the system varied considerably with nearly 58% of Americans using this self-service method while its equivalent use in Africa and Middle East was merely 10 %.

Initially airlines developed dedicated desks to differentiate themselves from others and to give themselves that competitive advantage particularly to their frequent flyers. The kiosks were branded with their name and identity. However there were no common standard for these dedicated kiosks and hence the investment and the maintenance costs also proved to be very high particularly when the airports being served was not a major base for the airlines.

Hence the CUSS kiosks were developed which allowed the costs to be shared between different airlines and less airport counter staff. However the airlines would lose the individual control over the check-in process and the cost which they incur and are no longer able to differentiate this aspect of their product.

For the airports the CUSS system provides more flexibility just as the CUTE system when it was introduced as it allows for terminal space to be used for efficiently. This may enable a higher volume of passengers to be handled without the necessity of expanding the terminal. The check-in facilities could be placed in the most convenient places in the terminal and spread out if needs be to avoid crowding. In theory the space no longer needed to be check-in can also be used for retail opportunities although this may well require considerable reconfiguration of the overall space to place these new facilities in an appropriate location. In most cases it is the airports which owns the kiosks and then charges the airlines but in rare cases it may be the airlines themselves or their handling agents.

As far as the passenger is concerned, both the types of kiosks provide facilities for easier and faster check-in but the CUSS system gives them most flexibility to check in anywhere regardless of their airlines and can thus eliminate any confusion of multiple dedicated terminals. IATA has estimated the average check-in time to be around 3.5 minutes but with self-check-in kiosks, this has reduced to 2.5 minutes or even 1.5 minutes if there is no hold on the baggage.

Kiosks could be placed not only in traditional check-in areas but also at other places in the terminal and off the terminal sites such as car parks, train stations, car rental return facilities, hotels, cruise ships which can reduce check-in queues in actual terminals and give passenger extra convenience and control.

For instance in the Las Vegas airport, CUSS Programme i.e. ‘Airport Speed Check’ was launched in 2003 and subsequently developed to include remote check-in as well. It has a goal of having at least 10 % passengers with bags check-in remotely. It has kiosks in two hotels, convention center, car-rental facilities which can hold baggage. In February 2004, there were only 10 airports using the CUSS system, but by the end of 2008 this number increased to 86 with the largest number being in Europe. In New Delhi check-in facilities are available in some Metro Rail Stations, Hotels etc.

Increasing usage of kiosks is one the major aims of IATA’s ‘Simplifying the Business’ initiative which was launched in 2004 to use technology to streamline processes and reduce complexities and costs. In addition to CUSS kiosks the other five focus areas are electronic ticketing, bar coded boarding passes, radio frequency identification for baggage management and paper-less cargo movement. More recently two other initiatives related to reducing the number of mishandled baggage and to encourage fast travel have also been launched.

The most basic self-check-in kiosks would verify the passenger’s identity and print the boarding pass. Some may allow for meal and seat choices to be made and some may also read travel documents such as passports and visas. But one of the key issues in this concept is to hold baggage check-in. Once the self-service check in is completed passengers have to queue up at the individual airline desks to check in their luggage. Many machines have tried to overcome this problem by being able to print baggage tags so that passenger themselves can tag their baggage and drop them off at a common baggage drop. But this is not allowed in all countries and in 2007 only 18% of the airports across the world had offered this facility.

In more recent years, mobile and web check-in has become a new trend. This is less costly for the airlines as they don’t have to install kiosks or use CUSS and the passenger print their own boarding pass.

There is currently a very active debate on whether self-check-in kiosks were an interim solution to improve check-in process and they would ultimately need not be needed as check-in remotely using PCs or mobiles is cheaper for airlines and more convenient for passengers. However such remote technology is not always available to the passengers particularly if they are away from home. Moreover using such system are not always seamless or without the issues of security or gate staff.

Bio-Metric Identification and Registered Passenger Schemes

A Registered Passenger scheme is ‘where interested passengers would apply to a national authority, be subjected to a risk assessment and, if that were successful, be registered as someone presenting a low risk to aviation security. When departing from an airport RPs would be exempted from certain security checks after identification.’ In certain places, an alternative definition of an RP scheme is introduced in this report – one that does not exempt or minimize the security checks to which RPs would be subject. Instead, this approach offers RPs an improved passenger experience through privileges such as fast tracking through accelerated security checks coupled with better customer service. The report explicitly specifies when this definition is being used.

There are three key stages to an RP scheme that need to be considered when assessing the most promising approach to international recognition:

- Enrollment
- Risk Assessment and

- Identification at the airports

Biometrics, on the other hand, is a generic term used to refer to a physiological or behavioral characteristic that can be measured to verify the identity of an individual. Physiological biometrics measure a part of an individual's anatomy, e.g. fingerprint, hand, face, and iris; behavioral biometrics measure an action performed by an individual, e.g. voice, signature; in both cases the characteristics have to be identifiable, universal, unique and permanent.

Biometrics can be used to “verify” or “identify” a specific individual's identity. Verification (authentication) refers to the problem of confirming or denying a person's claimed identity (Am I who I claim I am?). Identification refers to the problem of establishing and or authenticating a subject's specific identity (see more formal definitions at end).

Biometric systems have a series of key processes that have to be completed in order to:

- allow a person to use the system.
- achieve verification or authentication of a user's identity.

These key processes include:

- Enrolment – the capture of the raw biometric
- Template creation – preserving the biometric via the use of an algorithm to extract a template from the image captured that will subsequently allow the image to be compared to others using the same algorithm.
- Identification – takes new biometric samples and compares them to saved templates of all enrolled users.
- Verification – takes new biometric samples of a specific user and compares them to old samples taken from the same user.

These processes can also be developed as follows:

- Enrolment process, the individual provides a sample of the biometric which is captured by a device (e.g. a camera or a scanner). Information is extracted from this sample to create a biometric representation (template) which is recorded on a storage medium(e.g. chip or barcode).
- Authentication/verification process: The individual provides a sample of the biometric previously recorded on the storage medium. The representation created from this sample is compared to the (stored) reference representation. As no two biometric representations are exactly identical, the authentication process must determine whether the samples are a close match.

In terms of the main objective of biometric systems, i.e. the authentication process, the challenge is to achieve a high level of accuracy in the identity confirmation of any given individual. This involves developing a system that minimizes two key problems:

- Incorrectly matching a sample biometric representation of one individual with the reference biometric representation for another individual (False Acceptance Rate).
- Failing to recognise a match between a sample biometric representation of an individual with the reference biometric representation of that same individual (False Rejection Rate).

Identifying individuals upon check-in and before they board a plane is extremely important in ensuring safe air travel. Biometric travel document reconciliation systems achieve this specific function. The biometrics of an individual should be used to ensure that the passenger boarding an aircraft is the same person as the one who checked in; if necessary, an individual's biometric data can also be matched

against a “watch list” to prevent undesirable persons from boarding.

From check-in counters to boarding gates, biometric templates can either be written on the boarding pass (ATB magnetic stripe and/or 2D bar codes) or transmitted by the Departure Control System network, in which case a provisional database is needed. This procedure takes little time and can be completed during the normal check-in boarding process; therefore, no extra strain is put on the congestion of the airport. The implementation of biometrics on a Common Use (or airline dedicated) Self Service kiosk can be a viable way to capture the passenger’s biometrics upon check-in.

Facial recognition system (FRS)

Artificial Intelligence and Machine learning supported facial recognition systems integrated with the existing CCTVs and the preloaded database are helping enhance the security. Many airports in India are adopting these systems. Behavioral pattern study is added to the facial recognition system to obtain a very high degree of security with minimum disturbance to the passengers.

Airport Security

The airport should provide the necessary know-how and flexibility to achieve the integration, automation and interoperability of security systems, based on biometric recognition technology. This technology should support smooth facilitation and passenger flow within the terminal. The goal of airport security systems should be to ensure unequivocal passenger identification and to monitor passenger movement from profiling / check-in, through to boarding at the corresponding gate. Passenger identity should be checked by the system against Interpol and national watch-lists of criminals and terrorists. This would provide a significant increase in security, relying on biometric identity confirmation of passengers at each control point, from check-in until they board the right aircraft, thus avoiding identity switches or the use of fraudulent documents.

The systems to be implemented should speed up the validation processes for individuals and their travel documents. In this way, without unnecessary intrusion into a passenger’s privacy, the passenger should perceive both a higher level of security and easier passage. Airport management should allocate sufficient human and budget resources to the tasks of implementation, infrastructure adaptation, maintenance and upgrading.

Biometrics and Other Systems:

Biometrics can be used at airports to secure and facilitate a variety of other systems than border control, passenger facilitation and access control. For example, biometrics can play a role in:

- Employee background checks: as with corporate security, background checks have become increasingly vital to ensuring airport security. Airport authorities should conduct criminal record verifications using fingerprint identification for employees who deal with sensitive information or work on the aprons close to the aircraft. Good management practices and regulations dictate that record checks should be completed prior to employment or assignment to confidential tasks. Fingerprint capture stations can enroll staff and match their fingerprint templates with large existing forensic data bases, making background checks easier, faster and more reliable.
- Logical access control: airports are increasingly dependent on computer systems and the Internet and are therefore exposed to network hacking. This can be a major risk for airport operations and constitute a serious threat to civil aviation. Biometric log-in on client/ server software can add the functions necessary to secure any network biometrically. Logical access control, log-in and password

management (single sign-on), encryption, certificate activation and PKI compatibility are some of the ways airport network and computer systems can be secured. Cyber security and 2 factor authentications of systems are gaining importance.

ICAO's Recommendation on Bio-Metric System:

ICAO has developed standards for biometrically-enabled MRTDs. These standards concern passports (sometimes known as “e-passports”) and related documents such as visas and ID cards, for border control purposes, but may also be utilized by airports developing biometric systems for other purposes, be it for passenger facilitation or access control. Regarding the choice of biometric technology for border control, the direction given by ICAO is that face recognition is the primary biometric identifier, assuring global interoperability, and one or two additional, but optional, biometric identifiers - fingerprint and/or iris – as decided by each issuing State.

For purposes other than border control, it may not be necessary to use more than one biometric technology, as this will risk making the systems more complex, both for passengers and operators, and increasing the cost.

Application of Bio-Metric System:

1. Border Control: In general, the introduction of biometrics in MRTDs is a government issue therefore this implies that the costs of adapting the passport control booths at airports to be able to accept these new documents must be borne by governments. The following are the guidelines for the use of biometrics for border control:
 - a. Performance: The performance of a biometrically enabled border control system should be determined by the national regulators in accordance with the standards set by ICAO. A key factor in the performance of any system is that it must improve the passenger processing time and enhance the through-put of passengers. When designing and implementing the system, the airport operator and border control agencies should also ensure that the system contains fallback procedures in the event that a passenger is not recognized by the system and must be manually processed.
 - b. Standards: The biometric standards for MRTDs are set internationally by ICAO and implemented by national Border Control agencies. ACI members support the adoption of these standards internationally. Common standards for privacy and data protection should be defined between the appropriate agencies of each State.
 - c. Facilities: Eventually, biometric/ facial recognition systems will need to be installed at all airports where the national authorities wish to benefit from them, and should be managed to complement the more traditional identification procedures. Airports urge the regulatory agencies to consult and coordinate on planning and design of the layout, and integration of the Border Control facilities within the existing airport spaces. When designing a facility, there are many points to consider. System performance is a vital element; however, special attention must be paid to the flow of passengers through the layout / footprint of the system within the airport's facilities. In order to cater for this important facilitation aspect, the design of the system should reflect ergonomic considerations. Two other important items are that the process should be self-explanatory- the usage of the system should be intuitive to all users to avoid slow processing times, and the systems should meet passengers' requirements related to cultural and hygiene factors.
 - d. Technology: For the most part, the choice of technology is determined by the regulatory agencies. However, in order to facilitate interoperability, agencies should consider utilizing existing airport communications systems and infrastructure when implementing their technology– i.e. databases, communications, cabling, network, etc.
 - e. Costs: Airports request that the regulatory agencies consult them and coordinate with them on the costs and design of the systems to be implemented. The introduction of automated systems should not subject the airport to higher costs than conventional booths, such as the cost of additional or adjusted infrastructure. Costs must be borne by the agencies and not by airports, for example the airports are

within their rights to charge a rental fee to the agencies on usage of airport facilities and infrastructure.

2. Passenger Facilitation:

The use of biometrics for passenger facilitation will benefit air carriers (which may use them in the first instance to provide a higher level of service to their premium passengers and members of their frequent flier programmes) and government authorities through the use of ICAO and ISO MRTD standards. Airport operators may also benefit from the use of biometric systems to improve passenger throughput; however, the impact on the airport's passenger handling capacity will be largely dependent on how air carriers decide to deploy biometric systems. A "common-user" interface approach for biometrics benefit airport operators for check-in, security screening, passenger segregation boarding and border clearance. A proliferation of different biometric systems amongst air carriers and between air carriers and border control authorities would not deliver an improvement in passenger handling. Checking that a passenger's identity is consistent throughout all the processes - check-in, border crossing, passenger security check and boarding the aircraft - is the key to ensure that the right person is boarding the right aircraft and that the person boarding is also the same person who has undergone all of the earlier processes. If the passenger uses the same token in all these processes, it is quite obvious that there are benefits to be gained.

As the use of a travel document is relatively widespread in other processes at airports, and even within airline processes, it can be foreseen that MRTDs with biometric identifiers will swiftly be incorporated into these processes. The normal chain of processes that a passenger undergoes at an airport shows that a passport is not only used for border control; the check-in process has a link with the passport as does the boarding process.

Airport operators and air carriers should work together to ensure that regulators apply the same biometric identifiers for border control as for the check-in and boarding processes in order to facilitate quicker passenger flows. In terms of air carrier frequent flier programmes, airport operators encourage air carriers to employ common user systems to avoid the proliferation of biometric systems at dedicated self-service check-in points and dedicated check-in and boarding check points. The use of common biometric representations for air carrier frequent flier programmes should be considered. The integration of ICAO Standard MRTDs with ICAO selected biometrics in to the airline process may render redundant the need to use an airline frequent flier card.

3. **Security Access Control:** Airports reserve the right to determine which biometric technology (equipment and template) is appropriate for deployment in their staff access control system and infrastructure. In its most basic form, airport security managers are looking for a solution which ensures that flight crew and airport personnel are positively identified or verified and granted appropriate access into security restricted areas. Until now, airport security for staff access has been reliant on a series of tried and tested procedures coupled with conventional token or PIN-based access control security solutions. With the recent emergence of biometric identification technology a new capability can be introduced, enabling security managers to allow access to secure areas on the basis that they are able to identify who an individual is, as opposed to what they are carrying or what they know.

The use of a credential with an employee's biometric template for access control is extremely important since, unlike the passenger handling process, access control points for employees can be automated and therefore do not necessarily have to be manned by security staff, unless otherwise required by national law. Biometric technology for security access control in airports has been applied relatively slowly due to four key factors:

- "Over-promise" and under-delivery by biometric technology vendors. This issue has already started to disappear as vendors become aware that for a technology to be adopted on a mass scale, the 'customer' must be made aware of the weaknesses as well as the strengths of the technology they represent; all too often, trials do not fulfil the expectations of security managers.

- Fast progress of biometric technology capabilities. This factor is being mitigated as the leading biometric contenders for various application areas become apparent; however, an element of risk – albeit an informed risk – will always exist in the selection decision.
- Lack of a biometric interoperability standard. This factor is being addressed by the vendors and the biometrics industry in general, because they understand that airports want to be able to utilize different pieces of hardware within their existing access control system.
- The lack of a cohesive approach from regulating bodies. This factor is the biggest cause for concern: without the appropriate level of guidance from regulators, airports will remain intransigent on the decision of adopting biometric technology.

CHAPTER VI: PROCESS OF SETTING AIRPORT CHARGES

ACCOUNTING

While airports are operated under a variety of institutional frameworks — some as separate independent entities, others within an airport system or network — regardless of institutional/ownership structures, an airport accounting system should serve the interests of the various parties concerned. At a minimum, it should provide basic information to assess the financial health of the airport, to justify the charges imposed on its users, and to assess the performance of the airport over time. When designing an airport accounting system, it is useful to recognize the needs of the various parties concerned:

- Airport owners, governments, lenders, aviation authorities, etc., are all interested in the financial health of the airport. Information reflected in a financial statement will often serve their needs.
- Airport managers also need ready access to the financial data organized to allow for a detailed analysis of the financial performance of the airport. For this purpose, it is often necessary to organize financial data based on the airport's various verticals and cost centres.
- Airport users (air carriers, general and business aviation, inspection agencies, air navigation services provider(s), concessionaires) seek cost justification for the charges imposed by the airport. To provide such justification, it is often necessary to arrange financial data according to the various service lines within an airport.

In summary, when designing or upgrading an accounting system, reporting flexibility should be a critical design component. In order to achieve such flexibility, the accounting process leading to the production of financial statements must be understood as well as the statements for cost centres and service lines. While the accounting process behind financial statements is referred to as financial accounting, the process allocating financial data to cost centres and service lines is often referred to as management accounting. Figure 4-1 illustrates how the accounting system may be organized for an airport and the relationship between financial data and cost basis for airport charges.

Financial Statements

Airports operated as autonomous entities, under public or private ownership, are normally required to provide the following financial statements: a) income statement (revenue and expense statement); b) balance sheet; and c) cash flow statement. In order to produce the financial statements, a system must be developed for identifying various types of financial outlays and receipts. This involves establishing individual accounts, each showing a specific type of revenue, expense, asset or liability and cash flow. While the income statement, shows the revenues and expenses of the airport over a specific time period, the balance sheet is a snapshot of the financial health of the airport on a specific date, showing the value

of assets and liabilities in relation to the net value or equity (including retained earnings). The number of accounts established for a specific airport accounting system will depend on the degree of detail sought, i.e. the more elaborate the system, the greater will be the subdivision of accounts established.

Accounts recording revenues and expenses can be maintained on an accrual accounting basis or a cash accounting basis. Under accrual accounting, revenues are credited to the period (usually the financial year) in which they are earned and expenses charged to the period when they are incurred. Alternatively, under cash accounting, revenues are credited to the period when they are received and expenses recorded when paid. Accrual accounting systems reflect the financial position of the entity concerned better and are based on standard accounting practices.

In many cases, the financial statements of the airport may include operations that do not relate to the airport in question. For instance, the airport entity may operate several airports, air navigation services or even a local port. In other cases, some airport operations may be carried out by other entities and reflected in their financial statements. For instance, a department of public works may construct and provide capital assets to the airport, or the national telecommunications department may provide services to the airport without charge. In cases where the financial statements of the entity operating the airport do not reflect the operations of the airport in totality, some additions to and subtractions from the airport's financial statements will be required to ensure that a true and fair financial picture of the airport is provided. It is generally good practice to do this following the accounting conventions incorporated in the financial statements.

For various purposes (e.g. to obtain financing or to recover costs), it could be necessary to convert the financial statements into a format familiar to a lending institution or an international airline. International accounting principles, such as the Generally Accepted Accounting Principles (GAAP), or International Accounting Standards (IAS), or any other similar recognized standard would be acceptable.

The identification and subsequent recording of items is usually more easily accomplished for revenues than for expenses. This is chiefly because revenue sources tend to be fewer in number than expense items, and because each revenue item, with few exceptions, is often easily identifiable with only one type of source, whereas one expense item can frequently be identified with several major expense categories. The information required in an accounting system for airports can vary considerably in detail and layout. The precise level of detail will depend on management requirements at the particular airport concerned. However, there is a basic itemization of revenues and expenses that may be considered a minimum, which is described below.

Revenues

Revenue items that may be considered essential to meet the basic data needs of an airport management are outlined below as they might appear in a statement of revenues and expenses (the items shown are not intended to present an exhaustive list of the different sources of revenue).

Forms of Airport Revenues

Revenues from Air Traffic Operations

- Landing charges (including lighting and approach/aerodrome control charges). Charges and fees collected for the use of runways, taxiways and apron areas, including associated lighting.
- Passenger service charges. Passenger service charges and other charges and fees collected for the use of the passenger terminal(s) and other passenger-processing facilities (e.g. for passengers embarking or

disembarking).

- Cargo charges. Cargo charges and any other charges or fees collected in respect of cargo for the use of the airport's freight-processing facilities and areas.
- Parking and hangar charges. Charges collected from aircraft operators for the parking of aircraft (where not included in the landing charge) and their housing in airport-owned hangars, including any revenue from the leasing of such hangars to aircraft operators. Towing charges, if imposed, should also be included under this heading.
- Security charges. Charges and fees collected for the provision by the airport of security services for the protection of passengers and other persons at the airport, aircraft and other property.
- Noise-related charges. Charges collected related to the noise alleviation and prevention measures.
- Emissions-related aircraft charges. Charges collected to address local air quality problems at or around airports.
- Other charges on air traffic operations. All other charges and fees collected from aircraft operators for other types of facilities and services provided at the airport for the operation of aircraft.

Revenues from Ground-Handling Charges

This refers to charges and fees collected from aircraft operators for the use of facilities and services provided by the airport for the handling of aircraft. It should be noted that at the majority of airports ground handling is largely carried out by one or more airlines or special ground-handling enterprises. In the latter case, the airport will impose concession and/or rental fees which should be recorded as revenues from non-aeronautical activities.

Revenues from Non-Aeronautical Activities

- Aviation fuel and oil concessions (including throughput charges). All concession fees, including any throughput charges, payable by oil companies or any other entities for the right to sell or distribute aviation fuel and lubricants at the airport. Revenues from an automobile service station concession, including the sale of automobile fuel and lubricants, should be entered in the revenue accounts covering "Other concessions and commercial activities operated by the airport".
- Restaurants, bars, cafeterias and catering services. Charges and fees payable by commercial enterprises or other entities for the right to operate restaurants, bars, cafeterias and catering services at the airport, including aircraft catering. It would also include any revenues derived from any such activities when operated by the airport.
- Duty-free shops. Charges and fees payable by a commercial enterprise or any other entity for the right to operate duty-free shop(s) at the airport, and for off-airport duty-free shops to deliver goods sold at the airport. It would also include any revenues derived from duty-free shops operated by the airport itself.
- Automobile parking. Charges and fees payable by a commercial enterprise or any other entity for the right to operate automobile parking facilities at the airport. It would also include any revenues derived from such facilities when operated by the airport itself.
- Other concessions and commercial activities operated by the airport. Any concession charges or fees, other than those mentioned above, payable by commercial enterprises or other entities for the right to sell goods and services (such as automobile rentals, and banking and exchange bureaus concessions) at the airport. Also included are any revenues derived from commercial activities (shops or services) operated by the airport itself and not mentioned above, as well as any public admission fees charged for entry to areas of special interest (e.g. terminal observation areas) or for guided tours within the airport area.
- Rentals. Rentals payable by commercial enterprises and other entities for the use of airport-owned building space, land or equipment. Such rentals should include those payable by aircraft operators for airport-owned premises and facilities (e.g. check-in counters, sales counters and administrative offices)

other than those already covered under “air traffic operations” above.

- Other revenues from non-aeronautical activities. All other revenues the airport may derive from non-aeronautical activities. It would also include payments received by the airport for such services as heating, air conditioning, lighting, water, cleaning and telephone use, provided they are not included in the rental or concession fees, and for any services provided to non-aviation entities outside the airport.

Bank and Cash Management Revenues

This includes any revenues derived from investments and cash management such as interest on bank accounts, treasury bills, short-term debentures and bonds, or from trading in discounted notes and other similar revenues. Interest received may be deducted from interest paid to arrive at a net interest cost which is then shown as an expense item.

Forms of Airport Revenues

Operations and Revenues

- Personnel costs. Direct remuneration to personnel, as well as expenses for social and medical insurance, pensions, remuneration in kind (e.g. board and accommodation), travel subsistence allowances, employee training and other such costs that may be associated with employee compensation or development.
- Supplies. Cost of spare parts and consumable materials that the airport actually incorporates or expends in providing facilities or services without the assistance of agencies or enterprises outside the airport entity (see Services — contracted). Such costs should include the operation and maintenance of fixed assets (e.g. vehicles, machinery, furniture and fixtures) provided such items are not also listed as depreciable assets. Also included is the cost of services and supplies, such as heating, air conditioning, lighting, water, cleaning, laundry, sanitation, stationery and postage.
- Services — contracted. Payments made to others for the provision of airport facilities and services.

Administrative Revenues

This would include the cost of common administrative services, such as overall management and economic planning, to the extent it has not been reported under operation and maintenance.

Other non-capital costs. Non-capital costs not reported under operation and maintenance or administrative overhead. Included in such costs are national and other governmental taxes (e.g. property and income taxes) payables by the airport as a taxable entity. Excluded are any sales or other taxes collected from third parties on behalf of government taxing authorities (e.g. sales tax on goods and services sold in airport-operated shops, and income tax deductions from staff salaries).

Capital Costs

- Depreciation and/or amortization: Amount by which the value of the assets has decreased during the year due to physical deterioration, obsolescence and other such factors that limit their productive life. Also, the amount by which intangible assets (e.g. developmental and training costs) have been written off during the year would be included.
- Interest: Interest paid or payable on debts during the year as well as any interest computed on capital assets.
- Other capital costs. Long-term leases and capital repayments if an airport applies cash accounting instead of depreciation.

Capital

Capital of an entity is normally made up of equity and debt, each with a different financing cost to the entity.

The long-term capital (i.e. the sum of the share capital, the reserves and the long-term debt) is equal to the sum of fixed assets (net of depreciation) and net current assets (current assets less current liabilities).

Value of Assets

There are different ways of determining the value of assets: among others, historical cost, current replacement cost, or market value, and the value may differ from the balance sheet value. The asset may be valued from the airport's perspective or the regulators', and whether the assets base is regulated or not may also be a consideration. Asset values are also likely to be depreciated to reflect the wearing out of the assets. Each method will have a direct and different impact on the rate of return.

Working Capital

Working capital facilitates the working or running of an entity and is the difference between current assets and current liabilities (also known as net current assets), excluding cash in hand and at the bank, and/or an overdraft.

Capital Employed

In the case of an airport entity that has its own balance sheet, it is possible to determine a value for capital employed. For an airport that does not have a comprehensive balance sheet it will be necessary to create one from the underlying accounting records. There is no single generally accepted definition of capital employed because its composition depends on the use to which it is put. It may be defined in terms either of the capital invested in the airport or of its assets. The alternatives are shown in Table 4-3. In some cases, the total cost of fixed and current assets can be reduced by non-interest bearing liabilities.

Some airports are required to achieve a financial return. This can be expressed as a percentage of capital employed and is sometimes referred to as the return on capital employed (ROCE) or return on assets (ROA). When used in this way, it is usual to measure the return as profit before interest and tax. As the return relates to a period of time (e.g. one year), it is also more appropriate to define capital employed as the average over this period rather than at a particular point of time (e.g. end of the year). For the calculation of the return on capital, it is usually adequate to use the average of the opening and closing figures of capital employed over the period concerned.

Reasonable Rate of Return

When defining what costs should be considered in the cost basis for airport charges, ICAO's policies (Doc 9082, Section II, paragraph 2 i)) mention "the full cost of providing the airport (...), including appropriate amounts for cost of capital", and further in paragraph 2 viii) "airports may produce sufficient revenues (...) and so provide for a reasonable return on assets". However, charging authorities have encountered difficulties because of the lack of precision of these formulations, in particular with reference to what should be considered as "reasonable" in terms of rate of return.

Irrespective of the different structures that can be found in airport management, basic principles have generally been agreed. To arrive at the "cost of capital", first the financing costs of each part of the

capital (i.e. “equity” and “debt”) are calculated as required rates of return (in percentages). Then a “weighted average cost of capital” (WACC) rate is calculated depending on the proportion of equity and debt in the total capital of the entity. This rate is applied to the average capital employed to arrive at the cost of capital. Each component of an airport’s capital structure has a different cost.

For organizations in States with developed economies (where equity and bond markets, sound commercial banks and access to wide capital markets are available), the “capital assets pricing model” (CAPM) provides a general model for calculation of cost of equity. The cost of debt is the actual interest rate applying to the debt capital, although the regulator may take a view on whether the debt has been efficiently incurred. To do otherwise would not incentivize the airport to put in place an efficient debt portfolio. However, since the structures of airports vary widely, the CAPM model may need to be modified to meet the requirements of different airports. According to national jurisdictions, taxation may also influence the calculation of WACC.

The exposure to risk for investors in airports can be relatively low where the airport enjoys a measure of Government guarantee (which may enable them to borrow at sovereign borrowing rates) and/or is able to share traffic variation risk with airlines. In this situation risk exists but it is borne by the government and/or the airlines rather than exclusively by the providers of finance. In principle, there should be the prospect of a greater reward for equity to reflect the high risk that that bears compared to debt. Airports that are in transition from a Government service to a corporatized structure often may not have much equity (highly leveraged) but may still enjoy a measure of Government guarantee. In these cases, a token return on equity based on borrowing rates may be sufficient. In contrast, for an airport with a highly leveraged structure, but without a government guarantee or traffic variation risk sharing, there may be quite a significant chance of financial failure and its cost of equity would be high to reflect these risks. Returns for some airports are capped by independent regulators. In such cases the regulators would decide what an adequate cost of capital is. In other cases the country may have a high inflation rate. In these cases a margin on top of the inflation rate would provide the return on equity and the market interest rates would in any case include an inflationary adjustment. In States where there is no developed equity or bond market, or a robust competitive banking sector, calculating a beta² may prove difficult. However, in these cases the obtainable market interest rates should provide guidance to a reasonable cost of equity.

The CAPM formula states that an entity’s cost of capital is equal to the risk-free rate of return (typically the yield on a short-term Government bond), plus a premium to reflect the extra risk of the investment, or its beta. Details on the methodology are presented in Appendix 3 together with a practical example. The general guidance provided by CAPM can be adjusted to meet the particular economic environment of the airport.

Cash Flow

The statement of cash flows helps to measure the financial performance of the airport by showing its ability to provide the facilities and services whilst generating sufficient funds or cash inflows to cover its cash outflows, including payments for interest on borrowing and, when applicable, payments made to shareholders. This information is not provided by the revenue and expense statement or the balance sheet on their own, since they are usually prepared on an accrual accounting basis, which adopts the principle of matching income generated against the liability for expenditure in the period concerned. This is normally achieved through adjusting the cash flows.

Information is required on the liquidity, viability and financial adaptability of the entity managing the airport concerned. This can be measured by a statement of cash flows in conjunction with the balance

sheet. The balance sheet provides information about the airport's financial position at a particular point in time including assets, liabilities and long-term debt and their relationship to each other at the balance sheet date. Information concerning the airport's liquidity is usually incomplete because the balance sheet is drawn up at a particular point in time. Alternatively, a statement of cash flows shows information about the reporting airport's cash flows in the reporting period, the objective being to show the airport's cash generation and cash absorption for the period concerned. It is not a replacement for the revenue and expense statement and balance sheet; indeed, when assessing future cash flows, it is prudent to use all three statements in order to ensure that likely cash flows generated from earlier transactions are accounted for.

The statement of cash flows analyses the cash flows under standard headings such as operating activities, returns on investments and servicing of finance, taxation, investing activities and financing. The objective is to ensure that cash flows are reported in a form that highlights the significant components of cash flow and facilitates comparison of the cash flow performance with other entities.

It is worth noting that the term "cash equivalent" includes financial instruments that are highly liquid and convertible into known amounts of cash without notice and do not have any significant risk of changes in value owing to changes in interest rates. Statements of cash flows have largely superseded working capital-based sources and application of funds statements. This is because cash flow is more widely understood and is more transparent in identifying movements relevant to the liquidity and viability of an entity. An example of this is that a decrease in cash available may be masked by an increase in stock or debts.

DETERMINING THE COST BASIS FOR CHARGES ON AIR TRAFFIC

With regard to the cost basis for charges on air traffic, ICAO's policies on charges (Doc 9082, Section II, paragraph 2 i)) state that "the cost to be allocated is the full cost of providing the airport and its essential ancillary services". The purpose of this part is to suggest an approach for determining and analyzing total airport costs including costs attributable to non-aeronautical activities.

The establishment of the cost basis can be approached in several stages. First, the full costs of the airport need to be determined. The costs for safety, security and economic oversight provided by the State, or by an independent national oversight organization, or by a regional oversight organization, which are directly related to the provision of airport services, may be included in the airport cost basis for charges, provided that such costs are imposed on the providers of services. Where the airport is operated as a department within a civil aviation administration, this involves transferring costs to and/or from the airport department for services it receives from and/or provides to other departments or organizations. For some cost items such as depreciation and interest, the costs recorded in the regular airport accounts may need to be adjusted to better reflect the actual costs. Costs not attributable to air traffic or non-aeronautical activities then need to be estimated and deducted from the airport's total costs. These include non-aviation off-airport activities or services and costs attributable to en-route utilization of airport facilities and services. For reasons of equity and to avoid cross subsidies, costs attributable to flights exempted from user charges need to be estimated and deducted. The costs, so adjusted, form the basis for charges on air traffic as well as non-aeronautical activities. Second, once these two cost bases have been established, the air traffic cost basis can be allocated to user categories to form the cost bases for individual types of airport charges.

Considering the heavy workload in allocating costs to airport cost centres and service lines, it would be prudent to establish a priority arrangement among the cost centres and service lines. Normally, the highest priority should be given to allocating costs to aircraft movement areas, including approach and

aerodrome control, and to passenger terminal buildings — first to air traffic areas within the terminal and then to concessions and rentals (shops, restaurants, office space, etc.).

All costs must be determined in accordance with generally accepted accounting and costing principles (i.e. they must be based on recognized rules, standards or conventions; see Chapter 3, Part A, paragraph 3.8 and Chapter 4, Part A, paragraph 4.6) to permit the costs of airport facilities and services to be recorded and analysed in accordance with their nature and origin. Practices and procedures will differ from State to State. The approach illustrated in Figure 4-2, refers to the single-till approach (discussed in Part F).

Factors To Be Taken Into Account In Establishing The Cost Basis For Charges On Air Traffic

Implications of organizational structure

The organizational structure within which an airport operates has a direct bearing on its financial management and the approach taken in arriving at the total costs to be included in the cost basis for charges on air traffic, as well as on the costs attributable to non-aeronautical activities. The manner in which financial management is to be organized needs to be given special attention when an airport or group of airports is not operated as an autonomous entity but by a civil aviation administration or another government department with similar responsibilities. Since the civil aviation administration's format of accounts may not be responsive to the requirements of the airport's management, the airport department could establish its own supplementary internal accounting system that would meet these requirements.

Transfers of costs to and from other departments

Where an airport or group of airports is operated as a separate entity or department within a civil aviation administration, certain factors need to be taken into account when the actual costs and revenues of that entity are to be determined. For example, since it is part of a larger entity, it is likely that certain other departments within that entity or outside that entity would provide services or perform functions for the airport department. This may involve technical services, such as maintenance of equipment and vehicles, or administrative or overhead functions such as accounting, personnel administration, or the services of a legal department. In all these cases, the costs of the services or functions concerned must be determined and charged to the airport department. If this is not done, the costs of operating the airport will not be known and the charges on air traffic, as well as concession and rental fees and charges, could be based on less (or more) than actual costs.

Various approaches may be taken to determine the costs of the services and functions to be charged to the airport department. For example, concerning the costs of technical services, one approach is to calculate the costs per work-hour of the technical staff involved and then multiply the hours spent on airport work by that rate. Another approach is to allocate costs for services and functions using a percentage based on the share of the costs for the airport department in relation to the total costs of all departments involved in the services and functions concerned; it is to this total that the costs of material used should be added. An hourly rate should also be calculated for the costs of operation and maintenance of any tools and minor equipment used, including costs of power or fuel consumed, and an allowance for wear and tear. Moreover, depending on the extent of the technical services, an allowance should possibly be made for depreciation of building space and major equipment. Administrative overheads could be allocated by first establishing the total running and capital costs attributable to the departments concerned, and then estimating how much of their overall time was attributable to work pertaining to the airport department's operations, on the basis of which the airport department's cost

share would then be determined. It should also be recognized that in allocating costs on the various services and functions, priority should be given to those attributable to the airport department and, if applicable, the air traffic control department.

Conversely, the airport department may be performing services such as those described in the preceding paragraph for other departments within the civil aviation administration. In those circumstances, the reverse applies, in that the costs to the airport department of providing the services concerned would have to be estimated and allocated to these departments with a consequential reduction in the overall costs of the airport department. If this is not done and if the costs attributable to services performed for other departments were to form part of the cost basis for charges on air traffic, such traffic would in fact be paying for costs not attributable to it.

Transfers of the type referred to above are not necessarily limited to airports within a civil aviation administration. An airport entity or civil aviation administration may either provide all the aeronautical facilities and services at the airport or it may be charged for those provided by other government departments. However, in some instances, airport services are provided by another government department(s) without any corresponding charges being made either to the airport or levied on air traffic directly. This applies in some instances to costs of meteorological services provided at the airport, certain telecommunication services provided by another government department, etc. Assuming it is government policy to recover such costs from the users to the extent possible, there are two alternatives: 1) the costs should either be charged to the airport, where they would then be included in the cost basis for the airport charges concerned, or 2) the government department(s) involved should arrange for their costs to be covered by a separate charge(s), to be collected together with the airport's charges on air traffic. It should be noted in this context that Doc 9082 recommends (Section II, paragraph 3 vii) refers) that charges levied by different entities at an airport should, as far as possible, be consolidated, the combined revenues being distributed among the authorities concerned. This is discussed further in the following sections of this chapter

Difference between costs recorded in airport accounts and costs used for determining the cost basis for charges

The airport accounts provide the basic reference for determining the cost basis for charges on air traffic and the costs attributable to non-aeronautical activities. Where the accounts are complete and where they cover all airport functions, they can serve that purpose well. However, it may not be advisable to rely only on airport accounts when determining the basis for charges even when the accounts are complete. This is because while the costs of operation and maintenance, and administrative overheads, would probably remain unchanged, the situation may be different with regard to capital costs. In the accounts, for example, assets may be depreciated according to government accounting standards that may not reflect the true operating life of the assets concerned, or they may not be depreciated at all. When the cost bases for charges are determined, a depreciation element reflecting the use of the assets during the period concerned (usually the financial year) must be included. This may result in the application of depreciation rates for charging purposes which differ from those reflected in the airport accounts. Also, interest imputed on the net capital value of airport assets would normally not be reflected in the airport accounts but should be included in the cost basis for charges.

Depreciation and/or amortization: While practices vary in the calculation of depreciation, the most commonly used methods are the straight-line method and the reducing balance method. The most common method used by national administrations, and also the simplest, is the straight-line method whereby depreciation is charged as a constant amount year after year during the book life of the asset concerned, the amount being determined by dividing the historical cost of the asset (less its anticipated

residual value, if any) by the expected number of years of its book life. The reducing balance method involves the application of a fixed percentage to the book value of the asset, i.e. the historical cost less accumulated depreciation already charged, at the beginning of each accounting period. The actual amount of depreciation charged according to this method thus decreases each year. A third method used is the annuity method, where the amount charged to each year remains the same throughout the life of the asset concerned. However, it should be noted that the amount charged when this method is applied includes interest in addition to depreciation. Whatever depreciation method is used it should be consistently applied throughout the depreciation period of the asset.

Cost of capital: Cost of capital needs to be taken into account in the costing of the provision of airports. This basically falls into two categories. The first is the interest paid to creditors or lenders for the use of capital they provide (other than equity) for various financing purposes, usually in connection with the acquisition or provision of assets. The second category is the cost of capital applied on equity that is adopted for internal costing purposes and expresses the value attached to the use of all capital including equity capital.

Arriving at the revised costs forming the basis for charges on air traffic (and for costs attributable to non-aeronautical activities)

The following adjustments need to be made to the costs of the various areas and services in order to arrive at the costs basis summarized in Figure 4-2. Because of their interrelationship, total costs by area or service attributable to non-aeronautical activities at the airport should also be identified. The principal purpose of this is not only to recover the costs to the airport of making the relevant premises available, but also to establish a minimum for these fees and charges. For that reason, it is necessary to identify the actual total costs attributable to the provision of the different premises (building space and land) and the associated facilities and services involved. It should be noted in this context that the emphasis is on determining the costs to the airport of providing the premises concerned, not their market value (that is a different type of assessment, which is discussed in Chapter 5). It should also be noted that some expenses, such as those allocated to aircraft movement areas, and air traffic control and meteorological services, would normally not be attributable to non-aeronautical activities. However, shares of the costs of all the other areas or services would normally be attributable to non-aeronautical activities, although the shares involved would differ significantly between individual areas and services.

Adjustment for costs attributable to non-aviation off-airport utilization

The relevant airport costs are not only those attributable to air traffic, but also to concessions, rentals and other non-aeronautical activities. In combination, the costs related to air traffic at the airport and all aeronautical and non-aeronautical activities serving or dependent on that traffic account for the costs attributable to airport operations. However, an airport may, in some instances, also be incurring costs which are not attributable to such airport operations and which therefore need to be deducted before determining the cost basis for airport charges. This could be costs attributable to non-aviation off-airport utilization of services provided by the airport. One example of this is when a meteorological office financed by the airport provides meteorological forecasts for maritime activities, agriculture, the press and other media, etc., in addition to providing aeronautical meteorological forecasts and briefings. Another example is when an airport provides such services as snow removal or firefighting to a neighbouring municipality.

Adjustment for costs when the airport provides en-route utilization of airport facilities and services

In many cases, the airport provides services such as air traffic control, including communications, and meteorological services that are not only used by aircraft when landing and departing from the airport, but also during the en-route phase of their flight. Such services may also be used, moreover, by traffic overflying without landing at the airport. Where the overflying traffic element is significant, it becomes desirable in the interest of equity to determine the cost shares attributable to both airport utilization and en-route utilization, so that neither group of users will be burdened with costs properly attributable to the other. Guidance on this subject is provided in the Manual on Air Navigation Services Economics (Doc 9161).

Adjustment for costs attributable to exempted flights

In Article 3 of the Convention on International Civil Aviation (Doc 7300) a distinction is made between civil and State aircraft. Article 3 stipulates that the Convention shall be applicable to civil aircraft only and not to State aircraft. It also indicates that aircraft used in military, customs and police services shall be deemed to be State aircraft. No further elaboration on what constitutes a State aircraft is provided in the Chicago Convention. The guidance material provided in this manual does not change, revise, or further interpret the definition of State aircraft, or apply the Chicago Convention to State aircraft.

Many States have chosen, in the exercise of their sovereignty, to exempt from airport charges certain types of flights, in addition to those expressly deemed to be State aircraft according to Article 3 of the Chicago Convention. Such exemptions are sometimes implemented by bilateral or multilateral agreements, national legislation, or unwritten practical arrangements.

As per ICAO's policies on charges in Doc 9082, Section II, paragraph 1, States should analyse air traffic data, such as the number of flights by category of user (i.e. commercial aviation, general aviation, and other) in both domestic and international operations, aircraft weight, and other data relevant to the allocation of costs and the cost-recovery system, along with related financial data. Following such analysis, it can be determined if the volume of exempted flights is such that the method of allocating the airport costs amongst all chargeable flights is inconsistent with the principles of equity and non-cross subsidization. Where such traffic is minimal and incidental, and the costs associated with it are low, a detailed examination of the existing cost allocation methodology would normally not be warranted. However, if such traffic is substantial, it will be necessary to ensure that the principles of equity and of non-cross subsidization are observed and that the costs are allocated appropriately. Furthermore, airport costs should be identified in such a way as to ensure that when a State chooses to host flights that are exempted from user charges, and the volume of such traffic is substantial, all costs are properly allocated according to sound accounting principles (Section II, paragraph 2 vi) of Doc 9082 refers) and the host State, not other users of the system, bears the costs of the exempted flights. In this respect, current practices in certain States include the reimbursement of costs incurred by service providers through the central State budget, or ministries such as defence, foreign affairs or transport. Such practices, consistent with the principle of proper allocation of costs, ensure that airports avail themselves of revenues to recover the costs of the services that they provide to flights exempted from user charges.

Special reference should be made to the situation that arises when an airport, operated by civilian authorities for civil traffic, is also used by military or other State traffic. Normally, where such traffic is substantial, the military or the other government agencies involved (such as police or coast guard) have their own terminals, aprons, parking spaces and hangars at the airport. Where that is the case, no costs would be borne by the airport for these facilities (unless the facilities have been built by the airport), nor would it derive any revenues from them. There may, however, be common usage by the State and civil

traffic of runways and taxiways, air traffic control (including communications), meteorological services, firefighting and ambulance services, possibly ground access facilities, and security services. In such circumstances, these costs should be allocated in an equitable manner to avoid cross subsidization and the airport should be compensated accordingly, on a cost-recovery basis.

ALLOCATION OF COSTS

Allocation of full cost to cost centres and service lines

Once the total costs by categories of expense (that is operation and maintenance costs, administrative overhead, capital costs and taxes) have been determined, they should, if possible, be allocated to the various airport cost centres and service lines concerned, such as those referred to in the section A of this chapter. Note that all costs (in all categories of expense) should be allocated to both cost centres and service lines.

As to the allocation of taxes, these could be allocated in the same manner as administrative overheads, except where the tax can be identified with a special cost centre or service line. All costs that are directly attributable to one cost centre or service line are allocated to that cost centre or service line. However, for costs which are attributable to two or more cost centres or service lines, for example, administrative overheads, allocation keys or parameters would need to be developed. Such costs would only be allocated where the amounts involved are considerable.

The type of allocation key applied to a specific category of expense will depend on its nature. For example, the costs of staff working in more than one cost centre or service line could be allocated according to time spent working in each of the cost centres or service lines involved. Costs of administrative staff could be allocated according to the total work time of staff working in each cost centre or service line. Alternatively, administrative overheads could be allocated on the basis of costs of operation and maintenance of the cost centres or service lines concerned. With regard to cost allocation based on work time, it should be recognized that relevant time-recorded data for staff working in more than one cost centre or service line are in most cases not available. An alternative method of allocating staff costs is to distribute them on a percentage basis, according to the proportion of the costs for each department in relation to the total costs for all the departments concerned. Costs of power, electricity, water, heating or air conditioning could be allocated on the basis of measured or estimated consumption of these services or utilities for each cost centre or service line. Capital costs attributable to investments covering several buildings or areas could be allocated according to volume of space, floor area, and/or movement area within each of the airport cost centres or service lines concerned.

Allocation of costs to categories of airport users

Provision of facilities and services required for different users may vary among airports. Arriving at an equitable cost basis for charges therefore requires an allocation of costs among users. This includes first determining who the users are. As for airport operations, they can be broadly classified as international civil traffic, domestic civil traffic, and flights exempted from user charges. International and domestic civil traffic can be further subdivided into commercial and general aviation, and all these categories could be divided into VFR/IFR traffic. However, it may suffice to limit the allocation of costs to the airport facilities and services provided for the three categories referred to above, i.e. international and domestic civil traffic, and exempted flights. In addition to these categories of airport users, there is the other group at the airport to which airport costs are attributable, namely, the various non-aeronautical activities that serve or benefit from the aircraft operations.

Allocation of costs between international and domestic civil traffic

With a few important exceptions, international and domestic civil traffic normally use or benefit from the provision of the same airport cost centres and service lines. The exceptions relate principally to passenger terminals owned and operated by the airport and, to a lesser extent, to cargo terminals similarly owned and operated, as well as the associated apron or aircraft parking stands. Terminal facilities and services provided for international traffic are relatively more costly than those provided for domestic traffic. The reason is that international traffic requires larger terminal facilities, because of, for example, the additional space needed for immigration and customs clearance and the associated requirement for separate international traffic passageways and waiting areas. Also, larger lounges, gates, and parking stands are usually required since aircraft used on international services tend to be larger than those used on domestic services. Moreover, international traffic normally requires more costly airport security services than domestic traffic.

Where separate terminals are operated for international and domestic traffic, the air traffic costs of each terminal can be directly allocated to the traffic category concerned. In the case of common use terminals, their costs could, for example, be allocated on the basis of floor area used for international traffic only and for domestic traffic only.

When passenger terminal cost allocation is undertaken, the whole terminal floor area might first be divided into three categories according to whether it is used for: a) air traffic revenue-generating purposes, that is for processing international and domestic traffic; b) non-aeronautical revenue-generating purposes, such as various concessions and rentals; or c) non-revenue purposes, such as airport office space and utilities.

Since all terminal costs should be covered by revenues from aeronautical as well as non-aeronautical revenue-generating activities, the floor space used for such activities should form the basis for total terminal cost allocation, including the costs attributable to terminal space used for non-revenue purposes. In fact, this applies in the wider context, since the costs of all revenue as well as non-revenue-generating areas and services need eventually to be allocated to the revenue-generating areas and services (aeronautical as well as non-aeronautical) if the full costs are to be recovered.

Aircraft apron parking stand costs would be similarly allocated on the basis of square metres or footage used for international aircraft parking as opposed to domestic aircraft parking. The costs of the whole area used for stands and associated equipment as well as roadways should form the basis for the costs to be allocated. Costs of certain security services, such as supervision of boarding gates and security personnel assigned to specific areas, can be directly allocated to either international or domestic traffic, and the costs of the remaining security services could then be divided proportionally on the basis of these two identifiable components.

COST BASIS FOR INDIVIDUAL CHARGES ON AIR TRAFFIC

Basic Aspects

Once the costs attributable to civil air traffic have been established (see Figure 4-2) and, if required, divided into their international and domestic components, the cost basis for individual charges can be estimated. In this way, each charge is derived from a specific cost basis. It is important to remember that the cost elements included in the cost basis for individual charges on air traffic will vary between airports, depending on the types of charges each airport levies on air traffic and also on the cost

structure of each airport. In this context, reference should be made to the text in paragraphs 4.63 and 4.67 on establishing priorities in the determination of costs.

Considering that circumstances differ between airports, the descriptions given in the following paragraphs of the cost basis for individual charges can only be indicative.

Landing Charges

This would include the costs of aircraft movement areas (except remote parking stands) and their associated lighting (unless lighting is charged for separately), firefighting and ambulance services, costs of security services attributable to the aircraft movement areas (unless security services are charged for separately), aircraft noise and emissions (unless either or both are charged for separately), and air traffic control (including communications) and meteorological services (unless either or both are charged for separately).

Lighting Charges

If not included in the cost basis for landing charges and parking charges, this would include all costs attributable to runway and taxiway (and possibly apron and remote parking areas) lighting.

Approach and Aerodrome Control Charges

If not included in the cost basis for landing charges, this includes the costs of air traffic control (including communications) and meteorological services.

Aircraft Parking Charges

Costs attributable to remote parking areas and their associated lighting, as well as aircraft towing where provided by the airport, and costs of security services attributable to remote parking areas (unless security services are charged for separately).

Aerobridge Charges

If not included in the cost basis for passenger service charges, this includes the costs attributable to the provision and operation of aerobridges.

Hangar Charges

Costs attributable to hangars owned by the airport, including access roads, and costs of security services attributable to hangars (unless security services are charged for separately).

Passenger Service Charges

Costs of passenger terminal facilities that are attributable to passenger processing, including the costs of security services attributable thereto (unless security services are charged for separately), and the costs of ground access facilities and services attributable to passenger terminal access.

Cargo Charges

Costs of cargo terminal facilities, costs of security services attributable to cargo terminals (unless security services are charged for separately), and the costs of ground access facilities and services attributable to cargo terminal access.

Security Charges

All costs attributable to the provision of security services for air traffic. This would include all security measures of a preventive character and performed on a routine basis, i.e. the security measures indicated in Appendix 1 of Doc 9082. Costs of security services attributable to non-aeronautical activities should be included in the cost basis for such activities. The need for cost-effectiveness analysis when contemplating new or enhanced security measures should be emphasized.

It is important to draw a distinction between the security functions performed directly in relation to civil aviation operations and those that are related to national security in order to ensure that costs of security not directly attributable to civil aviation operations are not passed on to the air transport industry or its customers. Responses to acts of unlawful interference, including attacks and threats (e.g. the use of in-flight security personnel) as well as unannounced airport inspections, quality control measures, and general policing and threat assessment, would normally be considered as national security responsibilities. States may determine in which circumstances and the extent to which the costs involved in providing security facilities and services should be borne by the State, the airport entities or other responsible agencies

Noise-Related Charges

If incurred and not included in the cost basis for landing charges, the costs of noise monitoring and noise abatement measures.

Emissions-Related Aircraft Charges To Address Local Air Quality Problems At Or Around Airports

If incurred and not included in the cost basis for landing charges, the costs of the measures applied to prevent or mitigate environmental impact to local air quality caused by and directly attributable to civil aircraft operations⁵.

Other Charges

The cost basis for other charges levied on air traffic by the airport would be determined by using a similar approach — that is, by determining the costs of the facilities and/or services the charge is to cover. For example, if separate towing charges are levied, the costs of that service would be estimated (and deducted from the cost basis for parking charges) to arrive at the cost basis for these charges.

Pre-Funding Charges

Aggregation Of Cost Bases For Setting Charges

Paragraph 2 iv) in Section II of ICAO's policies on charges (Doc 9082) gives airport operators more flexibility in setting airport charges by aggregating cost bases and, thereby, applying cost-relatedness at a higher level than as described above. However, this practice may raise concerns with respect to cost-relatedness of the charges, transparency and possible discrimination among users. Therefore, the aggregation of costs should be done in a logical and transparent manner, accompanied by safeguards, as

appropriate, regarding consultation and, where possible, agreements with users to avoid discrimination among users in setting charges.

The range of costs that make up the cost basis for individual charges on air traffic will depend on the number of types of charges that an airport levies; accordingly, the fewer the charges the broader the cost basis will be for each charge. As an example, airport owners/operators could aggregate all relevant air-side costs into a single cost category and then establish a single charge to recover these costs. This would retain the relationship between the charges and the services provided and also be in line with the generally accepted practice that a single charge may be applied for costs of as many airport-provided facilities and services for normal landing and take-off of aircraft as possible (see paragraph 4.147 in Part H below). The cost basis for landing charges may cover the cost of runways and taxiways and their associated lighting, apron parking stands, firefighting and ambulance services, meteorological services, security services, ground access facilities and services, aircraft noise and emissions, and approach/aerodrome control services (if provided by the airport)⁶.

In certain circumstances, it may be mutually beneficial for the airport operator and the airport user community to develop more aggregated cost bases for the purpose of setting charges. In particular, it may be beneficial to establish a single cost basis (or a reduced number of cost bases) from which individual charges could be derived. Reducing the number of cost bases would reduce the administrative burden on all parties involved. For example, it may be possible to reduce the burden associated with the collection and processing of airport charges. Such cost savings not only benefit the airport operator, but can be passed on to the users in the form of lower charges. The aggregation of cost bases would also give airport operators (in particular small- and medium-sized airports) a tool to support the desired efficiency and development of their airports. Another benefit in situations where users receive a comparable set of services is that by aggregating costs it may allow airport operators to better estimate marginal costs. This is particularly important if an airport operator is attempting to recover costs based on the discussion of economic pricing found in Part G below. Aggregation of costs may also have merit where the single-till is applied and where aeronautical charges in general are being defrayed to a significant extent by non-aeronautical revenues.

However, the aggregation of cost bases could at the same time significantly reduce transparency between the cost of service and related charges, and possibly lead to cross subsidization of one user group by another user group and to discrimination in the application of charges. Also, without a clear link between charges and airport services, the ability of States to conduct meaningful economic oversight and encourage user consultation may be diminished.

Paragraph 2 vi) in Section II of Doc 9082 states that the proportion of costs allocable to various categories of users should be determined on an equitable basis, so that no users shall be burdened with costs not properly allocable to them according to sound accounting principles. For consistency with these policies, care should be taken in the process of aggregating costs. The aggregation should be done in a logical and transparent manner to ensure that it does not result in cross subsidies between users and discrimination. Such flexibility in charging should therefore be accompanied by appropriate safeguards, for example: the limitation of the application of enlarged cost bases to airports with homogeneous services used by homogeneous users, and consultation and, to the extent possible, agreement with users before any decision is taken on their implementation. The airport owner/operator should retain the ability to disaggregate costs into more granular categories for transparency and consultation purposes, and to allow the State to conduct effective economic oversight of the airport.

DETERMINING THE COSTS ATTRIBUTABLE TO CONCESSIONS AND OTHER NON-AERONAUTICAL ACTIVITIES

Determining the Cost Basis for Individual Non-Aeronautical Activities

In arriving at the cost basis for individual non-aeronautical activities, it is necessary first to determine how much of the airport's revenue-generating space each activity is occupying. For example, in the case of shops, restaurants and other trading activities as well as rental space, this would be the floor space in square metres or footage, and where land is involved, the size of the area occupied. Unless already included in administrative overheads allocated to the airport cost centre or service line concerned, the costs of services or utilities provided by the airport (such as power, water, heating, air conditioning, telephone switchboard service) need to be distributed on an individual non-aeronautical activity basis using, to the extent possible, separate metres for each activity.

Concessions Directly Associated With the Operation of Air Transport Services

The full development of revenues from non-aeronautical activities is encouraged, except for concessions directly associated with the operation of air transport services such as fuel, in-flight catering and ground handling. Consequently, when the airport costs attributable to such activities are being determined, more precision may be required than in the case of other concessionary activities, and they would not necessarily be expected to make significant contributions towards costs not recovered through charges on air traffic or on other non-aeronautical activities. However, they still remain non-aeronautical activities, and insofar as ICAO cost-recovery policies are concerned, they are not subject to the same limitations as is recommended be applied to charges on air traffic. The following paragraphs refer to the costs that would normally be included in the cost basis for fees and charges on these three types of activities.

Cost Basis for Fuel Concessions

These would include any maintenance costs, administrative overheads and capital costs attributable to premises, land and equipment owned by the airport and placed at the disposal of the fuel concessionaires (this includes any fuel farms, pipes, hydrants, pumping facilities, etc.). Also included would be costs of firefighting and security services attributable to the storing and tanking of fuel (unless security services are charged for separately), as well as costs attributable to the use by the concessionaires of ground access facilities and services.

Cost Basis for In-Flight Catering Concessions

These refer to any maintenance costs, administrative overheads and capital costs attributable to the provision by the airport of premises, land and equipment for in-flight catering services, including costs of associated security services and ground access facilities and services (unless security services are charged for separately). It should be noted in this context that a concessionaire may not only be operating in-flight catering services, but also airport restaurant and bar facilities, the concession fees for which are not subject to the same qualifications that apply to in-flight catering. However, both functions may share the same facilities, such as kitchen areas. That may, for the purposes of setting the concession fees, require assessments to be made of the relevance, in terms of costs to the airport, of in-flight catering as opposed to the other catering activities of the concessionaire.

Cost Basis for Ground Handling

Ground handling is a special activity in that while it is performed by airlines or concessionaires at the majority of airports, a considerable number of airports themselves perform either the entire handling function or a part of it. In the first instance, the costs to the airport would be limited to the maintenance costs, administrative overheads and capital costs attributable to premises made available to the concessionaires, including costs of security services and ground access facilities and services (unless security services are charged for separately). However, when the airport itself provides ground handling completely or in part, the cost basis would be much broader and include costs of operation and maintenance, administrative overheads and capital costs attributable to personnel, vehicles, equipment and premises engaged in or used for providing ground handling. Because they serve different, although closely related, purposes the two cost bases should normally be separately identified.

METHODS FOR ATTRIBUTING NON-AERONAUTICAL REVENUES TO AN AIRPORT'S COST BASE

The cost to be allocated is the full cost of providing the airport and its essential ancillary services. This includes appropriate amounts for cost of capital and depreciation of assets, as well as the cost of maintenance and operation, and management and administration expenses. Consistent with the form of economic oversight adopted, these costs may be offset by non-aeronautical revenues. Airports may produce sufficient revenues to exceed all direct and indirect operating costs (including general administration, etc.) and thereby provide for a reasonable return on assets at a sufficient level to secure efficient financing in capital markets for the purpose of investing in new or expanded infrastructure and, where relevant, to remunerate adequately holders of airport equity.

How the full costs shall be allocated depends on a number of airport-specific factors. In determining how the costs are to be allocated and which costs should be recovered on the basis of air traffic versus non-aeronautical activity, the airport must balance a wide variety of interests, including the access of the local community to domestic and international air service options, as well as considering the needs of travellers, shippers, aircraft operators, other aeronautical users, companies that do business on or with the airport, and airport neighbors.

In general, three approaches are used to describe how an airport recovers the full cost associated with the airport and its essential non-aeronautical services. These approaches are commonly referred to as: a) the single-till (sometimes referred to as the “residual” method); b) dual-till (sometimes referred to as the “compensatory” method); and c) hybrid-till.

- a) Under the single-till approach, the full cost associated with an airport and its essential ancillary services, including appropriate amounts for cost of capital and depreciation of assets, as well as the cost of maintenance and operation, and management and administration expenses, are included in the cost basis attributed to air traffic. These costs are then adjusted to reflect non-aeronautical revenues that accrue to the airport. In general, in exchange for sharing the risk associated with the airport's operations, aircraft operators and/or end-users benefit from a cost basis that is adjusted to reflect non-aeronautical revenues.
- b) Under the dual-till approach, the full costs associated with the airport and its essential ancillary services are allocated between the airport owner/operator and the airport users. The costs allocated to air traffic include only those costs associated with the facilities that are actually used by the aircraft operators and the end-users. No adjustment is made to this cost basis to reflect non-aeronautical revenues accruing to the airport. The airport owner/operator is free to direct the use of any revenues generated from its concessions, parking facilities, and any other non-aeronautical activities for use at the airport, as it deems necessary and appropriate.

- c) Under the hybrid-till approach, the cost basis is established based on a combination of the single-till and the dual-till approaches. For example, the airport owner/operator may choose to recover landing costs on the basis of the single-till approach while establishing terminal costs on the basis of the dual-till approach.

While the choice of cost recovery methodology will greatly influence the degree to which the airport owner/operator and the aircraft operators serving the airport bear the financial risk associated with the airport's operation, other factors can also influence risk-sharing. Perhaps just as important as the choice of cost recovery methodology are the details associated with its application. Factors such as existing contractual arrangements between the airport and the aircraft operators, and institutional arrangements particular to the airport can all influence the degree to which each party shares the financial risk associated with the operation of the airport.

Regardless of how the cost basis for charges is established, it is incumbent on the State to ensure that it is done in a transparent manner, involving user consultation, which clearly describes which costs are included and to what extent non-aeronautical revenues are being used to offset aeronautical costs.

SETTING CHARGES FOR AIR TRAFFIC OPERATIONS

The aim of levying airport charges is to seek to recover over time the costs incurred by the airport operator in providing facilities and services required for handling air traffic, after making allowance, where appropriate, for other sources of revenue and recognizing short-term pricing fluctuations that will impact the balance between supply and demand.

The principle is to charge users for the facilities and services that are directly related to their use of the airport or the airport system. The airport operator should avoid cross subsidizing different user categories, as such cross subsidization may not only result in discriminatory treatment of users, resulting in service pattern distortions, but can also result in an economically inefficient use of the airport.

As airport charges are updated at most annually, cost-based pricing may, at times, result in periods of over- or under-recovery. In certain circumstances, States may wish to recover less than the full cost associated with providing airport facilities and services. In recognition of local, regional or national benefits received, States may encourage the greater use of an airport by subsidizing users from non-aeronautical airport profits or from other sources of funds, such as national treasuries. In such cases, it is important to ensure that such subsidization does not unintentionally provide an unfair competitive advantage to any particular user or user group at the airport.

Economic Pricing

Objectives

Traditionally, charges on air traffic operations have been set on the basis of average costs. While administratively simple, this approach does not necessarily recover costs in a way which encourages the most economically efficient provision and use of the airport's facilities and services. An alternative approach to setting charges is based on the principle of economic pricing. Such charges are expected to encourage a more efficient use of the airport's scarce resources by incorporating the users' "willingness-to-pay" within the context of cost recovery while at the same time ensuring that no users will be burdened with costs that are not properly allocable to them according to sound accounting principles. Similarly, in situations where there are large fixed and/or joint costs, economic pricing can be used to ensure efficient cost recovery. In each case, the application of economic pricing serves two purposes: a)

it provides a mechanism to allocate resources efficiently; and b) it provides market signals, indicating where investment would yield the greatest benefit to the users of the airport.

Application of economic pricing for cost recovery

The application of economic pricing should be consistent with paragraph 3 iii) in Section II of Doc 9082, which states that “charges should be determined on the basis of sound accounting principles and may reflect economic principles as required, provided that these are in conformity with Article 15 of the Convention on International Civil Aviation and other principles in the present policies”. Essentially, applying economic pricing in setting airport charges refers to the concept of marginal (or incremental) cost. The marginal cost approach differs from the more traditional regulatory accounting-based approach in which charges are set on the basis of average costs. Assuming that the airport operator can adequately measure its marginal cost and has a sense of user demand, setting charges equal to marginal cost will produce a more economically efficient outcome than setting charges equal to average costs.

However, the challenge faced by many airport operators is that their production process is characterized by “economies of scale” — average costs decline as output increases. Setting charges equal to marginal cost would result in under-recovery. This requires airport operators to subsidize these facilities and services from other revenue sources or to adopt some form of non-linear pricing in which charges are modulated while ensuring that an adequate revenue stream is maintained. Examples of charging techniques include the use of Ramsey pricing, two-part tariffs (involving a fixed charge and a variable charge related to marginal costs), and peak-period pricing, all subject to the constraint of full cost recovery. With respect to peak-period pricing, in which there are significant variations in the level of service by time of day, charges could be established on the basis of short- and long-run marginal costs. To ensure consistency with ICAO’s policies on charges, airport operators should make certain that users engaged in similar types of operations are treated equally. To implement this particular form of economic pricing, airport operators need to identify peak and off-peak users, the costs of serving peak and off-peak users, and how users’ behaviour changes once the pricing scheme has been implemented.

Other instruments that may be used in the context of economic pricing are incentives. These are instruments that incite a particular course of action. They may take the form of a financial reward (or penalty) or a change in operational efficiency. An airport could use an incentive through its charging scheme to encourage users to act in ways that will lead to the desired outcome.

Regardless of the types of incentives, as a premise, States should ensure that, where airports introduce incentives for users, the incentive schemes meet the principles set out in Doc 9082. Incentive schemes should be transparent and subject to periodic reviews (for example, to assess whether the incentives meet the stated objectives), and the estimated benefits such as savings generated by operational efficiency should offset, at a minimum, the cost imposed on the users.

One type of incentive would affect users’ decisions on fleet renewal or on the selection of types of aircraft used, in function, for example, of their environmental performance. Experience has shown that the application of local air quality (LAQ) charges at certain airports may have an influence on the type of aircraft operated at these airports.

Another type of incentive may be applied to the airport by an independent regulator to encourage improvements in service quality. Such incentives should be based on achieving standards of quality for which aircraft operators and/or end-users would be prepared to pay.

Congestion management

Economic pricing can also be applied to yield benefit in cases where the airport is congested. Congestion charges are designed to address the situation where an airport user imposes a delay or other type of congestion cost on another user, greater than the cost they themselves experience. This type of modulated pricing approach might be applicable in cases where capacity is constrained and certain flights impose a disproportionate cost on the airport capacity. To implement this pricing approach, the airport operator needs to first determine whether one user is imposing a cost on another user. Second, these costs must be identified. Third, a charging system must be established to internalize these externalities. If the congestion charge is properly structured, users should not be burdened with costs that are not entirely attributed to their own business practices. The practical difficulty with this approach is that it becomes extremely complex to effectively measure the externality. Furthermore, given the fact that congestion costs are not directly associated with the cost of airport services and facilities, it is difficult to reconcile this pricing practice with the principle of cost recovery. Consequently, the use of congestion pricing should be done with great care, and revenue derived from such charges should be reinvested in the airport or airport system in order to expand capacity to better address the congestion problem.

A type of incentive for users that could be used in relation with terminal congestion would be one that affects their tactical or operational decision at the level of each flight in terms of timing. Although tactical decisions are often made without consideration of such incentive, it is conceivable that, for example, at a congested airport, some users would be willing to re-time flights in exchange for preferred sequencing during approach or preferred access to the taxi queue during arrival or departure.

Similarly, as presented in paragraph 4.134 above, a type of incentive would target the demand for airport access by affecting users' decisions regarding their services, for example with respect to scheduling or the capacity of aircraft used. Airport charges could be modulated in such a way that higher charges would apply during peak-periods when demand for the airport's limited capacity is greatest, and lower charges would apply during off-peak hours of service.

Differential charges

In other circumstances, the airport operator may wish to set charges based on other objectives. For instance, the airport operator may want to modify its airport charges to include a differential component. This differential component refers to any preferential charges or other reductions in the charges normally payable for the use of airport facilities and services. Such charges are designed to elicit specific changes in user behaviour for purposes other than using pricing to recover economic costs. For instance, if an airport operator were seeking to expand service at the airport or to encourage the use of certain technology to improve efficiency of the airport, the airport operator could use introductory discounts or other incentive schemes to achieve these goals.

Given the nature of the differential charges, their application should be closely monitored. There are a number of potential adverse effects that need to be considered. For example, when airports have a great degree of market power, the differentiation of charges might be part of a strategy to prevent certain providers of airport services to enter the market. When airports are owned and operated by public authorities (which do not act as a private investor would in a market) or receive subsidies from States, offering lower airport charges for specific users may constitute a form of State aid for those users. The subsidization of the airport by the State could distort competition between airports and indirectly benefit specific users, for example, through lower airport charges, and thereby distort competition between users.

In light of the potential adverse effects associated with differential charges, when performing their economic oversight function, States should, where necessary, assess the positive and negative effects associated with such differential charges on a case-by-case basis according to national circumstances. ICAO's policies on charges (Doc 9082, Section II, paragraphs 3 iv) and 3 v)) describe four high-level principles for safeguarding users against potential negative effects of differential charges:

- a) non-discrimination: this principle has its roots in Article 15 of the Chicago Convention. Doc 9082, Section II, paragraph 3 iv) states that charges must be non-discriminatory both between foreign and domestic users, as well as between two or more foreign users. In practice, this could be interpreted as "all categories of users meeting the same criteria and offering the same or similar air services should be treated equally";
- b) transparency: airport operators should publish the existence of differential charges together with the purpose and the criteria on which they are offered. Also, where State aid is used to differentiate airport charges (and/or maintain charges at an artificially lower level), States should take transparent and effective measures accompanied by clear criteria and methodology to ensure that aids/subsidies do not adversely affect competition in the marketplace. This principle does not mean that airports should have to disclose any commercially sensitive information to the public;
- c) no cross subsidization: where any differential charges are extended to particular categories of users, without prejudice to modulated charging schemes, costs associated with such differential charges should not be allocated, either directly or indirectly, to those other users not benefiting from them. This means that revenue shortfalls resulting from the introduction of preferential charges for specific user categories should not be shouldered on to other users; and
- d) time-limitation: this principle relates to the amount of time that an airport may provide particular categories of users with start-up aids and similar incentive schemes to attract and/or retain new air services. Since the air services receiving preferential treatment are ultimately expected to become profitable (except for essential air services of a public or social service nature that a State may consider needs to be provided and where the market may not have sufficient incentive to do so, for example, lifeline air services for remote or peripheral destinations), start-up aids and similar incentive schemes should be offered on a temporary basis only.

Regarding the applicability of safeguards in the context of modulated and/or differential charges, the principles of non-discrimination, transparency and non-cross subsidization should be applied to all types of charges, while time-limitation should be applied to differential charges only.

CONTRACTUAL ASPECTS:

Once the concessionaire has been selected, a contract needs to be drawn up establishing and defining the relationship between the airport and the concessionaire. The airport should normally prepare the draft contract. If the headquarters of the concessionaire are located in a State other than that of the airport, the contract should be drawn up under and governed by the laws of the State where the airport is located. The contract should also stipulate that where arbitration procedures fail, any disputes that might arise should be settled before the courts of that State. The same general considerations would apply with regard to leases.

Concessionary Type Contracts

Apart from what has been stated in the preceding paragraph, contracts governing concessionary trading activities normally incorporate stipulations and provisions, such as:

1. duration of the contract;
2. specification of the activity to be carried out on the premises and prohibition of any changes in the intended utilization of the premises;
3. arrangements concerning subletting, if applicable;
4. level of concession fees, terms of payment and arrangements for review of fees;
5. payment of cost of registration of contract, various services and taxes;
6. requirement to make security or guarantee deposits;
7. obligation to adopt proper accounting procedures and to submit audited accounts periodically;
8. right of the airport to have full and unrestricted access to all the accounting and financial records of the concessionaire that relate to the concession;
9. designation of the premises to be occupied, statement to the effect that they have been inspected by the parties concerned, and right of the airport administration to carry out inspection and supervision of the premises;
10. obligation to maintain the premises in their initial condition or, alternatively, obligation to submit to airport management any project for alterations, and terms for evacuation of premises on termination of the contract, including undertaking to return such premises in their initial condition;
11. conditions governing maintenance and repair of the premises and cleaning arrangements;
12. insurance requirements and determination of liability with respect to:
 - accidents sustained by occupants or by third parties;
 - thefts with or without forced entry involving damage to the premises; and
 - damage caused by fire or water; or by floods, lightning and other Acts of God;
13. obligation to observe current laws and regulations;
14. conditions governing advertising and signs on the premises;
15. causes for termination of contract (bankruptcy, criminal conviction, non-compliance with terms of contract, etc.) and conditions regarding the application of sanctions in such cases;
16. arbitration procedures;
17. definition of terms used; and
18. options for renewal of contract.

Depending on the nature of the concessionary activity, various other clauses may be included, such as the:

- a) guarantee of exclusive rights to operate the type of concession specified;
- b) opening and closing hours;
- c) obligation to sell merchandise at competitive prices and at the prices displayed, and the nature of price control exercised by the airport;
- d) quality standards, control of merchandise and such aspects of the sale and serving of food and beverages as:
 - 1) quality, procedure of preparation and storage of food and beverages;
 - 2) quality, condition, maintenance and cleanliness of apparel, tables, chairs, etc.; and

- 3) hygiene standards for personnel;
- e) right to install specialized equipment; and
- f) requirements concerning qualifications of personnel engaged in specialized services and security procedures.

Leases For Premises, Land And Construction Sites

Leasing contracts, concerned primarily with the occupation and use of airport property, are usually less complex in terms of the variety of provisions they contain, although in some cases certain clauses may need to be expressed in greater detail. It is unusual for these contracts to contain any provisions concerning the accounting procedures of the lessee, or to impose any obligation to submit financial statements to the airport; clauses relating to the nature of the enterprise to be conducted might often be less specific than in the case of a concessionary trading contract.

Since leases relating to land, and to construction sites in particular, are usually negotiated for longer periods than is normal for leases of airport premises or concessionary trading contracts, there is a greater need for them to include provisions for periodic reviews of the rental charges, so that due account may be taken of property revaluation. It is prudent for contracts of this nature to be quite explicit concerning the airport's right to repossess the property after expiry of the contract, and the conditions and terms under which this may be effected. Repossession of property by the airport may also take place if the lessee defaults on payments, if the airport needs to repossess because of its operational requirements, or if repossession would be in the public interest. If repossession takes place, compensation, if due, may also need to be addressed.

Length Of Contract Period

The length of the contract period would normally be influenced by factors such as the type of business or rental involved and the extent of the investment in fixed assets by the concessionaire or lessee. Thus, longer term contracts would usually be offered in cases where significant investments are involved. Generally, contracts would make specific provisions for renewal.

While the lengths of concession contracts vary, most tend to fall in the one- to five-year range. Leases of airport premises are usually for somewhat shorter periods, with up to three years or less being most common. For the rental of airport land involving the construction of buildings by the lessee, the general range appears to be from 10 to 40 years, with the most common period being around 20 years. s.

Management Contracts

As noted in Part B of this chapter, a special form of contract is the "management contract", which may be used by an airport in cases where it may wish to contract out for the necessary expertise to conduct an activity of a commercial nature but still retain ownership of, and a high degree of control over, the activity concerned. Such contracts would specify the type of activity to be performed in exchange for a management fee, while stipulating that the net revenues earned accrue to the airport, possibly after deduction of a commission.

Contracts Relating To Free Zone Enterprises

The airport free zone concept has so far only had limited application. The nature of free zones and the contractual arrangements involved would depend largely on local circumstances. Contracts and leases

with commercial enterprises operating in free zones are likely to contain certain clauses not common to the other types of contracts mentioned above. Where foreign enterprises are involved, such clauses may contain reference to requirements imposed by legislation or governmental regulations.

The creation of a free zone and various aspects of its operation by the entity charged with its administration (whether the airport itself or a subsidiary established by it) would probably be covered by special legislation, while the rights and obligations of an enterprise functioning in the zone would be defined in the legal instrument (such as a charter or letters of incorporation) effecting its creation. Stipulations applying to foreign enterprises concerning their ownership, expatriation of capital and profits, employment of nationals, etc., would therefore not normally be covered in any contractual arrangements drawn up by the free zone entity, since such matters would already be governed through the mechanisms of the administrative or corporation law of the national, State or other jurisdiction concerned.

MODULE IV- AIRPORT-AIRLINE RELATIONSHIP

CHAPTER I: STRUCTURE OF AIRPORT-AIRLINE RELATIONSHIP

INTRODUCTION

Most texts approach this subject by focusing on the *vehicle* used by airport administrations to document their relationship to other parties, for example, a contract. This chapter instead focuses on the *relationship itself*, a reality that is not always readily apparent to industry newcomers.

Frequently, we make sense of something new by comparing it to something already known. In the case of airports, we find a large facility wherein portions are leased to various companies; thus a newcomer comes to believe that the airport manager is primarily a landlord, and all other parties at the airport are tenants. Although true to a point, this over-simplification is misleading and can lead decision-makers to consider airport issues in an inappropriate manner.

As a further example, people with a military background will frequently compare an airport to an air force base since they certainly *seem* alike in many respects. Unfortunately, this mental model may lead a newcomer to assume the airport manager commands most of the personnel at the airport. In reality, the airport manager's direct employees account for a minority of the total persons employed at the facility.

Even though his direct workforce is relatively small, the manager is still responsible for the smooth operation of the airport as a whole, and must therefore maintain multiple relationships with the members of the airport population and other segments of the air transportation network. This chapter will trace a brief overview the key features of the airport manager's relationships with the major airport user groups.

Airlines

Recalling the air+air+air equation from the first chapter, it's apparent that airlines are more than just tenants to airports. Airports and airlines are really partners who must work together to produce the final product: air transportation for the customer. In a sense, airports are the wholesalers of ground infrastructure, and airlines use this input to produce the final retail product.

Although the term partner is used when describing this relationship, it must be emphasized that the partnership operates at an arm's length. Airports and airlines are frequently on opposing sides of an issue, and the partnership is often based on mutual needs rather than mutual interests.

Historically, airlines have been the partner that initiates change and airports react to these changes. Airlines purchased jets and jumbos and established hub-and-spoke systems; airports responded to these changes by enlarging facilities and reacting to the consequences. Recent discussions about wayports and cargo hubs seek to change this relationship by setting the airport as the initiator of change and expecting the airlines to react favorably. Whether or not these grand plans are workable is yet to be seen.

The most common financial mechanisms used to obtain a revenue stream from airlines include a square footage charge for rented space and a landing fee based on aircraft weight (usually established as an amount per 1000 pounds of Maximum Gross Landing Weight). These amounts may be calculated in such a fashion to (1) recover the airport's specific costs for providing facilities to the airlines, or (2) balance the airport's overall budget after revenues from non- airline sources are subtracted from total expense. This latter method is referred to as the residual method and is part of a more tightly-woven contractual relationship between airport and airlines.

Selection of the airline rate -making philosophy is a central feature of an airport's financial strategy. Purely compensatory rate methods leave the airport owner with greater flexibility to control future plans and pursue new opportunities. On the other hand, a residual contract shares decision- making authority with the airlines in return for their commitment to pay adequate fees to balance the airport's budget (in the simplest example, all non-airline revenue is subtracted from total airport expense -this residual amount is charged to the airlines; thus, the airport operates at the break-even point).

Both methods are common throughout the industry, and many airports use both by establishing different

cost centers and selecting the appropriate method for each. Which strategy best suits an individual airport depends on its financial situation, negotiating posture, and overall management philosophy. In *Northwest Airlines vs. County of Kent* (92-97), the U.S. Supreme Court reaffirmed the right of airport owners to pursue either ratemaking strategy provided the final calculation produces reasonable airline fees and charges (The U.S. Department of Transportation holds authority to review such fees for reasonableness.).

In any event, in the deregulated era it has become obvious that airport rents and fees from airlines are not guaranteed cash flows. If passengers don't board an airline, the airline leaves town, and the airport doesn't get paid. In this sense, the airline fees received by the airport are best viewed as a percentage of the passenger fare originally paid to the airline. Thinking of the cash stream in this manner helps to overcome the landlord-tenant mentality and focuses attention on the true market viability of the airport's air trade area.

How can airports attract more airline service? Like all businesses, airlines seek to increase their revenues and decrease their costs. Concerning revenue, it is doubtful that airport management can have a meaningful impact on the size of the local market for air travel demand. Any particular airport will serve an air trade area, and this area will have (1) population, (2) disposable income, and (3) an economic profile. For the average U.S. city, these items combine in such a way that the airport will enplane a certain factor times the air trade area's population during a year (1.5 is a common number), and airport management's actions cannot alter this relationship in a significant way.

Concerning airline expenses, labor, fuel, and travel agents' commissions account for approximately two-thirds of the total; payments to U.S. airports usually amount to about 5%. Although some airport managements have attempted to attract new airlines by offering special pricing incentives, airport fees are such a minor cost factor that special incentives have little power to alter the airlines' fortunes in an appreciable way (though it should be noted that some communities have attempted to overcome this impediment by combining incentives on airport fees, labor costs, advertising, and taxes). Airport fees can be a deciding factor if an airline must choose between airports that are otherwise judged to have equally attractive markets. A cautionary note is in order at this point: any form of subsidy, whether a fee reduction or outright offer of cash assistance, should be made available to all airlines on an equitable basis, otherwise, an airport sponsor is open to a charge of economic discrimination, an event that can trigger a D.O.T. investigation.

Regardless of these hurdles, an airport's leadership can be proactive by thoroughly studying its own air travel market and communicating useful information to those airline companies that are best positioned to profit from it.

If, a particular airline is expanding its route system toward an airport and (2) the airport staff has market data indicating the local citizens wish to travel on the new airline's routes, it's not difficult to communicate this information to the airline's management. In doing so, the airport management hasn't attempted to alter the size of the local market nor the expense profile of the airline; rather, it has altered the timing of an event that may now take place sooner rather than later.

Concessionaires

If you wish to open a restaurant and sell hamburgers, you are free to do so, but if you wish to place golden arches in the front and call your restaurant McDonald's, you must pay a franchise fee for this privilege. Someone else spent a great deal of time and money to create the McDonald's image, and you may not profit from it unless you pay back a return on that investment.

Airports that have spent large sums of money to create an air transport facility have also created a marketplace in the process. If an entrepreneur wishes to enter that market, she owes a franchise fee to the airport that initially created this opportunity. This is the correct mental model for understanding an airport's relationship to its concessionaires. Once again, there is a larger dimension to this relationship than the simple landlord-tenant model that meets the eye.

The customary financial mechanisms include a square footage charge for rented space and/or a percentage of gross revenues. Frequently, a contract that specifies a percentage of gross revenue payment to the airport will also establish a minimum annual guarantee to be paid regardless of business conditions.

At larger airports, the airport owner may employ a master contractor who operates one of the major concessions (e.g. food and beverage) and subcontracts other business opportunities to other companies. Alternately, some airports have employed the concept of a master developer who likewise subleases and oversees all the concession opportunities but is specifically prohibited from operating any itself.

An alternate relationship is established in a management contract wherein the airport essentially retains ownership of the concession and contracts with an outside company to provide competent management of the service. With this arrangement, the airport usually retains control over the strategic issues (pricing, product offering, total service hours) while the operator is given latitude to exercise tactical judgment about the actual operation (employee scheduling, product display, etc.) Although financial incentives for the operator may be included in the management contract, risk and reward primarily accrue to the airport.

When should an airport operate a particular concession with its own employees? The simple answer is when (1) the airport has a natural advantage over outside concessionaires and (2) it desires to do so. For example, an airport parking lot will be staffed with employees drawn from the local labor market, and airport management can attract employees from the local area as well as (or better than) a concessionaire whose headquarters is located several states away. If the local airport management already has a competent personnel management structure and efficient work rules, its leaders may decide to use these strengths to its advantage. Operating the parking lot without a middleman can result in a greater net return to the airport.

On the other hand, if the airport must abide by strict civil service rules or if it is currently engaged in labor troubles, it may be more prudent to recognize that an outside operator can better serve the situation, whether employed as a concessionaire or a management contractor. Each concession opportunity at each airport requires a specific assessment; no generalized answer can be given.

General Aviation

General aviation is such a broad category of activity that it is not surprising our airports have developed a wide variety of relationships with this segment of the flying public. To the extent there is a standard, it is to lease ground space to a Fixed Base Operator (FBO), which then builds facilities and offers customer services to the GA public. In a sense, this portion of the airport is routinely privatized, although the airport may require certain product offerings that would not otherwise be supported by strict market economics.

Alternately, the airport may wish to provide these services directly to the flying public without the FBO middleman. This method is less common than the previous and many times exists because of a peculiar situation in the local GA market rather than a preferred strategy by the airport's leaders. A variation of this strategy is to employ an experienced company to provide these services under a management contract, an approach that is gaining popularity.

Finally, at very small airports it is not uncommon to find the FBO actually acting as airport manager. A small county that owns an airport may not have the resources to hire a professional airport manager and staff. The county may then lease airport space to a FBO and further require the FBO to mow the grass, inspect the runway, and otherwise provide some minimum maintenance services in the guise of "airport manager". The potential for conflict of interest is obvious; however, many times there is simply no other economically viable solution.

In all cases, these points must be kept in mind when considering the relationship of airports to general aviation:

- The airport may not grant one FBO a monopoly; however, the airport owner may grant monopoly status

to itself if it provides aeronautical services directly to the flying public. In either case, the FAA will exercise its oversight responsibility to ensure no members of the flying public suffer "unjust economic discrimination".

- If an airport has two or more FBOs on the field, it must treat them fairly, without unjust discrimination toward any. Easy to state in theory, this is sometimes difficult to apply in real life situations.
- FAA doesn't have as much regulatory control over general aviation as many of its employees would like. Sometimes the FAA forces the airport to act as a regulator, a role many are not pleased to acquire (Example: Requiring some airports to inspect GA fuel farms; requiring some airports to establish traffic patterns for ultralights).

In all cases, it is prudent for an airport's governing body to understand its local GA market and determine (by policy) its strategy for serving this flying segment. The alternative is to invent a strategy after the fact by negotiating with the various entrepreneurs that pass through the airport manager's office.

Customary financial mechanisms include a square footage charge for space leased (or per acre for raw land leased) and a fuel flowage fee. The fuel flowage fee is usually expressed in terms of cents/gallon although some airports establish it as a percentage of the retail price. A wide variety of other financial mechanisms can be found at different airports around the country; however, fuel is usually the predominant revenue source for an FBO and the fuel flowage fee is frequently the central GA revenue source for the airport.

How can the local general aviation market be quantified? As a starting point, there are approximately 200,000 general aviation aircraft in our country. Dividing this by the total population (280,000,000) yields a ratio of about 1 airplane for each 1400 people; thus, if a particular community has 500,000 citizens and 450 locally-owned aircraft, it has a general aviation market that appears to be larger than average. Beyond sheer numbers, it is important to examine the type of aircraft. In the example above, if those 450 aircraft were all single-engine piston-powered aircraft (no turbojets, no twin-engine aircraft), this would be unusual and warrant further study. Finally, beyond the market of locally-based aircraft, an airport serves itinerant aircraft. A small rural airport may only serve two dozen local owners, yet sell over 250,000 gallons of jet fuel every year to the itinerant aircraft which deliver their owners to a nearby resort.

After measuring the size and composition of the locally-based and the itinerant markets, it is useful to classify the aircraft operators in these categories:

- How many aircraft are used to make money?
- How many aircraft are used to save money?
- How many aircraft are used to spend money?

Making money (e.g. air ambulance, crop dusting) and saving money (corporate travel) are economically viable uses of an aircraft and produce the majority of positive economic impacts associated with general aviation. Spending money (recreational flying) becomes more and more difficult as the cost of aircraft ownership increases. If a local airport serves a general aviation market that is (1) smaller than average, (2) primarily composed of lighter piston-powered aircraft and (3) serving recreational users entirely, the airport manager has to entertain concerns about the long term viability of the market.

State Aeronautics Agencies

Due to the interstate nature of air commerce, most government involvement with aviation is focused at the national level; however, practically every state has a bureau, department, or agency that oversees intrastate aeronautics. The size of these agencies and the breadth of their responsibilities varies greatly from small offices offering little more than expert advice to larger organizations involved in financial

assistance, accident investigation, airport licensing, and statewide airport system planning. Because of this wide diversity, no clear generalization can be given about the customary relationship between airports and their respective state aeronautics agencies.

CHAPTER II: AERONAUTICAL CHARGES AND AIRLINE OPERATIONS

Traffic growth generates higher aeronautical revenues through an increase in aircraft movements and also drives non-aeronautical income higher with more passengers spending on airport products and services. Airports have been very successful in growing non-aeronautical income streams. Data from ICAO in 1990 indicate that only about 30 percent of airport revenues were from non-aeronautical sources. In recent years, ACI surveys have confirmed that the global figure is now closer to 50 percent, with a number of large airports deriving over 60 percent of gross revenues from non aeronautical sources, including retail concessions, auto parking, rental car concessions and property income from leasing of airport land.

The last decades saw a period of huge transformations in the airport industry. Changes in the ownership structure, the understanding of an airport's mission, the influence of new market players such a low cost companies etc. changed the focus of airport management and lead to an increased focus on non-aeronautical revenue. Some airports have successfully refocused and others are now only on the eve of that.

Airports need to be attractive and effective to survive. Thus while management has to pay attention to all the activities of an airport, non-aviation activities have become extremely important for airports to remain profitable and competitive.

Non-aeronautical revenues have become increasingly important for airports, as the growth of non-aviation revenues enables airports to generate funds for investment in infrastructure and development. Besides, having a high non-aviation revenue share is a key component for airports as it makes them more attractive for managers and investors, private or public.

Non-aeronautical revenues are a vital component in the economics of airports. During the downturn the diversification of airport revenues cushioned the impact of lower passenger and freight volumes and safeguarded operating profits. Non-aeronautical revenues critically determine the financial viability of an airport as they tend to generate higher profit margins than aeronautical activities, the latter frequently representing a zero sum game or producing a deficit.

Emergence and evolution of non-aeronautical charges and incomes are of recent origin. However the traditional source of airport revenue would always remain aeronautical incomes.

Hence this chapter intends to conduct a brief overview on aeronautical incomes.

Meaning of Aeronautical Incomes

Aeronautical revenue sources are those directly associated with airport infrastructure related charges such as aircraft landing and takeoff fees, aircraft parking charges, passenger services fees. Aeronautical charges are imposed for the provision and use of an airport. In broad terms, the aeronautical side of the business is made up of fees paid for the traditional core airport-related activities such as the provision of runways, aircraft stands, facilitation and security areas and the associated staff to undertake such activities.

Revenue to the airport from aeronautical uses by airlines, aircraft owners and FBOs, measured on a net basis after discounts and incentives. Includes charges such as aircraft landing and takeoff fees, aircraft

parking charges, passenger service fees, security charges, and in the U.S., terminal rental charges imposed in lieu of passenger charges. Includes ground handling user fees which are a significant source of aeronautical revenue at some airports.

Aeronautical revenues generally include airport and air navigation charges. These charges are to defray the costs of providing facilities and services for civil aviation. The ICAO recommends, "As a general principle it is desirable that the users shall ultimately bear full and fair share of cost of providing the airport and its facilities"

Sources of Aeronautical Incomes

Landing Fees

Among the many types of airport charges, the landing fee is the oldest and most common of all. It is believed that the landing fee was first introduced in Britain under the Air Navigation Act signed on 30 April 1919 by Winston S. Churchill, who was then Secretary of State for Air. The Act set the accommodation charge and the landing fee due at Royal Air Force aerodromes open to civil traffic. Until today, the landing fee remains the most universal and basic airport charge. The level of the landing fee and the method by which it is computed can vary greatly from one country to another and, within a country from one airport to another. Generally, however, the landing fee is based on the aircraft's weight and is levied on operators for use of the aircraft maneuvering area. In a few instances (e.g. Australia) the landing fee includes enroute air navigation charges as well.

There are usually two ways of specifying the amount of landing charges based on the aircraft's weight: either as an

- "accumulative charge" or as a
- "straight charge".

The landing fee is sometimes accompanied by a variable surcharge, particularly for night landings or for certain peak periods of the year or for peak traffic hours. The surcharge can be viewed as an incentive for reducing or even eliminating night traffic for environmental reasons or, in the case of peak-period surcharges, for avoiding daytime congestion of airport and air traffic control facilities. The surcharge may also reflect the additional costs imposed by airport users during night-time or during peak traffic hours. For example, in Japan, each landing and each take-off at night is charged 5% more to cover the cost of lighting the airfield.

Certain types of flights are usually exempted from landing fee payment. These are generally the following:

- Royal, head-of-state, diplomatic and state aircraft
- Aircraft engaged in search-and-rescue operations
- Approved test flights or calibration flights
- Military and police aircraft
- Operations necessitated by mechanical problems on board or forced under threat of violence

Many airports also offer discounts on landing fees. For example, Turkey offers a 50% reduction in charges "for international aircraft for tourism or sports aircraft provided that no additional passenger or cargo is embarked or disembarked". The Emirate of Sharjah offers a similar reduction on landing fees for aircraft operating scheduled services originating from a recognized point less than 40 nautical miles away from the airport. In the United States, San Francisco Airport offers a volume discount based on the monthly gross aircraft landing weight of revenue flights of each carrier: an airline with a total flight gross landing weight between 40 and 80 million pounds per month receives a 10% discount; with between 80 and 120 million pounds, a 20% discount; and with more than 120 million pounds, a 30% discount.

Parking and Hangar Charges

Most airports grant free parking to aircraft for a limited amount of time after landing. Beyond that time,

aircraft are charged for the amount of time they stay at an airport. For example, apron parking is free for the first three hours after landing in Brazil and thereafter, aircraft are charged

20% of the landing fee per hour or part thereof.

It is common practice among airports to base parking charges on aircraft weight and/or the space occupied by the aircraft. Prima facie Brazil, in this case, would seem to be an exception to this rule in that the parking fees are not based on weight. However, because the parking fees depend on the landing fees, the parking fees are in fact indirectly based on aircraft weight too.

Where a "space-occupied" approach is used, the space occupied by the aircraft is defined to be the aircraft length multiplied by the wing span.

The parking charges may also consider the type of parking area, the time period and other factors. At some airports, the charges for parking on the apron, at a gate position and in the hangar, differ significantly. Time-of day differentiation may also exist. At London-Heathrow Airport, parking during the peak period costs four times more than off-peak parking [AD, 1983].

San Francisco Airport offers long-term parking at a reduced rate. Charges are also sometimes imposed for removing fuel or oil stains from the ground, e.g. in Paris.

Passenger-Service Charges

Passenger-service charges were initially conceived as a means of supplementing aircraft revenues and alleviating the magnitude of user charges paid directly by the airlines. Over the years, however, passenger-service charges have become increasingly associated with the recovery of costs of terminal buildings and of passenger facilities and services (such as immigration, passport control and customs). They are now accepted as the fees levied for the use of embarkation, disembarkation and reception facilities by passengers.

During the early years of aviation and even until recently, these charges were paid by the passengers (in addition to the fare) before embarkation in most countries. The collection was either undertaken by the airport authority or relegated to the airline and/or to a collection agent.

This practice, however, has become increasingly cumbersome at busy airports, and is unsatisfactory from the facilitation viewpoint.

Airport authorities, tourist organizations and such bodies as the Council of Europe and the European Civil Aviation Conference (ECAC) have repeatedly demanded that passenger-service charges be included in the passenger fare. The airlines have objected strongly to this idea. This is because it is not quite so simple to include passenger-service charges in the price of tickets. International fare structures are too complex to make an automatic arrangement of this sort. Moreover, it is generally not recognized that passengers may pay less through a separate collection at the airport than they would if such a charge is collected through the fare structure. This is because any increase in fares attracts agents' commissions. There are also administrative costs associated with passing through the amount to passengers in the fare structure.

When the passenger-service charge is collected through them, airlines generally take the attitude that it should not be considered a passenger service charge but a variable addition to the landing fee. This view is shared by the German Airport Authority (ADV) and, since November 1968, the landing fee at West German airports has been split into two parts: a fixed part which is related to aircraft weight (the original landing fee) and a variable part which is related to the number of passengers (the passenger service charge).

In some countries, the amount of passenger charge payable depends on the flight destination. For example in Singapore, passengers going to Malaysia and Brunei pay S\$5 per departure. Passengers bound for other countries pay S\$12. Transit passengers are exempted from payment. Appendix 2A gives a summary of the amount of passenger service charges and the collection methods used in various International Civil Aviation Organization (ICAO) contracting states.

Fuel Throughput Charges

At some airports, the authorities concerned are responsible for fuel facilities such as underground fuel hydrant systems. The cost of financing, operating and maintaining these facilities may be recovered through what is known as fuel throughput charges. Fuel throughput charges are tariffs levied on airline fuel purchases and they are normally collected from the airline operator according to the amount (as opposed to the value) of fuel uplifted.

The amounts collected vary from airport to airport.

In the United States, fuel throughput charges are often collected from general-aviation operators in lieu of landing fees. The amount is about US \$0.05 per gallon of fuel uplifted [Lim, 1980]. Few air carrier airports charge air carriers for fuel uplifted. The few which do include Honolulu International and Anchorage International.

Some authorities impose fuel throughput charges as part of the rental or concession arrangements made by the airports with fuel suppliers who provide their own installations at the airports. Under this type of arrangement, fuel throughput charges are actually fees collected by airport operators from the fuel suppliers for granting rights to perform refueling within the airport boundaries. The fees are therefore not classified as aeronautical charges and are justified on the grounds that the revenue goes directly or indirectly to support the aviation facilities at the airport. However, the fuel concessionaires often consider these charges as a component of their costs.

Thus, the fees are often passed on to the airlines as an add-on to their normal invoices for fuel. As concession fees, by definition, do not necessarily have to be related to any airport operator's cost, they can be quite substantial. Airlines, individually and through their associations, have expressed strong concern over this matter. It is argued, in addition, that, if airlines are already paying landing and parking fees based on maximum certified take-off weight which assumes maximum fuel capacity, the fuel element is taken into account thrice in applying airport charges.

Airports like Copenhagen, Casablanca, Buenos Aires, Manila, Tenerife and Caracas have recognized fuel charges as aeronautical revenues. In 1969, the Danish Government decided to abolish fuel throughput charges for international flights from Danish state-owned airports. In 1971, the charges were abolished for domestic flights as well. The revenue formerly derived from the fuel charge was substituted by an appropriate increase in landing rates. The replacement of fuel throughput charges by an increase in landing rates was welcomed by the airlines. It has also proved to be advantageous to the airport authority in Copenhagen. Such advantages and disadvantages, and the reasons which led to the Danish Government's decision to replace the fuel charges, are discussed in detail in a paper presented by Denmark at the 1981 ICAO Conference on Airport and Route Facilities Economics.

Noise or Nuisance Charges

Measures aimed at mitigating the effects of noise pollution may be adopted at airports where noise is a major problem. These measures include noise curfews, land-use planning around airports, operational measures for noise abatement, construction of new airports or runways and soundproofing/ acoustical installation.

Noise or nuisance charges may be levied to pay for a particular noise reduction program or to provide once-only compensation to affected residents, as well as to dissuade airlines from using airports at certain times of night, or to encourage them to acquire quieter aircraft. Appendix 2B gives a list of noise-alleviation measures which involve costs to an airport.

In France, a levy for the purpose of reducing nuisance to communities around Orly, Charles de Gaulle and Le Bourget Airports was introduced in February 1973. The levy (3 French francs per passenger on international flights, 1 French franc per passenger on domestic flights) is collected by Aero port de Paris, which administers the resources in a special, independent, extra-budgetary account. A plan calls for replacement of this fee at these airports with a charge to be calculated by applying a progressive

percentage in relation to the noise caused by the aircraft to the landing fees due.

Other countries which levy noise charges include Japan, Switzerland, the Federal Republic of Germany and the United Kingdom. In the United Kingdom, the British Airports Authority (BAA) scheme involves rebates rather than additional charges. Noise-abatement measures are financed out of general airport revenues.

One can then identify three categories of noise or nuisance charges:

- "Redistributive" charges, which are charges collected to finance a noise-exposure reduction program. (An example of this is the levy introduced in France.)
- "Punitive" charges, i.e. those designed to penalize noisy aircraft. (An example of this is the noise charges introduced by the government of the Netherlands.)
- "Incentive" charges, i.e. those designed to induce airlines to use less-noisy aircraft or retrofit aircraft. (An example is the BAA's scheme which involves a rebate.)

Many airlines object to paying "redistributive" noise-related charges and feel that government agencies concerned must also meet their share of the burden. This is because, it is argued, airlines over the years have spent large sums of money on noise-abatement measures such as buying quieter aircraft, suffering fuel and payload penalties by carrying noise-suppressive hardware, operating on noise-preferential runways, and flying minimum-noise routes that avoid populated areas, which often increase route mileage and fuel consumption. In addition, airlines must adhere to noise-abatement procedures on landing and take-off, and purchase ground equipment to reduce noise during ground running. Furthermore, airlines are subject to curfew restrictions at numerous airports.

Some airlines have also been required to meet regulations covering the noise of older in-service aircraft at significant cost. This is especially true if the compliance date requires aircraft to be retired and replaced earlier than in the absence of such regulations.

Airlines thus feel that federal and local governments are jointly responsible with other parties (including the airlines) for the existence of the noise problem. After all, this argument goes, it is the governments which select sites for airports and control use around them, certificate the aircraft flown by the airlines, and have final authority regarding international agreements and national policies under which airlines operate.

In some cases, governments have adopted policies which have the effect of delaying introduction of quieter wide-bodied aircraft at their airports. Some governments have also encouraged expansion of air traffic to benefit the community to which they are answerable.

Airlines also feel that they have made strenuous efforts to fulfill their responsibilities in contributing to the solution and will continue to do so. Further action on the part of airlines to reduce noise depends on advances in technology and available finances. It is said that "incentive" charges will not have the effects anticipated by their proponents. In fact, "incentive" charges may have the opposite effect. Airlines are anxious to introduce quieter aircraft as soon as possible, and any noise-related charges can, according to them, only delay their financial ability to do so.

"Punitive" charges are viewed by the airlines as a form of taxation.

Penalties collected are added either to the general tax revenues of the country or the capital reserves of the airports concerned. The International Air Transport Association (IATA) is strongly opposed to such charges. IATA reasons that the charges contradict International Civil Aviation Organization (ICAO) policies on taxation in the field of International Air Transport [ICAO Document 8632-c/968] which call for aviation to be exempted from all taxes "regardless of the names attached to them".

Security Charges

Most international airports have taken exceptional security measures in recent years and are equipped with expensive means of control and surveillance for the protection of passengers and aircraft. The measures taken include inspection/screening of passengers and cabin baggage, security in arrival and departure lounges (including transit/transfer lounges), security of airside areas, and security of landing areas. Usually there are many parties involved in the provision of security at a single airport. The parties include the airport administration, airlines, local/municipal government and national government. Table 2.6 presents a summary of the results of an ICAO survey on the spread of responsibility among various parties for different security functions.

That survey conducted in 1980 indicated that airport security costs fluctuated widely among airports, both in absolute terms and on a per passenger basis. The amounts ranged from a low of US \$0.01 to a high of US \$1.68 per passenger among the 23 airports responding to the survey. In most cases, however, the cost-per-passenger was in the US \$0.10 - 1.00 range. It was also noted that these figures may not reflect the total airport security costs, but only those security costs incurred by airport administrations.

The considerable additional expenditures that have been necessitated by airport security measures have given rise to questions concerning the responsibility for the financing of these measures. Some governments claim that such security measures involve much more than simply maintaining law and order at airports. Moreover, only a relatively-small percentage of the population travels by air. Consequently, it is argued, the population at large should not be expected to pay through general taxation for security measures at airports which it does not use and cannot afford. The conclusion is that users should bear the cost.

At some airports, the costs of these security measures are indeed recovered through the usual passenger service charge or other regular sources of revenues. At other airports in countries like Canada, the Philippines, Switzerland and the United Kingdom, these costs are recovered through a separate charge known as the "security charge".

Enroute Charges

Enroute air navigation charges or airways charges are those fees paid by the airlines for the use of enroute navigation aids, air traffic control services, the supply of information on weather conditions, and the provision of ground-based communication services required in the identification and separation of air traffic. Some countries do not levy any airways charges.

Some recover the entire cost of the services they provide, while others recover only a part. As mentioned earlier, in a few countries the air navigation charges are included in the landing fees.

In 1967, only 40 states levied route facility charges. In 1971, the number rose to 61 states, which included 10 states applying the charging scheme introduced by the European Organization for the Safety of Air Navigation (Eurocontrol).

The methods used to compute air navigation tariffs or enroute charges differ substantially around the world. Some countries like Burma levy a single fixed charge and differentiate between overflying and landing flights.

Such simple charges thus may disregard the aircraft weight and the distance flown within a country's airspace.

There are several specialized international organizations providing unified air traffic control services for their members and contracting states.

The three main such organizations are

The basic scheme was originally developed by Euro control and has been endorsed by the International Civil Aviation Organization (ICAO). In this system, a single charge is invoiced for the entire area served by the participating states. Whatever the number of states overflown, the single charge for any given flight is the sum of the individual charges calculated for each state overflown.

CHAPTER III- DEVELOPMENT AND MANAGEMENT OF NON-AERONAUTICAL ACTIVITIES

BASIC FACTORS

ICAO'S Policies on Charges

ICAO's policies on charges recognize the continuing importance of revenues from non-aeronautical activities and recommend the full development of such revenues except in the case of concessions directly associated with the operation of air transport services such as fuel, in-flight catering and ground handling (Doc 9082, Section II, paragraph 10 refers). It should be noted that revenues from non-aeronautical activities are in fact the principal means by which airports that apply the single-till or the hybrid-till are able to recover their total costs, because their profits from these non-aeronautical activities more than cover the shortfalls that they incur on their airside operations. A delicate balance has to be found, taking into account, inter alia, the fact that the development of non-aeronautical revenues should not in any way compromise safety or security on airport land and premises, and that the primary role of an airport is to facilitate air traffic.

While a large number of airports in several regions of the world have actively developed revenues from non-aeronautical activities, in some other regions their development still appears to be below its potential, taking into account such factors as the overall volume of traffic and high share of international traffic. In this context, as airport traffic increases, not only do revenues from non-aeronautical activities tend to increase in absolute terms, but their share of total airport revenues also tends to increase compared to revenues from charges on air traffic. At some airports, however, inadequate terminal space management and lack of terminal space, as well as of financial resources can contribute to low levels of non-aeronautical activities.

Organizational aspects may also hinder the development of non-aeronautical activities. For example, the airport administration may not be able to exercise any control over the granting of concessions or rentals, when this is vested in another entity with revenues either accruing to it or to the national treasury. Under such circumstances, airport administrations may not have the same incentive to develop non-aeronautical activities as they would have if they were directly responsible for the management of these activities and the resulting revenues. It is important that an airport operator has the possibility to manage non-aeronautical activities to maximize the potential of the commercial opportunity presented by the airport location. Experience has shown that a mix of commercial activities needs to be kept under review to ensure that, in a dynamic market situation, airports continue to provide services and products that customers wish to buy.

NON-AERONAUTICAL ACTIVITIES — TYPES AND OPERATIONAL RESPONSIBILITIES

Types Of Concessions And Rentals

Non-aeronautical activities occupying airport building space and land are many and varied. They include a wide range of shops and service activities, office and other premises occupied by airlines and governmental agencies, as well as free zones. Airport revenues from non-aeronautical activities chiefly consist of fees for the rights to operate businesses at the airport, rentals of leased land and premises and, to a much lesser extent, receipts from commercial activities operated by the airport itself. Airports may also receive revenues from commercial activities operating off the airport but relying on airport traffic for their customer base.

Commercially oriented non-aeronautical activities cover a wide range. The most commonly found activities, listed in order of prevalence, are presented in Table 5-1. Most common are aviation fuel suppliers and food and beverage concessions (restaurants, bars, cafeterias, etc.). Also among the more common and significant activities are duty-free shops, banks and foreign exchange facilities, airline catering services, taxi services, car rental agencies and automobile parking. Even the smallest airport terminal buildings usually contain shops or stalls dealing in such items as confectionery, reading

material and souvenirs. As airports increase in size, the trend is towards increased diversification and specialization as well as in the size of individual enterprises. The emphasis in merchandise trading is on light and compact items which can be carried as hand baggage and have a relatively high value per unit of weight and volume.

Duty-free shops exist at most international airports, although sales may be restricted to liquor, tobacco and perfumes at the smaller locations. As traffic increases, duty-free sales tend to expand, often rapidly, to include watches, cameras and optical equipment, radios and other sound-producing equipment, various electronic devices (computers, calculators, games, etc.) and expensive but light designer clothing accessories. Although the emphasis is on high-value portable items, duty-free sales at a number of airports have in recent years expanded to include such bulky merchandise as automobiles and large television and audio sets. Providing high-quality goods and services at competitive prices remains necessary but is no longer sufficient for commercial success. Attention is increasingly being given to airport advertising revenues which have become a major generator of income at many airports. The increased ability to easily transport people within an airport, leaving passengers free to peruse their surroundings, has given rise to more advertising at some airports. Advertising has also been used effectively on aerobridges and in some airport facilities, floors, particularly near revolving doors or in other areas where passenger attention could be reached. Another logical area for advertising is at the baggage claim area, where many passengers have time to dwell. There are of course limits to the amount of advertising an airport can undertake, since it should in no way compromise good airport signage.

While access to duty-free shops was traditionally limited to departing traffic, in recent years a small but growing number of airports have also successfully operated duty-free shops for arrivals. It is recognized, of course, that establishing duty-free shops for arrivals may in most States require amendments to be made to customs laws and associated regulations. Another development has been the establishment of off-airport duty-free shops where the products sold are collected at the airport at airside by the passengers. Websites created by airports can also facilitate this practice. Many airports maintain sophisticated websites where they provide useful information to passengers and the public. These websites often include real-time flight information, airline timetables, airport maps, and information on ground transport. The websites are also used by many airport operators to inform passengers about airport retail facilities and duty-free shops. Some airports have links that enable passengers to “pre-order” retail or duty-free shop items for pick-up at departure. Airport websites can be useful both from a customer service point of view and as a tool for enhancing non-aeronautical revenues.

The clustering of time-critical goods-processing facilities around airports is stimulating further expansion of air cargo, air express, less-than-load (LTL) trucking, freight forwarders and their party logistics providers along arteries leading into and out of gateway airports. Major forecasters project cargo volumes to grow more rapidly than passenger traffic over the next twenty years. The express parcel business and other time-sensitive services are expected to have the fastest rates of growth over this period. Airport operators are increasingly looking at cargo operations as an excellent option for using scarce airport capacity, since cargo can be moved at night or at other off-peak times. Airports with ample space sometimes host “cargo villages” where trucking, containerization, warehousing and other cargo activities can be handled on airport property. This represents a considerable source of rental income for the airport operator and also creates jobs.

Historically, most of the concession trade has been aimed primarily at travellers and their accompanying friends and relations. However, a growing number of airports have been paying increasing attention to the market composed of persons working at the airport and those living in nearby communities, developing for this market such concessions as restaurants, supermarkets and cinemas. Establishments of this kind need not be located in prime space in the major passenger flow areas or in the immediate vicinity of the passenger terminal(s), thus permitting more profitable use of building space and land than might otherwise have been possible.

Certain concession-type activities are frequently established at an airport, not because of their revenue-generating potential for the airport, but because they provide a service considered essential or highly desirable for passengers and/or persons working at the airport. Such activities may include employee cafeterias, post offices, government tourist information booths, etc.

With respect to rentals, in addition to the rental of premises for merchandising purposes, office space in terminal buildings, if available, can be leased. The main lessees would normally be airlines and governmental agencies. Rentals of hangars, workshops and warehouses (other than bonded warehouses) by the airport tend to be less common, as they are often owned by other entities although usually constructed on land leased from the airport.

Airport-operated non-aeronautical activities

Since they sometimes do not possess the expertise and marketing knowledge required, and also in order to limit their financial commitments, some airports prefer to arrange for certain commercial activities to be conducted by outside parties specialized in the businesses concerned while retaining overall control through contractual arrangements. Airports may also wish to consider making the concessionaires or lessees responsible for finishing and furnishing the premises they occupy. This, however, should be done under the control of, and subject to the approval of, the airport and in conformity with airport plans to promote overall harmony and visual balance in interior and exterior layout and appearance.

In some circumstances, however, it may be more advantageous for an airport to operate certain activities itself, particularly those not requiring specialized knowledge or substantial capital outlays or inventories, such as automobile parking, although more resource-demanding activities, such as the provision of conference facilities and services, have also been introduced. Even without previous direct retailing experience, airports are becoming more knowledgeable about the characteristics of their passenger base through the conduct of sophisticated passenger surveys, which provide useful indications on directions to follow for business development. The results of these surveys permit the careful establishment of retail strategies that are tailored to the needs and income levels of passengers through precise market segmentation.

A related situation, which is discussed in Part E, is when an airport itself owns a non-aeronautical activity, such as a hotel, but contracts out for the necessary expertise to operate that activity while retaining ownership and receiving the revenues it generates.

“Airport City” concept

The “airport city” (or “aerotropolis”) concept acknowledges the notion that large airports take the characteristics of a real city. They develop non-aeronautical services far beyond the core business of providing a location for passengers. Airports have not only become catalysts for employment and economic growth, but they have attracted a full range of businesses to the airport vicinity, which are reminiscent of the way seaports and river deltas became centres of economic activity in past centuries. Modern airports are becoming meeting places and indeed a destination in their own right, with corporations scheduling meetings at or near airports to maximize the valuable time of their managers. Many hotel chains report that airport hotels are among their most profitable properties, due not only to high demand for rooms, but also for revenues generated from conference services and catering. Airport cities are usually located only partially on land belonging to the airport, but also on off-airport land, a situation which may entail different treatment in terms of revenue for the airport operator.

Free zones

A small number of airport-operated free zones have been established, most commonly to accommodate bonded warehousing and storage, often with the primary objective of serving duty-free shops located at the airport.

The establishment of an airport free zone may impose substantial financial commitments on the airport

and the State concerned, depending on the extent of the incentives which are offered to encourage enterprises to locate in free zones. These incentives would normally include:

- exemption of goods imported, exported, stored or processed from any import, export, transit or processing taxes or duties;
- goods produced benefitting from trade agreements to which the State may be party;
- possibility of entering a new market or improving present market position;
- tax exemptions or reductions regarding profits from export business;
- freedom to repatriate capital and profits;
- well planned secure zone with newly constructed buildings or sites prepared for construction with all necessary utilities;
- availability of materials, utilities and skilled and non-skilled labour at low cost; and
- satisfactory air and surface transport services.

The selection of incentives offered to enhance prospects for the operation of a successful free zone will, of course, be related to local circumstances and national laws and regulations.

Past experience, although limited, indicates that the type of industries most likely to be attracted to a free zone are primarily those involved in the manufacture of products with a high value per unit of weight and volume, or requiring a substantial component of inexpensive skilled and/or unskilled labour, or both. Considering the requirements that may need to be met, free zones may not represent an economically sound proposition for a large number of airports (or States). However, airports may still find it feasible and desirable to establish or expand bonded warehouses and storage areas to allow for limited consolidation and assembly activities, as this frequently may not impose substantial financial commitments on the airport or the State concerned.

Off-airport activities

A number of industrial or commercial activities are also taking place in the close vicinity of airports. They take advantage of the proximity of the airport but do not need to be located on the airport grounds, or they simply cannot, because of the scarcity of land at airports. Examples of such activities include hotels, restaurants, convention centres, shopping centres, freight forwarding agents, warehouses, e-commerce distribution centres, press distribution centres, light industries, and surface transportation-related activities. In terms of revenues that airport operators can derive from these activities, however, the situation is not as straightforward as for activities located on airport grounds and will depend on local circumstances and regulations.

MANAGERIAL ASPECTS

Planning and Selection of Non-Aeronautical Activities

For a number of reasons, priorities may need to be established for the selection of those concessions which are likely to yield the highest net revenue while ensuring that public convenience is taken into account. Similarly, coordination is necessary in developing commercial activities and harmonization in layout. All these factors are particularly important at the start of the master planning process and at the subsequent design stage of a new airport or terminal, when some compromises may be necessary in choosing among features required for the basic operational functions of the airport and those conducive to the profitable conduct of non-aeronautical activities. Periodic reviews of the various activities occupying airport space, to determine whether they are producing a satisfactory return and whether they could be replaced by more lucrative activities, will also need to be undertaken to ensure optimum use of the space available.

Since the market catered to by airport shops and services is composed of passengers, visitors and employees at the airport, it is useful to obtain information on these three groups of clients regarding their income levels, demands and the factors influencing their purchases. This would include information on preferred types of facilities, and opinions on prices charged and the quality of goods and services offered, which may be obtained by conducting periodic surveys. Other information that airport management is likely to find useful includes past, current and forecast air traffic volumes, including a breakdown of numbers of international and domestic passengers into arriving, departing and transit/transfer passengers; present and forecast numbers of visitors and airport personnel; the average duration of time spent by various categories of passenger traffic at the airport; and distribution of the passenger traffic over the hours of the day, days of the week, and months of the year.

Internal administrative arrangements

As non-aeronautical activities expand, airport administrations may find it necessary or desirable to assign their supervision to a separate managerial unit. The responsibilities of such a unit would usually include the selection of the range of services to be provided to the public, the selection of concessionaires and tenants, the negotiation of contracts and leases, including selection of the appropriate concession fee structure, together with the subsequent monitoring of prices charged, quality of service and such other conditions as the contractual agreements may stipulate.

Promotional aspects

Particularly in the early stages of its development of non-aeronautical activities, the airport needs to actively promote itself by such means as the preparation and circulation of promotional material describing, for example, the potential market offered by the airport, indicating the size of that market and the above-average income levels in that market. Also, the media should be used to describe the airport as a place of trade, and contacts should be established with such interest groups as local chambers of commerce. It is important to develop an overall marketing plan for these various aspects of non-aeronautical activity development and promotion.

SETTING FEES AND CHARGES FOR NON-AERONAUTICAL ACTIVITIES

Approaches to Determining Market Value

With the exception of the special service-oriented concessions, prior to setting a concession fee or rental charge it is necessary to estimate the costs to the airport of providing building premises or land to each of the various concessionaires or lessees involved, in order to establish a minimum for the fees and charges to be set in each case. This is to prevent the airport from incurring any losses on the activities concerned. However, since a prime objective is normally for the airport to derive as much profit as possible from non-aeronautical activities, it is necessary, particularly in relation to commercial trading activities, to establish the market value of the various airport premises for different non-aeronautical activities. In this context, it is the customer potential and the location of the premises, not only at the airport as such, but also within a certain building (terminal or other) or the airport area, that determines how attractive it is to a prospective concessionaire or lessee and consequently determines the level of the fee the airport can charge for its use.

Market value can be determined by a tendering procedure or can be assessed by the airport itself. Often a combination of these two procedures is used. Most airports using the tendering process do so as a general practice and also use it for the renewal of concessionary contracts on their expiry. Some other

airports use the tendering approach selectively, usually confining its use to the potentially more lucrative activities. Tenders will be discussed in more detail later in this section.

An assessment of the market value of the premises offered usually involves comparison with premises of similar character in the vicinity of the airport or in the downtown area, taking account of factors such as the nature of the trading activity, the size of the market to which access is provided, and the volume of business transacted. In this context, it should be noted that certain areas or locations within the airport, particularly in the terminal building(s), are commercially much more attractive than others because they may be more visible to and accessible by prospective clients. Consequently, an airport may divide building space and land into different zones, setting a range of market values per unit of floor space (within, for example, a terminal building) or land depending on the location and the type of activity for which it is intended. In general, the more remote the location of the building space or land, the lower the market value.

Setting concession fees

With exceptions, such as those referred to below, concession fees may be variable or fixed, or a combination of both. The combination-type fee is normally preferable, particularly with regard to such major activities as restaurants, bars, duty-free sales and shops, as well as car rental and car parking operations because it creates the right commercial incentives for retailers and concessionaires, particularly on airports with limited commercial space. The range of activities to which the fees would apply would generally increase with airport size. At airports handling a very large annual volume of traffic, the tendency would be for most concession fees to be assessed in this way.

The fixed and variable components in a concession fee should recover all airport costs attributable to the concession concerned as well as produce the level of profit desired. It is for the individual airport to decide how much of the costs and profits, respectively, would be covered by the fixed as opposed to the variable components of the fee for a concession. The variable component of the fee should normally be expressed as a percentage of the turnover of the business concerned rather than as a percentage of net profit since the latter can raise various monitoring and auditing problems, and is thus more difficult to apply satisfactorily. While it is common practice to use a percentage rate that remains constant for one activity, irrespective of the volume of business, in some cases the percentage payable increases as the business volume increases, particularly when major concessions are involved.

It may be difficult to determine the turnover of a concession activity for fee assessment purposes. The airport will therefore need to establish the necessary accounting, auditing and control procedures to monitor turnover levels and include the necessary provisions in the concession contracts (see also paragraph 5.44 h)).

The fixed-amount type of concession fee would usually be applied selectively to those activities of a specialized nature likely to yield only modest profits (e.g. florist, barber, book and newspaper shops, photo slot-machines, taxis and hotel reservations). Contracts of this type should, however, be for relatively short periods, or if they are longer-term contracts, provide for review of the fee at periodic intervals.

Certain forms of concession fees are distinctly different from those more commonly used. Perhaps most interesting among these are the practices of assessing certain kinds of shops a fixed amount for each arriving and departing passenger; charging car rental companies a fixed amount for each car delivered, or a fixed rental plus a fixed sum for each airport passenger; and, in the case of taxi operations, imposing a licence fee payable by each taxi authorized to operate at the airport.

Attempting to increase airport revenues by raising the level of concession fees should be approached cautiously. Careful and subsequent monitoring and evaluation are recommended to avoid the concessionaire charging higher retail prices that may have an adverse effect on that concessionaire's gross revenue (as well as on the maintenance and appearance of the premises involved) and consequently on airport income. Airport management should, therefore, exercise reasonable control over prices charged at the airport to ensure that they are fair and competitive, when compared with the major airports of destination and departure of its traffic or with premises of similar character in the vicinity of the airport or in the downtown area.

Fees for concessions directly associated with the operation of air transport services

ICAO's policies on charges (Doc 9082, Section II, paragraph 10) encourage the full development of revenues from non-aeronautical activities, with the exception of concessions directly associated with the operation of air transport services, such as fuel, in-flight catering and ground handling. This group of activities nevertheless remain concessions and therefore not subject to the same limitations that it is recommended be applied to charges on air traffic, although caution should be exercised when the fees for these activities are being determined. As far as, for example, in-flight catering is concerned, it would essentially involve a lower fee being charged for that type of concession than for other food and beverage concessions at the airport. Because of their special characteristics, aviation fuel and ground-handling services concessions are referred to separately below.

- Aviation Fuel Concessions
- Ground-handling concessions and ground-handling charges

Setting Rental Charges

The approach to setting rental charges is broadly similar to that outlined for concession fees. An assessment of the market value of the building space and land involved could be arrived at by taking into account the level of rentals charged for similar building space or land in the vicinity of the airport or in other comparable areas.

Since the market value of a rental property is strongly influenced by its location, an airport would normally divide building space and land into different zones, setting a range of charges per unit of floor space (particularly within terminal buildings) and lot of land, with much lower charges applying to space in more remote areas of the airport. In this context, airports may wish to consider making a distinction between space required by airlines that is essential for their operations at the airport, as opposed to space required by them for other purposes. Apart from airlines, airports may also choose to charge certain categories of tenants less than others, for example, other aviation enterprises, flying clubs, certain government departments and non-profit organizations. Moreover, some airports charge below what could be termed an adequate return for airport locations where they wish to encourage the establishment of certain activities.

Tenders

Public tendering is used extensively in making arrangements for the offering of concessions, and also sometimes for the renting of airport premises or land, because it is often the most practical way of determining the market value of business trading rights at the airport or of airport premises. It also provides airport management with a widely acceptable means of selecting clients and tenants on favourable terms. It is worth noting that it may not necessarily be advisable to accept the highest tender since other factors, such as standards of service and competitive prices, could play a major role in

arriving at the selection most profitable to the airport. To ensure that all requirements are met, many airports follow specific procedures in the invitation and processing of bids by tender. In some cases, particularly where major concessions are involved, the process is undertaken in two stages — the first to select candidates that meet the basic qualifications to provide the standard of service desired, and the second to invite these candidates to submit tenders for evaluation.

When airports invite public tenders, it is usual for such invitations to include information on which the bid may be based, together with specific indications as to the information required in support of the bid and the way the bids are to be submitted. In the case of simple rentals, the points covered might be expected to include:

- details of the size, location and condition of the premises;
- the nature of the activities that could be conducted on the premises;
- the proposed date of commencement and duration of the lease;
- maintenance and services provided;
- improvements expected to be carried out by the lessee;
- security or guarantee deposit requirements; and
- closing date for tender submissions.

For concessionary trading activities, information on some or all of the following additional aspects is usually included in tender documents:

- specific information on the type(s) of concessionary activity envisaged, including the variety of merchandise or services to be provided;
- nature of any exclusive trading rights to be granted;
- qualifications and other requirements regarding personnel;
- the standards set for merchandise, service, fittings and furnishings;
- the nature of furniture and fittings to be provided by the concessionaire;
- insurance requirements;
- data on past traffic volume and predictions for the future;
- past sales figures, if applicable;
- trading hours; and
- extent of control to be exercised by the airport entity.

CHAPTER IV: SLOT ALLOCATIONS IN AIRPORTS

Airport slots are specific time periods allotted for an aircraft to land or take off at an airport. Where the demand for slots at a particular airport exceeds the available supply, the airport can be considered “capacity-constrained”, at which time a “slot allocation” process is implemented. Capacity constraint may occur only at certain periods of the day or on certain days of the week, or even during specific seasons.

The issue of slot allocation is linked to specific airport situations in specific States, but each of these local situations impacts market access and operation of international air services from any airport of another State. As air traffic continues to grow and hub-and-spoke operations continue to increase, slot allocation becomes more ubiquitous in those regions of the world where present demand far exceeds initial slot allocation.

As growth in air traffic continues to outstrip available runway, parking, and passenger processing capacity, shortages of airport take-off and landing slots are occurring at a growing number of airports. The situation varies widely across regions. According to the International Air Transport Association (IATA), the total number of capacity constrained airports that have been labeled as a fully-coordinated or Level 3 Airport¹ subject to slot allocation under the IATA Schedule Coordination System continues to increase²: 136 in 2000, 155 in 2010, and by 2012, the number is expected to reach 159 (104 in Europe, of which 92 are in the 27 EU Member States, 43 in Asia Pacific, and the remaining 11 scattered in the Middle East, North America, and South Africa). In addition, 121 airports across the world are experiencing some level of congestion. If traffic volumes continue to increase at a pace faster than investment in capacity expansion, it is expected that many of these 121 airports experiencing congestion will become fully-coordinated or Level 3 airports.

Furthermore, traffic patterns also influence the availability of take-off and landing slots. The airline practice of hub-and-spoke operations creates banks or waves of flights arriving at an airport from many origins and depart shortly thereafter to many destinations. While such practice helps minimizing the time passengers spend for changing planes, it creates a series of peak periods throughout the day, thus reducing the availability of slots at these hub airports.

Therefore, the issue of slot allocation, by definition a global issue requiring compatible, if not aligned, rules, is expected to become more prevalent and will increasingly place constraints on the development of the air transport industry.

The insufficiency of slots affects in a fundamental way the ability of air carriers to exercise market access rights granted to States under air services agreements (ASAs). For example, at the 2008 Conference on the Economics of Airports and Air Navigation Services (CEANS), African States advised of increasing difficulties in securing slots at some airports outside Africa, that African air carriers wished to serve. The African States expressed the view that such difficulties have negatively affected African air carriers' access and operation on international routes outside Africa and that States having airlines concerned should apply the principles of reciprocity and equity embodied in ASAs in resolving the slot issues.

While the expansion of airport infrastructure and, in some cases, increased utilization of existing facilities can offer a solution or significant amelioration in the long term, short-term regulatory solutions for the allocation of slots are often difficult to achieve, and, once achieved, are sometimes contentious.

ICAO and Slot Allocation

ICAO has addressed the issue of slot allocation extensively, both in the context of market access and infrastructure development. Policy guidance developed by ICAO includes: a study on Regulatory Implications of the Allocation of Flight Departure and Arrival Slots at International Airports, conclusions of AT Conference on the issue (Doc 9819, Report of ATConf/5), and model clauses for bilateral ASAs.

The main thrust of ICAO guidance is that “in liberalizing market access, due consideration should be given to airport capacity constraints and long term infrastructure needs”. In addition, it states that “Any slot allocation system should be fair, non-discriminatory and transparent, and should take into account the interests of all stakeholders while it should also be globally compatible, aimed at maximizing effective use of airport capacity, simple, practicable and economically sustainable”.

In addressing the slot allocation issue, States should take into account the legal framework provided by the Chicago Convention, obligations under ASAs, applicable national and regional rules, and existing voluntary mechanisms for managing insufficient airport capacity.

Since ATConf/5, although many airports have built new runways and expanded airport utilization, the numbers of airports having slot constraints and the extent of those constraints have increased. Many carriers are unable to obtain the slots they need, and State efforts to assist carriers have not been successful. Such situation has created a certain degree of frustration among concerned parties. In response to African States who urged ICAO to take further action to address the issue of slot allocation at CEANS-2008, the ICAO Council directed the Secretariat to explore the development of model bilateral clauses on slot allocation.

Accordingly, the Secretariat, in consultation with the Air Transport Regulation Panel (ATRP) and based on States' practices and ICAO guidance, developed three options of bilateral model clauses which are presented in Appendix A. These options were reviewed by the Air Transport Committee in January 2011, which endorsed the first option as a model clause to be included in the ICAO bilateral Template Air Service Agreement (TASA) and for dissemination to States for optional use. The Committee also agreed that States be advised of the availability of the other two options, as well as the prerogative of States to determine whether to use any of the proposed clauses. The Secretariat was also requested to continue to monitor developments and to undertake further work with a view to providing other options that would achieve wider acceptance. It is worth noting that in January 2012, the African Union Summit of Heads of State and Government held in Addis Ababa, Ethiopia, endorsed an "African Civil Aviation Policy". This policy, inter alia requests African States to use Option 2 of the ICAO model clause on slot allocation in air service agreements.

The basic framework under which global civil aviation is regulated was established in 1944 by the Chicago Convention on International Civil Aviation. Article 1 of the Convention provides that every state has "complete and exclusive sovereignty over the airspace above its territory". Article 6 does not allow any scheduled international air service to be operated over or into the territory of a contracting state, except with the special permission or other authorization of that state. Non-EU routes are usually licensed by governments on a bilateral basis. The UK used to have air service agreements with most countries that provided the framework for the operation of air services between the two. The air service agreement is registered with the UN and has treaty status. The details of the service to be operated, such as the number of flights per week and the airlines to fly the route, are contained in a memorandum of understanding. This can be varied but the agreement itself remains unaltered. However, in recent years the EU has taken over negotiations on behalf of all EU Member States and gradually UK-second party agreements are being replaced with EU-second party agreements.

In a parallel process, individual airlines must negotiate slots at the airports to and from which they have an agreement to fly.

Airline self-regulation is the traditional and widespread approach used outside the United States to allocate runway and terminal slots between airlines. This involves two stages:

- overall and worldwide schedule co-ordination at twice-yearly IATA meetings; and
- local co-ordination at individual airports usually through their own scheduling committees.

All airlines operating at an airport are usually members of its scheduling committee. The base airline or the largest base airline provides the administrative support to the committee and the chairman. Each

scheduling committee is responsible for developing, within the IATA guidelines, local scheduling guidelines and advising the airport co-coordinator. All airports have scheduling committees but at small airports the committee may not need to meet often.

The objective of the IATA conferences is to agree the slot allocations for the coming season between airlines and coordinators for airports around the world. They are attended by airlines and coordinators and up to 650 delegates. The process of the conference is for airlines to make brief appointments to see the coordinators of the airports they plan to serve in the coming season and then to meet and discuss the feasibility of the proposed schedule.

Airlines apply to the committee twice yearly for runway and terminal slots for their winter and summer schedules, normally in June for the winter season and in November for a summer season. Airline schedule requests are submitted to the coordinators by midnight on the day of the deadline set by IATA. This produces a picture of unconstrained demand for the airport and for the coordinator.

When allocating slots the guiding rules are:

- historical precedence or ‘grandfather rights’ (that is, an airline can keep a slot previously allocated if it has operated it);
- ‘use it or lose it’ – if an airline used an allocated slot less than a certain proportion of time, it is given to someone else; and
- priority for regular services – if there is competing demand, it will be allocated to the service that plans to use it most frequently. Services of longer duration get preference over those that are of shorter duration (i.e. a year-round service would have priority over a summer-only service) and services operated on more days of the week have priority. For instance, a daily service at a particular time would have priority over a service offered at the same time but operated only five days a week.

Once the airport scheduling committee has allocated slots on the basis of these priorities, airlines can exchange slots among themselves provided they have broadly similar operating characteristics. An individual airline can also change the use of its own slots for instance, by switching a slot from a domestic to an international service or even from scheduled to charter. Trading can also take place on an ad hoc basis after the conferences.

The system has evolved over time and is probably not what one would have designed from scratch but it has worked reasonably well. It allows carriers to put together scheduling networks with the minimum bureaucracy and the maximum flexibility. The airlines have an incentive to sort out differences in a spirit of compromise and without outside agencies. That said, such a system does become increasingly anti-competitive as slots at peak periods are used up.

MODULE V- CONTEMPORARY ISSUES IN AIRPORT MANAGEMENT

CHAPTER I: AIRPORT MANAGEMENT: TRENS, DEVELOPMENTS AND CHALLENGES AHEAD

Airports are evolving to play different roles in the wider ecosystem of the communities they serve. Driven by the complexity of shifting needs, the airport industry is adapting by developing different models, each meeting a different combination of needs. Some travelers wish to experience the airport almost as a destination unto itself, with many options for leisure and entertainment, dining, fitness and shopping. Others want a more minimalist experience, moving as quickly as possible through the airport before and after their flight. Still others may need extra assistance to navigate through an airport. The challenge for the airport is to deliver the experience that each type of passenger wants, consistently and cost-effectively, despite the inherent complexity in meeting a wide variety of needs. The magnitude of this challenge will increase over time as passenger volumes continue to rise.

We believe that airports will evolve along the lines of three models that will all have to meet the passenger experience needs. The airport city is a fully-featured international gateway and destination catering to the needs of both travelers and visitors from the local community. The regional travel and transportation hub is an arm of the local economy focused on moving passengers and freight efficiently. The local, self-service terminal is a streamlined entity where most of a traveler's airport processes are conducted through self-service, focusing on speeding passengers efficiently from curb to aircraft with minimal human assistance.

Regardless of the type of facility, airport executives face a common set of management challenges. These challenges stem from the amount, variety and speed of information flowing from the major management domains in any airport, as depicted in Figure 1. The six domains shown in the figure are linked to management outcomes, which enable the business outcomes central to the airport as an enterprise.

Underlying the management domains and their associated outcomes, efficient data processing is critical to ensuring that managers can understand, predict and direct events, processes and assets to achieve the outcomes. Business intelligence and analysis has taken hold in airports and the airline industry, focusing primarily on analyzing specific, single domain issues.⁷ For instance, most airports today can determine if a flight arrived on time or was delayed and often know why, but most cannot analyze and respond in real time to the root cause (e.g., delayed catering truck, slow fueling, etc.). For airports to be able to meet their challenges and imperatives while remaining agile enough to accommodate evolutions in the industry, they must move beyond using analytics to simply producing reports in single domains to using them

to produce instant insights across all domains. This means that airport executives and CIOs must elevate the strategic importance of the digital infrastructure to manage informational complexity and produce successful outcomes.

Managing Information Complexity In Airports

As airports evolve, the amount of information and data generated will increase, driven by increasing numbers of subsystems, people, technology platforms and the interconnections between them, creating massive complexity for airport managers. Typical airport management systems using information technology (IT) are designed around discrete, single-purpose systems, such as passenger management,

which sit within organizational silos. This results in a complicated and inflexible system that is difficult to administer and expensive to maintain and power. Worse still, these legacy systems segregate information that should be shared between domains and cannot easily adapt to changing requirements placed on them. Moreover, as the volume and complexity of information increases, these legacy systems can be overwhelmed, degrading managers' ability to run the facility.

A better approach to managing information complexity is to implement an overarching system integrating all of the domain subsystems and enabling cooperation between them. Under this approach, aviation operations, security, energy and physical assets would all coordinate during a snowstorm, for instance, to accommodate sudden changes in air traffic patterns while ensuring positive passenger experiences. Using current management systems, this level of coordinated activity is difficult and costly, as managers manually abstract relevant information from multiple sources and then try to combine it in the moment. The integrated management system approach builds business value by reducing administration costs, improving process efficiencies and generating higher, supervisory-level insight. Moreover, an integrated management system extends managers' visibility across all domains, increases control and balances between them, promoting continuous improvement holistically.

Smarter Airport Management

The digital infrastructure for an integrated airport management framework is based on ingesting, processing and sharing data from the many subsystems throughout the airport domains. This supports a method of smarter airport management through visibility, control and continuous improvement capabilities.

Holistic Management Systems

The heart of smarter airport management is a holistic management system that integrates an airport's stand-alone systems. Because many airports will have substantial investments in these legacy systems, the holistic application is able to incorporate the stand-alone systems without having to replace them. The holistic system works by obtaining operational data from each separate system and then creating a single view of all the data. This also allows interconnection between the separate systems and promotes collaboration between domains through shared sources of information.

Holistic management systems support smarter airport management by:

- a) Giving security officers the ability to detect a threat, such as an unauthorized intrusion into a secure area, evaluate its implications and direct the appropriate personnel and resources to neutralize the threat without disrupting airport operations or inconveniencing passengers
- b) Enabling maintenance managers to schedule work during low traffic periods while retaining the flexibility to rapidly reschedule physical assets and personnel in the event of a weather emergency to accommodate the unexpected surge of passengers
- c) Allowing airport real estate managers to use consumer forecasting to evaluate the impact of a new entertainment center on energy consumption, security needs and terminal traffic patterns to drive increased passenger spending

CHANGING FACES OF AIRPORT

Privatisation of Airlines

Privatisation of State owned airline has been one of the prominent transformations in international air transport, where airlines in all but a handful of States had been government owned until recent times. The motives for privatisation have been highly discussed, ranging from few purely economic considerations to improving operating efficiency and competitiveness, to a more pragmatic desire to reduce the heavy financial burden for governments for financing capital investment in new equipment. Since 1985, about 140 governments announced privatisation plans or expressed their intentions of privatisation for approximately 180 State- owned airlines.

Low- Cost Airlines

Another recent development in the airline sector is the introduction of 'Low – cost business model'. Low-cost carrier also known as no-frills or discount carrier is an airline that offers low fares but eliminates most traditional passenger services. The common features of this business model are, a single type of aircraft reducing training and servicing costs ,point to point network focusing on short-haul routes, high frequencies, simple low –fare structures, high density single class with no seat assignment, simple in-flight services, staffing flexibility and minimal overheads, and intense use of electronic commerce for marketing and distribution. They also use less-congested cheaper secondary airports to ensure short turn rounds and high on-time performance.

The first successful low-cost carrier was Pacific Southwest Airlines in the US, which pioneered the concept when their first flight took off on 6 May 1949. Southwest Airlines followed the trend in 1971. With the advent of aviation deregulation the model spread to Europe as well, the most notable being Ireland's Ryan air, which began its low cost operations in 1991 and Easy Jet followed it in 1995. Many traditional carriers also followed this model such as KLM's Buzz, British Air's Go Fly and United's Ted. Some of them found it difficult to run both the traditional and low-cost models together. Notwithstanding, the low-cost models are on the increase. As per Mercer Management Consulting report of 2002, a comparison of costs per seat/mile reveals unit cost advantage of 20 to 40% for South West low –cost airlines over US airlines. Low-cost airlines are overtaking established carriers in market capitalization on the stock exchanges. Ryan air by and large remains the low-cost pioneer in Europe and pursuing this business model in its pure form. It is forecast that low-cost airlines will expand their European market share from the present less than 10% to 25% by 2010.

The low-cost formula is likely to spread to other regions and increasingly to international services where market conditions and regulatory arrangements permit. The low-cost model 'airline –within an airline' strategy by major airlines tries to combine the ingredients of low cost carriers approach with the reputation and quality of their own brand. While only purely 'low-cost' airlines will survive as major players, this model can also compete with railways by way of inter modal transportation offerings (Rail &Fly) offering affordable prices for long distance rail tickets. The low-cost model provides immense opportunities for regional airports and medium sized airports including military bases for growth. The user profile being that flexible holiday and private travelers and price-conscious business passengers preferring low –cost airlines for short routes, while the big network carriers focusing on inter-continental/inter-regional business passengers, the stage is set for the growth of low-cost airlines and in turn cheaper secondary airports.

Airline forecast points to almost a 2.7 fold increase in passenger traffic, and of doubling of aircraft movements by the year 2020. These forecasts are predicted on the assumption that sufficient system

infrastructure and capacity will be available to handle the demand. It is relatively easier for the airline to meet the growing passenger flows by moving to higher capacity aircraft where as airport sector is a different ball game.

Capacity Constraints

Capacity constraint is one of the bottlenecks in air transport growth. At their meeting on 28 January 2000, Ministers of Transport from 38 European States estimated that cumulatively flights experienced over 27 million minutes delay in Europe alone due to airport and air space congestion. Traffic patterns based on the underlying demand for air services and air carrier practices influence the use of available capacity.

Airport slot is different from the air traffic control (ATC) slot, which is the take-off or landing time of an aircraft which is assigned by the relevant air traffic control unit to make optimum use of available capacity at points en-route or at the destination airport. With the assignment of airport slot, airlines build their schedule taking into account time to taxi out and the customary en-route duration, on the assumption that an ATC slot will be available. This factor therefore underlines the importance of close coordination between the airport slots and ATC slots. Generally, the airport capacity is never fully utilised throughout the day. It undergoes peak and lull periods. There are seasonal peaks as well.

When we talk of airport capacity, it is a combination of runway and terminal capacity. The runway capacity is determined by the regulatory authorities, usually in terms of the number of movements (landing or take-off which can safely be performed per hour) taking into account such factors as the physical characteristics of the runway and the surrounding area, types of aircraft involved and air traffic control capabilities. Whereas, terminal capacity is the amount of passengers and cargo which the airport can accommodate in a given period of time sometimes referred to as passenger or cargo throughput. Type of passengers or passenger mix can influence the rate of passenger throughput. Aircraft size is another factor that can affect terminal capacity. Airport capacity can also be adversely affected by external factors such as environmental restrictions and air traffic control capabilities.

When the air carrier demand at an airport exceeds the availability of slots, the airport can then be considered capacity constrained. To a great extent capacity constraints are eased out through International Air Transport Association (IATA), schedule coordination conferences, in which well over 260 airlines participate and schedules are adjusted through bilateral discussions. Capacity is essentially controlled through regulatory framework within which slot allocation mechanisms are employed at global, regional and at national levels.

The ability of an airline to exercise the market access/ traffic rights granted under relevant air services agreement is closely linked to the availability of slots (designated times for an aircraft to take off or land) at the specified airports for which the traffic right was granted. Shortage of airport slots by and large is an important physical constraint on market access. Some of the airports resort to auctioning of slots or price the slots to control the demands.

One may ask, why not expand the airport and build new runways? Here again, there are considerable constraints to the development of new airports or even the expansion of existing facilities. Environmental and physical constraints are formidable. Past experience in the UK, Japan and Germany where local resistance to the construction of a second runway or new airport explains the point. Japan was forced to build an offshore airport (Kansai) in a man-made island in Osaka Bay. Hong Kong and Macau have both built new airports on reclaimed land in their in- shore waters, and Incheon airport in the republic of South Korea built partly on reclaimed land between two islands. Even in the USA,

Denver is the only new airport that has been constructed in the past over 10 years. Liberal air services agreements with multiple designation and gradual removal of capacity restriction have enabled increases in the number of air carries and air services, thereby putting additional pressure on existing airport capacity and it would continue to challenge the airports.

Consumer Interests

Growing dissatisfaction with the conduct of airlines staff and similar concern on quality of service such as facilitation at the airports are matters of increasing passenger concern. In USA and Europe, certain measures are in place aimed at reinforcing the rights of air passengers, proposing new voluntary commitments and enforcement legislation. As for voluntary commitments, airlines and airports in the member States of the European Civil Aviation Conference (ECAC) developed two codes. The Airline Passenger Services Commitment and the Airport Voluntary Commitment on Air Passenger Services. These two codes became effective in February 2002. Governments in other regions have also been considering some legal measures. IATA also adopted a global customer services framework in June 2000 intended as a guide for member airlines in developing their own voluntary commitments.

The point to remember is that consumer interest issues are gaining momentum and they need to be carefully examined to make sure that the service quality has adequately been dealt with by the current commercial practices by airlines and airports. There will be a need for the States to strike the right balance between voluntary commitments and airport infrastructure

Change of Airport Ownership

Majority of airports world over were constructed pre-post World War II and in any case prior to mid 1960s. Airport ownership then was reviewed as strategically important and as such most of them came under government ownership. A further shift in ownership began in early 1970s when a number of countries created airport corporations under public ownership and it provided access to private/external capital market. A second shift occurred in the mid 1980s and a number of countries began to turn the private sector for direct financing of airport investment and to further improve the managerial efficiency. A large number of publicly owned and operated airports are generally not rated well equipped due to limited government funding. Hong Kong and Singapore airports are exception to the rule. In the 1990s many of the public airports became privatised. The privatisation model included outright sale of asset through stock market, long-term leases, joint ventures/equity flotation etc. Private sector participation in Asia has revealed primarily around green field projects. In the current economic climate, there is an increasing pressure to reduce or re-direct government spending and that makes it more and more difficult for public involvement in airport infrastructure. Therefore, there is an increasing trend in the airport ownership by way of leasing and private participation,

Airports have been moving away from the government ownership to commercial and private ownership. British Airports Authority (BAA) was among the first to privatize in 1987 and it remains a paradigm for airport management. Aer Rianta and Schiphol are examples of airport companies which although State owned, operate as commercial enterprises. New airports in Asia including India is based on a concept of Public-Private Partnership (PPP), instituted through a Special Purpose Vehicle (SPV). All the Greenfield airports in India are based on this model.

Traditionally, governments were cautious to take part in airport privatisation barring few like British Airports Authority (BAA). Long-term lease holds of Australian Government in Brisbane, Melbourne, Perth, Sydney etc have provided the lead for other governments to come out of their traditional outlook.

Involvement of local authorities, concession for the management, Inter-airport shareholdings are encouraging trend in airport ownership. Aeroport DI Roma has 20% (US\$ 130 million) shareholding in Airports Company of South Africa(ACSA). Copenhagen airport has a 25.5 percent stake in a consortium to develop and operate nine airports in South Eastern Mexico. The management of Djibouti airport was awarded to Dubai Ports International Authority, Bamako airport in Mali transferred to a private concessionaire, Tehran airport to an independent airport authority and similarly, Beirut airport to a commercial entity to operate.

China has embarked, on a trial basis, a substantial airport management reform – under the scheme, hub airports will focus on strategic initiatives to fulfill their development potential, while major regional airports would specialise and strengthen links with their regions. Similar airports are expected to peruse innovative approaches to become more financially sustainable.

What is interesting to observe is that aimed at reducing the financial outlay and improving the efficiency of government owned airports, more and more airports around the world are transforming into autonomous authorities and subsequently moving towards private sector participation. Common technique for private participation involves Build –Own - Transfer (BOT), Build – Own Operate – Transfer (BOOT), Lease – Develop-Operate-management Contract (LDC). The limited past experiences of airport privatisation, however, does not confirm to any single model with a single definition as yet. Financing of airport projects however continues to be the critical constraint and a major challenge for the airport sector.

Change Management- Challenges

The first task for the airport management therefore, is to cope with the transformation from being largely state owned/ supported entities to more and more commercial and competitive entities with private participation. Airports are therefore challenged to re-organise themselves and cope with the organisational stress in the wake of this ownership changes. Additionally, airports will have to face the conflicting demands from airlines for increased capacity due to the changes in their own business models and high service expectations of customers and stakeholders, at the same time there is a mounting pressure from environmentalist seeking to ensure that progress will not be made at the expense of environment. Regional and local planning authorities expect increased social and economic activity in the form of employment and new business opportunities. From the technological point of view, airports are beginning to face the waves of advanced Information Communication Technology (ICT) and it certainly calls for a comprehensive airport management system.

There is yet another area that is likely to involve airport operations and that is the on-going efforts to form air traffic alliances. Euro control is talking about such an alliance, the re-organisation of air space focused on efficiency and cost-effectiveness from Iceland to Turkey. As the ICAO initiated CNS/ATM gets its way, several such advanced measures including reorganisation of airspace would have to be introduced despite the likely political uncertainties. Nevertheless, airports have to be on board in all such new ventures. In order to achieve the financial viability, airports have also been diversifying their business- direct operation in ground handling, management involvement at other airports (BAA, Schiphol, Frankfurt etc.), providing training or consulting services (Montreal, Airports de-Paris, Singapore Etc.), airline partnerships and diversification into non-aviation activities(real estate, production of aviation related items such as fire fighting equipment etc.)

Faced with the emerging changes, airports in most parts of the world have been forced to re-examine their operational capability and managerial style. A new buzz word “World Class” has emerged and quite a few airports/Department of Civil Aviations/Civil Aviation Authorities have also duly filed their flight plan to destination ‘World Class’ and are now obsessed with ‘VISION’, ‘MISSION’, ‘VALUES’ and ‘STRATEGIC OBJECTIVES’ to reach their destination.

Interestingly, most of the VISION /MISSION statement reads “to be a world class airport”, “to be a world leader”, “to be a world class airport in the region”, and so on. They all want to be world class players. Apparently, both the management and staff are being sensitised to go through the strategic management path, a clear shift towards commercial management philosophy.

CHAPTER II: PRIVATIZATION OF AIRPORTS

INTRODUCTION

Since 1987 airport privatization has become a worldwide trend. As of early 1994, privatizing airports was on the agenda of more than 50 sell all or a partial interest in existing airports or airport authorities. In developing countries, where the principal need is major expansion and modernization, the usual pattern is for government to use a long-term franchise to have the countries. In developed countries, the general pattern is for the government to private sector finance and develops new terminals or entire new airports. A major factor in the growing interest in airport privatization is government fiscal stress. Developing countries often lack the resources to develop new airport capacity, so they turn to private capital and expertise to get the job done. Governments in developed countries increasingly view airports both as assets and as businesses. A commercial airport is an asset which often fails to produce a commercial rate of return, as operated by government. And as “reinventing government” becomes the guiding philosophy, airports are often seen as non-core functions that can better be managed as businesses, by a private-sector business enterprise. In part, the move to airport privatization reflects a changed paradigm of what an airport is supposed to be. The traditional paradigm views an airport as essentially a public service whose objective ought to be simply to enable aircraft and their users to arrive and depart while just covering its costs. The airport-as-enterprise paradigm views an airport as an entrepreneurial business, whose objective is to identify and meet the needs of a diverse clientele: not only airlines and private pilots but passengers, meters-and-greeters, airport staff, airport neighbors, and airport tenants, among others. Airport privatization is much further along overseas than in the United States. Developed countries generally seek to reduce or eliminate their need to invest scarce resources in airports, which can be commercially financed and operated. Developing countries seek world-class expertise, as well as capital, to ensure modern and efficient airports. Airport sales have taken place in four countries, and another seven have announced plans to sell major airports (with the issue under study in eight more). Franchises for new airport capacity projects are under way in 17 countries and under study in 14 others. In this country, the principal factor leading to interest in airport privatization is the growing trend toward reinventing government, seeking to replace monopoly government agencies with the competitive forces of the private sector. All U.S. air-carrier airports are owned by governments, and less than a dozen are currently leased or managed by private firms. However, since 1989 public officials in a number of cities have proposed the sale or lease of air-carrier airports, including Atlanta, Baltimore, Boston, Indianapolis, Los Angeles, New York, Philadelphia, Rochester, San Francisco, Syracuse, and Worcester. A number of jurisdictions are considering contracting out the management of general-aviation (GA) airports, including DuPage, Illinois; the state of Rhode Island, and San Diego County, California. The purpose of this guide is to explain how airport privatization applies in the U.S. context, so that public officials can consider their options for ensuring high-quality airport services.

PRIVATIZATION MODES

Existing Airports

There are three principal alternatives for making use of privatization in the context of an existing airport. In order of increasing reliance on the private sector, they are:

- contract management
- long-term lease
- sale

Contract Management

Many types of municipal facilities are being turned over to private contractors on relatively short-term (five years or less) management contracts. Convention centers, data-processing centers, golf courses, jails, sports arenas, and wastewater plants are among the facilities now routinely contracted out by city, county, and sometimes state governments. Governments use the competitive process to stimulate greater efficiency in the operation of these facilities, since a firm must rethink the way it does business in order to be competitive in winning an operating contract. Typically, in a facility management contract, the operating budget is proposed by the contractor and approved by the government; funds needed for budgeted items are appropriated by the government and passed through to the contractor. Fees and charges are paid by users to the government agency, not to the contractor. The contractor receives a management fee from the government agency, which may be based in part on the contractor's performance. The facility's employees and managers work for the contractor, not the government. Contract management can be used for airports of all sizes and economic conditions, though it is generally most applicable where an airport has been losing money. If an airport is inherently unprofitable (i.e. its costs are very much more than its current and likely future revenue potential), the motivation for contract management is usually to reduce costs and increase revenues, thereby reducing the extent of the airport's deficit. A nearly break even airport can potentially become profitable under contract management. A number of U.S. airports are operated by contractors. Table 1 lists the four air-carrier airports under contract management as of mid-1994. Also listed are a number of general-aviation airports also managed by contractors, including the five general-aviation airports in Los Angeles County.

Long-Term Lease

A long-term lease is quite different from a management contract. Generally, a lease is used in preference to a contract where significant airport development is anticipated. The aim is to shift a significant portion of the risk of development away from the taxpayers and to the private-sector lessee. The term of the lease is often related to the length of time needed by the private operator to recover its investment in new facilities. A lease arrangement transfers the principal responsibility for airport operations and development to the private lessee. Hence, unlike the management-contract case, in lease situation airport users pay fees and charges directly to the lessee, and the lessee must cover its operating and capital costs out of those revenues (and hope to have enough money left over to show a profit). The typical lease agreement provides for a lease payment to the government based, in part, on a percentage of the airport's gross revenue. This gives the government an incentive to work cooperatively with the lessee, since the government will share in the proceeds. But this arrangement also gives the lessee an incentive to minimize costs, so that it can maximize the difference between gross revenue and costs. And since the lessee is responsible for capital investment in the airport, it will have strong incentives to add only that amount of runway or terminal capacity that will produce an acceptable return on its investment. Several small air-carrier and large general-aviation airports in the United States are currently leased to private firms, as noted in the number of other airports have been leased by municipal governments to independent public authorities; a principal example is the lease by the cities of New York and Newark of Kennedy, LaGuardia, and Newark airports to the Port Authority of New York and New Jersey.

Sale

Worldwide, the most common mode of airport privatization is the sale of either a part-interest or the entire airport. Full divestiture (sale) is the mode of choice when the airport is profitable but may not be maximizing its entrepreneurial possibilities under government ownership and management. Governments generally sell entire airports as part of an overall program of divesting themselves of noncore businesses, using the proceeds either to reduce outstanding debt or for investment in other needed infrastructure. This was the motivation for the British government's 1987 sale of the British Airports Authority and the planned sale of the airports belonging to Australia's Federal Airports Corporation. In some cases, governments sell only a majority interest, retaining some fraction of ownership and therefore a direct voice in airport management. Liverpool, England sold a 76-percent interest in its airport to a single strategic investor, British Aerospace. Several other British cities are planning similar sales of majority interests. Some other countries are thus far selling only minority interests. Austria sold 27 percent of Vienna International in 1992 and plans to sell another 18 percent in 1994; the proceeds are being used for airport expansion. Denmark sold 25 percent of the Copenhagen Airport in 1994, and airport authorities in several other European countries are considering similar sales of minority stakes. Table 3 summarizes the status of airport sales worldwide as of mid-1994.

New Airport Capacity

New airport capacity may be developed privately in two ways. The more conventional is via the government granting of a long-term franchise (called a "concession" in most other countries), at the end of which the airport (or terminal) reverts to government ownership. This type of transaction (which sometimes involves some financial participation by the government) is a kind of public-private partnership. The other approach is for the private sector to develop an airport entirely on its own, subject only to the planning permissions required (airspace approval by the national aviation authority, local land-use regulations, etc.). In effect, the airport company has what amounts to a perpetual franchise, though there may not be an actual agreement to that effect (any more than there is for an investor-owned steel mill).

Long-Term Franchise (BOT or LDO)

Around the world, long-term franchises for infrastructure facilities are usually referred to as BOT projects, because under this type of contractual agreement the private sector builds, operates, and eventually transfers to government the facility in question. When a lease of the underlying land is involved, this type of arrangement is sometimes called Lease-Develop-Operate (LDO); in this case the "transfer" back to government is implicit, since the lease has a fixed number of years. The BOT approach is widely used for several reasons. First, it taps into a different pool of capital than is normally available for public infrastructure projects, thereby expanding the range of potential funding sources. Second, private consortia are often able to design and build large facilities in significantly less time than is possible via traditional government procurement methods. Third, both the up-front cost and the operating costs may be lower in a facility that is designed, built, and operated by a single team interested in long-term profitability. Fourth, BOT is a way of shifting many of the risks of project development from the public sector to the private sector. For these reasons, airport BOT projects have proliferated in recent years. As of early 1994, there were 15 airport BOT terminal or runway projects under way worldwide, and another five projects to develop entire new airports. In addition, another 18 such projects were under study. No outright airport BOT project has yet occurred in the United States, but Transport Canada used this process to develop the successful international terminal (Terminal 3) at Toronto (as will be discussed in the next section). Many U.S. airports have used something resembling an LDO process to develop new terminals sponsored by either one or a group of airlines, which gain exclusive control of the gates in that terminal. But this type of project raises important competition and

access issues that do not arise when the developer/operator is an independent third party which relates to all airlines equally as users (as is the case with BOT terminal projects worldwide).

Perpetual Franchise

The number of fully private air-carrier airports (as opposed to small general-aviation fields) is quite small. Among those currently in operation are the London City Airport (a short/medium-haul airport in the Docklands area near the financial district), the Freeport airport on Grand Bahama island in the Caribbean, and the Punta Cana airport serving a resort area in the Dominican Republic. Hawaiian Airlines built and operated a small commercial airport in West Maui, HI in the 1980s, but turned it over to the state as unprofitable several years later. Several entrepreneurial private airport proposals have been made in the United States, several of them as potential “wayports”—freestanding hub airports aimed primarily at transferring passengers from one flight to another (and therefore not linked to a city's origin/destination market). One of the best-known is the proposed Aeroplex, planned to occupy 22,500 acres in northwest Martin County, on the east coast of Florida. Its developer received airspace clearance from the Federal Aviation Administration in 1991, but as of 1994 development had not begun.

Military Base Conversions

Over 100 major military bases are expected to be closed during the 1990s. Many of these are airfields, and quite a few are in or near urban areas. The general procedure for federal disposal of unneeded bases is that if no other federal agency needs the property, the local government has first claim on it; under certain conditions, the municipality may be able to obtain it at no charge. In the case of air fields, if the Federal Aviation Administration recommends the site for airport use, the property may be given to the local government for that purpose. Without such recommendation, the municipality may buy the base or arrange for a private firm to purchase it. A number of military bases have been or are being converted to civilian airport use. Orlando International Airport is the former Strategic Air Command McCoy Air Force Base, converted in 1974. In New Hampshire, the former Pease AFB became a civilian airport, Pease International Tradeport, in 1991. Scott AFB, 15 miles east of St. Louis, is becoming Mid-America Airport. And in Austin, Texas, officials abandoned a Greenfield site for the city's new airport when Bergstrom AFB became available; the base is now being redeveloped as the replacement for Austin's outmoded air-carrier airport. The long-term franchise mode of privatization is the one most applicable to converting a military airfield to a civilian airport. Instead of attempting the complex task of developing, financing, and managing the airport project itself, the base-redevelopment authority can seek competitive proposals from private-sector consortia. In this way, not only can greater professional expertise be brought to bear, but much of the risk involved in new-airport development can be shifted from taxpayers to investors.

POTENTIAL BENEFITS OF AIRPORT PRIVATIZATION

Increased Operating Efficiency

One of the most common benefits of substituting a private operator for a government department is greater efficiency in operations. In part this is due to the different incentives at work in the two sectors. Private-sector managers are generally evaluated and compensated in part based on the economic performance of the enterprise; this is very seldom the case in the public sector. Second, the public sector is hampered by such constraints as civil service (which makes it difficult to fire incompetent staff or to reward outstanding performance), cumbersome government procurement regulations (which stretch out the time and increase the cost of purchasing supplies and equipment), and micromanagement from higher levels (either departmental or political). The private sector may also benefit from economies of scale. A firm that owns and/or operates multiple airports may be able to purchase supplies in bulk, operate centralized accounting, personnel, and other support services to serve all the airports, and take advantage of other economic benefits of larger size. In addition, the private sector is likely to be less

constrained and more willing to contract out functions that can be performed more cost-effectively by other firms. For example, airport fire and rescue service at privately managed Burbank (CA) Airport is contracted out to a private firm. Thus, the single decision to privatize the airport (via management contract, lease, or sale) can serve to depoliticize a potential host of smaller-scale contracting-out decisions, each of which might have involved a political wrangle if it had to be made by a government department.

Additional Operating Revenues

It is increasingly being recognized that airports are economic enterprises able to generate more kinds and larger amounts of revenue than traditionally imagined. For smaller, currently unprofitable airports, privatization offers the potential of turning a loss-maker into a profit center. For larger airports which may already be operating in the black, the greater revenue potential under private management can lead to increased returns to the current governmental owner, either via lease payments or sale proceeds. For general-aviation airports, increased revenues may be derived from instituting landing fees (if none exist), better enforcement of fee payment, encouraging fixed-base operators (FBOs) to develop expanded offerings of goods and services (a percentage of whose proceeds flow to the airport-management company), and more intensively developing airport real estate. For air-carrier airports, the revenue opportunities are even greater. In some cases, landing fees and/or rental charges may be out of date and below market; likewise for current agreements with concessionaires. Perhaps more important, a privatized airport firm will typically adopt a more expansive retail approach involving a much broader array of goods and services aimed not only at passengers but also at airport and airline employees and airport neighbors. New business opportunities also include providing business services, conference facilities, hotel accommodations (both short-term and longer-term), as well as more intensively developing airport real estate. It is sometimes noted that there is nothing in the preceding list that is uniquely known to the private sector, which is correct. However, most of these activities require specialized knowledge and an entrepreneurial corporate culture which may not be present in the public sector. There is a higher risk of failure in seeking to convert civil servants into entrepreneurs than in hiring genuine entrepreneurs to do these things. In addition, the competitive process may well generate innovative new ideas for cutting costs or increasing revenues; ideas which would not otherwise have been brought to bear.

Improved Customer Amenities

The most dramatic difference which privatization can bring about is a new approach to airport retail activities. Air travelers who have used London's Heathrow or Gatwick airports (privatized via sale in 1987), the new international Terminal 3 at Toronto (developed via BOT/LDO and opened in 1991), or the new Pittsburgh terminal (whose concessions are managed privately by BAA under a 15-year lease) will have experienced airport retail that differs dramatically from other U.S. airports in three respects: 1) the amount of retail space is several times as much as in other terminals of comparable size; 2) the retailers include numerous national and international brand-name outlets; and 3) the prices charged are not high "airport prices" but are the same as one would find in the local shopping mall. The new privatized retail approach produces a situation in which all parties are better off. Air travelers like the lower prices and greater variety of goods and services, as proven by per-passenger sales two to three times higher than in traditional terminals. The airport operator is happy, because the higher sales volume produces higher net revenues. And the airlines are happy because concession revenues cover a higher fraction of total airport costs.

Reduced Risk of White Elephants

A principal reason why the World Bank is now urging privatization of major infrastructure (including airports) in developing countries is to minimize the risk of unwise investment, leading to "white

elephant” projects which cost several times what they can generate in revenues. In this country, airlines have grown weary of being faced with grandiose plans for architectural monuments (often referred to as Taj Mahals) posing as new airport terminals. Recent cases in point include the (now-canceled) JFK 2000 project to build a new central terminal at New York's Kennedy International airport, the large new terminal at Washington National airport, and the very costly new Denver International airport. How and why does privatization make a difference in new-project development? Privatization of airport capital project development (whether by sale, long-term lease, or BOT) shifts many of the risks from the taxpayers to private investors. This, in turn, forces a high degree of “due diligence” in reviewing the design and cost of the project, and especially an insistence on “investment-grade” traffic and revenue forecasts. Privatization helps to ensure that project decisions are made on economic and financial grounds, not on political grounds.

Lease or Sale Proceeds

Under contract management, a city or county may be able to reduce or eliminate an airport's operating loss, thereby ending a drain on the taxpayers. But this type of short-term privatization may not produce net revenue for the municipality. That is because federal airport grant legislation makes it illegal for a city to “divert airport revenue” to municipal coffers. All revenues generated by the airport must be used solely for airport purposes, if the airport is to retain eligibility for federal grants. The only legal way around this restriction is for the municipality to cease being the airport operator. By selling or leasing the airport, the city or county can recover its investment of land (and capital, if any) in the airport, via the lease payments or sale proceeds. The private airport lessee or owner may choose to remain eligible for airport grants, working out its fee schedules and payment arrangements so as to obtain FAA approval, or it may opt to forego federal grants and operate free of FAA economic restrictions. (In the latter case, it may have to pay back the depreciated value of the facilities purchased with the grants.)

PROJECT PROFILES

Air Carrier Airport/Contract Management (Westchester)

The White Plains/Westchester County Airport is an 800-acre facility surrounded by affluent suburbs and office parks. In addition to scheduled airline service by four major airlines and several commuter carriers, the airport is the home base for numerous corporate jets and turboprops. Activist anti-noise groups made up of affluent homeowners have succeeded, via litigation in limiting the extent of growth in airline passengers over the years. Turned over to Westchester County by the federal government after World War II, the airport was operated by the airport's fuel supplier for 30 years. In 1977, faced with large operating losses (up to \$250,000/year) at the airport, the county government decided to bid out airport management on a five-year contract basis. Pan Am World Services won the initial contract, and it and its successor company, Johnson Controls World Services, have won renewals every five years since then. Under contract management, the airport has become solidly profitable, with net income of up to \$3 million per year. The company has achieved these gains by reducing operating expenses (e.g., by cross-training personnel so that fewer people are required), increasing revenues (e.g., by renegotiating ground leases to market levels and instituting paid parking in 1981), and fostering real-estate development. For example, there are now five fixed-base operators (FBOs) compared with three in 1977, as well as additional hangars and related facilities. Despite community-imposed growth limits, major airlines have been attracted to Westchester, compared with the mostly commuter airlines that provided service prior to 1977. The transition to contract operation was relatively smooth. The county requested the company to offer jobs to all the current airport employees, and all but two accepted such offers. After many years of political wrangling, a badly needed new terminal building is under

construction and set for opening in the summer of 1995, funded by county-issued bonds. A parking structure and service building opened in summer 1994. The county is pleased with contract management because it insulates public officials from community complaints. Though the county retains all policy-making authority, it can cite and rely on the company's professional advice, thereby depoliticizing many decisions. In addition, of course, the airport's former operating loss has been turned into an operating profit.

General Aviation Airport/Concession Management (L.A. County)

Between 1958 and 1970 Los Angeles County acquired five general-aviation airports which their developers were unable or unwilling to maintain. Due to concerns about high operating costs and net low revenues, the county decided in 1990 to contract out these airports as a group. What evolved was a hybrid between contract management and a long-term lease. The 20-year agreement (with two five-year extension options) does not grant the firm a leasehold interest, but it operates financially like a long-term lease rather than a management contract. In other words, users and tenants pay fees to the contractor, out of which the contractor must pay all operating expenses and turn over a guaranteed minimum annual amount to the county. Prior to the award of the contract to COMARCO, there was strong opposition from GA pilots, airport employees, and some airport tenants. By the contract's second anniversary, privatization had "gained acceptance by most pilots and proved worth celebrating for some," according to a local newspaper account. Board of Supervisors chairman Ed Edelman, who had voted against the contract in January 1991, wrote a letter of endorsement in January 1993, praising the success of the arrangement. Financially, during the first two years, COMARCO paid the county \$2.7 million per year, compared to the County's net income of \$2.2 million when it operated the airports itself. The increase was made possible by improved marketing of airport facilities, reduced operating costs, and a computerized revenue control system. Despite opponents' fears, there were no increases in user fees for the first two years of the contract. All fee increases must be approved by the county. COMARCO splits the airports' net income with the county according to a pre-arranged formula; the county puts all these revenues in its Aviation Division budget and uses them for capital improvements at the airports. COMARCO was required to offer jobs to all 56 county airport workers. Of these workers, two assistant managers and eight service workers went to COMARCO, five stayed with the Aviation Division, one resigned, one retired, and the others were transferred to other positions within the county's public works department. None were laid off.

Air Carrier Airport/Sale

The largest airport privatization to date was the British government's public share offering of the former British Airports Authority in 1987. At the time, BAA was the owner/operator of the three main London airports and the four principal Scottish airports (one of which, Prestwick, it subsequently sold). The initial share offering valued the company at \$2.5 billion. Three years later, in 1990, the market value had grown to \$4 billion, and by early 1994 to over \$8 billion. What difference has privatization made to BAA's operations? A Reason Foundation study in 1990 addressed five indicators: capital investment, productivity and efficiency, pricing and revenues, noise mitigation, and customer satisfaction, and found positive results in all five.

As a public authority, BAA had limited access to capital; essentially, it was permitted to borrow only from the British Treasury, and the Treasury set stringent annual limits on borrowing by state-owned companies. In the first three years following privatization, BAA capital spending more than doubled. Terminal expansion at all three London airports accounted for the majority of the initial investment; in addition, on-airport hotels were added at all three. Furthermore, plans were drawn up for construction of Heathrow Express, a high-speed rail line connecting Heathrow with central London (in a joint venture with British Rail). Thus, a capital-short enterprise was able to increase capital spending on productive projects as a result of being privatized. Economic theory predicts that a privatized enterprise would have

strong incentives to operate more efficiently. Data from BAA showed a steady upward trend from 1983 (as BAA began gearing up for privatization) to 1990 (the year of the study) in labor productivity, as measured by operating revenue generated per employee and by passengers handled per employee. In addition, BAA's unit labor costs (in terms of £ of expense per passenger) trended steadily downward. Airlines typically express concern that landing fees must increase as a consequence of airport privatization. Airports that possess monopoly power (such as BAA's London airports) might be able to increase landing fees above market levels. Because of this, the act authorizing BAA's privatization provided for regulation of airside charges. Rather than controlling individual charges, however, the price-cap regulation (RPI minus X, where RPI is the retail price index) applies to each year's airside revenue per unit of aircraft operation. In other words, the formula requires that the average unit charge on the airside increase by less than the rate of inflation. (The value of X is set by the regulator for each five-year period.) Thus, in real, inflation-adjusted terms, airside charges have steadily decreased at BAA's London airports. This flexible form of regulation permits the pricing structure to be based on market principles. Thus, at Heathrow and Gatwick, where significant airside congestion exists at certain hours and certain seasons, peak landing charges are much higher than those off-peak. In addition, BAA has abandoned the traditional weight based approach to landing fees, recognizing that the cost of handling the landing or takeoff of an aircraft bears little relation to its weight. Further, BAA makes use of noise-related surcharges and rebates to promote a shift toward quieter aircraft. With its airside revenues somewhat constrained by price-cap regulation, BAA has had strong incentives to increase revenues on the landside. Data show that while airside revenues made up 54 percent of BAA operating revenues in 1983, that fraction had declined to only 42 percent by 1990 (while overall revenues more than doubled). BAA accomplished this by aggressive expansion of the type and quantity of retail concessions in its terminals. Focusing on brand-name retailers and instituting a well-publicized guarantee that prices at airport shops would be no higher than in the same shops elsewhere, BAA developed the Heathrow and Gatwick terminals into the equivalent of shopping malls. BAA's airports remained subject to the same noise regulations before and after privatization, and the data showed continued downward movement in the figures for the amount of land impacted by various levels of airport noise. Finally, data from BAA's regular surveys of customer satisfaction (on such matters as catering, baggage-cart availability, cleanliness, and staff) showed either no change or slight improvements in the first three years following privatization.

Air Carrier Airport/Build-Operate-Transfer

In the mid-1980s Transport Canada, the federal agency that until recently owned and operated virtually all of Canada's major airports, decided that a new international terminal was needed at Toronto's Pearson International Airport. Its initial conceptual design called for a facility of 15 to 17 gates. Following the agency's normal development procedures, Transport Canada estimated that this facility would take seven years to develop, at a cost of C\$1 billion. Instead of pursuing the traditional approach, the agency opted for a BOT project. The resulting terminal, which opened in 1991, has 24 gates (plus five in a satellite terminal for Canadian Airlines). From drawing board to opening day, it took just 33 months, rather than the seven years projected by Transport Canada, and cost only C\$700 million rather than C\$1 billion. In addition, it operates with 25-percent fewer people than in Transport Canada's plans. Terminal 3 was developed and is operated by a Canadian/U.S. joint venture, of which Lockheed Air Terminal is the U.S. member. Their 40-year concession (franchise) includes a land lease on 130 acres (with a 20-year option). The project included the 1.2 million sq. ft. terminal building, a 3,300-car parking garage, a 500-room hotel, and five miles of access roads with six overpasses. The terminal was designed with extensive retail space, including a mini shopping mall. Terminal 3 incorporates several innovations, including the first airport shopping mall in North America and the first cash-and-carry duty-free operation in Canada. Unlike typical U.S. practice, the airport terminal company retains control of all gates (i.e., they are not leased to individual airlines) and controls the arrival and dispatch of all

aircraft onto the terminal's apron areas. It also controls the flight-information (closed-circuit TV) system, the public address system, and the baggage systems, rather than delegating some or all of these to individual airlines.

LEGAL ISSUES

Federal Grant Eligibility

Under the Airport & Airway Improvement Act of 1982 and subsequent amendments, the Federal Aviation Administration (FAA) makes grants to air-carrier and general-aviation airports. Air-carrier airports receive entitlement grants based on a formula related to annual enplanements. They and other airports may also apply for discretionary grants for specific projects, in competition with other airports. Airports accepting federal airport grants (generally known as AIP grants, meaning Airport Improvement Program grants) must sign contractual grant agreements with the FAA. Under the terms of those agreements, the recipient (the airport "sponsor") must provide assurances that the airport be open to all users on a nondiscriminatory basis, that airport charges be fair and reasonable, and that "all revenues generated by the airport" must be used only for airport (or airport-system) purposes. It is well-established in federal law that the FAA's control over such economic issues as airport access and charges stems from the grant agreements. If an airport did not make use of federal grants, the FAA's jurisdiction would be limited to safety and airTraffic control issues only. How does privatization affect grant eligibility? Under contract management, the government which owns the airport remains the sponsor, and the airport remains eligible for the same types of grants for which it was eligible when managed directly by the municipality. Likewise, under most forms of long-term leases and BOT arrangements, the government which remains the airport owner would remain the airport sponsor, so granteligibility would be unchanged. With respect to an airport sale, post-1982 federal law permits discretionary and noise-related grants to be made to privately owned airports, but entitlement grants are not permitted. Thus, an airport can be owned by the private sector and operated by it for profit and still receive federal grants for capital projects (though it must compete for such grants against other airports). To sum up, general-aviation airports can make use of any form of privatization without any impact on their grant status, since they do not receive entitlement grants (which are based on passenger enplanements) to begin with. Air-carrier airports can receive discretionary and noise related grants under any form of privatization, but if privately owned, cannot receive entitlement grants. Entitlement grants are a relatively small component of the revenue of large and medium airports, but can be significant for smaller air-carrier airports.

Existing Bonds/Tax-Exemption

A change in the ownership (sale) or de-facto ownership (long-term lease) may affect the status of existing bonds used to construct a portion of the airport. In most cases, these bonds will have been issued by the municipality on a tax-exempt basis. Most airport bonds are revenue bonds (secured solely by airport revenues), though some may be general-obligation bonds (secured by the general taxing powers of the issuing government). Three factors must be looked at in connection with these bonds. First, the bonds themselves must be reviewed to determine if there are any provisions that restrict the use of revenues or require the bonds to be defeased or redeemed in the event of a sale or lease. Even in the absence of such provisions, the bond language may require that the bonds satisfy IRS requirements as to taxexemption. Second, state law must likewise be reviewed to see if there are any comparable provisions. Having to defease or redeem the bonds may not prevent a sale or lease from taking place, but may affect its cost and therefore its financial feasibility. The third factor to consider is the IRS itself. Thanks to a recent change in its procedures, the IRS is now able

to consider requests to retain the tax-exempt status of bonds when the facility which they have financed is sold or leased. In 1993 the agency issued Revenue Procedure 93-17, which allows interest on outstanding bonds to continue to be tax-exempt when the facility is sold or leased, if certain other

conditions are met. The most important of these is that the disposition proceeds (i.e., the lease or sale payments) must be used in an alternative manner that would have qualified for tax-exempt status. Devoting the proceeds to other public works investment, for example, would be one such purpose. In addition, the facility must continue to be used for its original purpose for at least five years, and the new owner or lessee must transact business with the original government owner on an arms-length basis and for fair-market value. Hence, provided that neither state law nor the bond covenants prevent it, existing tax-exempt airport bonds may remain in existence (and tax-exempt) following the sale or long-term lease of an airport.

Access to Future Tax-Exempt Bonds

The difference in interest rates between taxable and tax-exempt bonds is in the vicinity of 200 basis points (e.g. two percentage points). In financing airport expansions, that difference in interest costs can lead to major differences in debt-service expenses. Thus, airport users would benefit from the availability of less expensive debt, other things being equal. Under contract management, capital expansions are the responsibility of the government owner of the airport, making use of tax-exempt bonds. Under BOT and long-term lease arrangements, it is generally possible for the government owner to issue tax-exempt revenue bonds on behalf of the private lessee or franchise-holder, with project revenues earmarked for debt service. (This is simply a variant on the common method of financing airline maintenance facilities and terminal buildings, in which the municipality or airport authority issues revenue bonds on behalf of the airline(s) committing to use the facility for a long-term period.) Under current federal and state tax law, it appears difficult or impossible for tax-exempt bonds to be issued for an airport which is owned and operated by the private sector. As a matter of public policy, this lack of a “level playing field” between public and private ownership is likely to skew the choice between public and private ownership, though it might not prevent full private ownership in certain cases of high profit potential.

POLICY ISSUES

Loss of Public Control

Airports are valuable community resources, providing a needed public service. Thus, it is to be expected that privatization, especially via sale or long-term lease, raises concerns about potential loss of public control. There are a number of mechanisms that can protect the public interest, while still retaining the benefits of private-sector operation. Under a management contract, the contract itself spells out the requirements and constraints under which the firm must operate. Although the more constrained the conditions, the less scope there may be for innovation and efficiency gains, the contract can potentially include any provisions desired. One particular benefit of contracting out is that measurable performance requirements can be specified, with appropriate penalties for failure to meet them (e.g., financial penalties and even termination of the contract). This is often a greater degree of real accountability for results than exists when the airport is operated by a government department that will remain in place regardless. A lease or franchise agreement, though much longer-term in nature, offers similar potential for including explicit provisions to protect the public interest and require achievement of certain performance targets. The temptation to micromanage the firm's operations via lease provisions should be resisted, however. Because far more of a financial commitment (and hence risk) by the private sector is involved in a lease than in a management contract, economic incentives will accomplish far more than detailed prescriptions in such arrangements. If an existing airport is sold, or if a new airport is built from the start as a private venture, how can the public interest be protected? With a sale, government can condition the sale on several factors. A deed restriction can be included, guaranteeing that the property continue to be used for airport purposes for, say, 99 years. Government may wish, as in Britain and some other countries, to retain a single share of ownership (the British call this a golden share), with special voting rights designed to protect specific public-interest concerns (e.g., foreign ownership in the

case of BAA airports). For either a new airport or an airport sale, government could grant a perpetual franchise, administered by a municipal entity such as an airport commission. Under such an arrangement, the private firm would hold title to the airport in perpetuity, subject to compliance with the terms of the franchise. The commission would be able to revoke the franchise if the firm violated its explicit terms.

Economic Regulation

Airports are often referred to as a municipal utility, like electricity, gas, telephones, or water. Although an airport is very capital-intensive, like those utilities, the key question is whether or not it possesses monopoly power. If it does, then the issue becomes the most appropriate way of dealing with that power.

The first question is to what extent monopoly power exists, and for what set of customers. In most cases, the airport's land-side services (restaurants, car-rentals, etc.) are subject to competition from off-airport suppliers; no airport user is forced to deal with them. So these services generally will not be candidates for regulation.

On the airside, many cities have at least one general-aviation airport in addition to their air-carrier airport. Thus, GA users do not face a monopoly situation. Airline passengers may have the option of driving 50 or 75 miles to another location with airline service, in which case they are not really victims of a monopoly even with only one air-carrier airport in the city. And many urban areas (e.g., New York, Chicago, Detroit, Dallas, Houston, Los Angeles, San Francisco) have multiple air-carrier airports, such that privatizing one of them would not create a monopoly situation. Only selling an urban area's entire set of airports to a single firm (as the British did by privatizing BAA, rather than selling Heathrow, Gatwick, and Stansted separately) would lead to monopoly conditions.

But suppose that some degree of airside monopoly does exist under privatization. What are the possible remedies? First, if the airport continues to receive federal grants, its pricing must meet the FAA's definition of fair and reasonable, in compliance with the grant agreements. Second, unlike the public sector, privately owned airports would be subject to federal and state antitrust laws, which prohibit both price discrimination and price gouging. Third, international air service is subject to bilateral treaties which protect airlines (and hence passengers) from discriminatory pricing.

Given the protections offered by these three mechanisms, it is not clear that any further regulation would be necessary. But if it were, several choices are available. One would be to subject the airport to traditional public utility regulation, administered by the state public utilities commission (PUC). Given that in all likelihood only a portion of airside services would exhibit monopoly aspects, the costly and time-consuming PUC regulatory process would not be appropriate.

Two more-flexible alternatives are British-type price-cap regulation and franchise-based rate-of-return ceilings. Under the former, BAA's airside charges are limited each year to increase by less than the rate of inflation, as noted in Section IV, via the RPI minus X formula. All the recently privatized British utilities are regulated in this way. The alternative, as used in California's BOT franchises for private toll roads, is for the

franchise agreement to set a ceiling on the annual rate of return the company can realize. This permits its pricing to respond to market conditions, but requires that any profits earned above the ceiling amount go into the state transportation fund.

As a general rule, any form of explicit economic regulation imposes costs and will reduce the attractiveness of an airport to potential investors. Thus, careful tradeoffs must be made to determine the extent of likely monopoly problems and the least-restrictive way of dealing with them.

IMPLEMENTATION

Once a municipality (or airport authority or state transportation agency) has determined that privatization might be applicable to an airport which it owns, what steps must be taken to move forward? Most or all of the following steps will apply in most cases.

Request for Information/Strategies

In order to ascertain the private sector's degree of interest, the agency can publish and publicize a request for private firms to submit expressions of interest in private management, operations, and/or development of the airport. If the agency is not sure which mode of privatization would be most suitable, this process can obtain expert opinions from airport professionals at very little cost to the agency. In 1994 Indianapolis received eight responses to such a request, from domestic as well as overseas firms. The Dupage, Illinois airport authority received 11 responses to its request for privatization ideas for its general-aviation airport.

Consultant Assistance

If the agency has already decided upon a privatization mode (contract management, lease, sale, BOT, etc.), its first step should be to retain a consultant knowledgeable about both airports and privatization to review its financial and operational data and assist with designing the competitive process and the required documents (RFQ, RFP, etc.). If the first step has been a request for strategies, the consultant can be of great help in assessing the (most likely) varied responses and helping the agency decide which mode of privatization makes the most sense, given the agency's objectives. Legal advice may also be advisable at this step, especially in the case of large airports and/or long-term modes of privatization (lease, sale, BOT).

Request for Qualifications

In the case of large, long-term privatization competitions, many governments make use of a two-step procurement process. The first step is to weed out those firms or consortia that are judged to be unlikely to succeed in meeting the requirements for operating, managing, and/or developing the facility. Hence, in this step the firms are asked to document in some detail their experience and qualifications. It is generally wise to spell out in some detail in the Request for Qualifications (RFQ) what factors will be used to evaluate the responses. This leads to some degree of self-selection, as clearly unqualified firms will be able to conclude that they have little hope of being judged qualified. Another way to discourage clearly unqualified firms is to require a filing fee large enough that only serious contenders will pay. Making the requirements and selection criteria as clear as possible may also serve to minimize the likelihood of legal challenges by firms which do not make the grade.

Request for Proposals

The next step is to issue a formal request for proposals to those firms which constitute the "short list," by virtue of having survived the RFQ process. For large procurements, the agency may be well-advised to hold a bidders' conference for these firms prior to finalizing the RFP, at which it presents an early draft of the document and seeks feedback and suggestions from them. This kind of interaction can lead to a more realistic RFP, which will lead to more responsive proposals and should make the subsequent negotiations with the winning firm go more smoothly. Given that airport privatization is at an early stage in the United States (there is still no clear-cut policy guidance on the subject from the FAA or its parent, the U.S. Department of Transportation), an important element in the RFP should be for the bidder to document its plan for obtaining DOT approval of the transaction (which will be required in most cases, if the airport is to continue to receive federal AIP grants). This will involve demonstrating to

the various stakeholders, especially the airlines serving the airport, that the privatization will not harm their interests. E. Proposal Evaluation Depending on the size and complexity of the privatization, bidders should be given from two to six months to prepare and submit their proposals. Rigorous evaluation should then be carried out by senior officials, possibly with consultant assistance. Here again, it is important that the evaluation process be as objective and “transparent” as possible, with detailed evaluation criteria having been spelled out in advance in the RFP. In addition, the scoring of proposals against these criteria should be documented and be made public following the completion of the process. The objective is to guard against subjective or biased decisions, as well as to minimize the likelihood of legal challenges by losing bidders.

CHAPTER III: ENVIRONMENTAL CONCERNS IN AIRPORT MANAGEMENT

The current concern for an assessment and understanding of the environmental, ecological, and sociological consequences of development actions has resulted in the emergence of a holistic approach to planning. This approach views all actions as being undertaken in a single system and examines the consequences of these actions in terms of the entire system. Traditionally, proposals for transportation facilities have been evaluated in terms of sound engineering and technological principles, economic criteria, and benefits to the users and community. However, policy decisions today are being made with a more complete awareness of the impacts of these decisions on both users and nonusers from economic, social, environmental, and ecological viewpoints.

Airports must be planned in a manner which ensures their compatibility with the environs in which they exist. There are many serious compatibility problems which presently exist in the vicinity of airports which represent a serious confrontation between two important characteristics of urban economics, the need for airports to meet transportation needs and the continuing demand for community expansion. Airport planning must be conducted within the context of a comprehensive regional plan. The location, size, and configuration of an airport must be coordinated with the existing and planned patterns of development in a community, considering the effect of airport operations on people, ecological systems, water resources, air quality, and the other areas of community concern.

Sources of Environmental Pollution from Airport Operations

Air Quality

Many of the larger, more densely populated urban areas are facing serious difficulties associated with the emission of dangerous gaseous and particulate matter into the atmosphere due to industrial processes, combustion, and transportation. Air pollution affects the public welfare including the personal comfort and health of man, causes damage to soil, water, vegetation, wildlife, animals, deterioration of property and the erosion of property values, and a reduction in visibility resulting in losses of aesthetic appeal and increased hazards in transportation. Air pollution is defined as the introduction of foreign substances or compounds into the air or the alteration of the concentrations of naturally occurring elements. Hub airports with a considerable volume of commercial jet aircraft traffic may contribute substantially to this problem.

Air quality is defined by the concentration level of six pollutants for which standards have been adopted, namely, carbon monoxide, hydrocarbons, nitrogen oxides, sulfur dioxide, suspended particulates, and photochemical oxidants

The amount of a particular pollutant produced by an aircraft is a function of the type of engines and the mode of operation of the aircraft. An analysis must include a consideration of aircraft idling at the gate

and runway threshold, engine power run-ups, taxiing, takeoff, climb-out, approach, and landing. The dispersion of the pollutants is studied through the use of either emission models or diffusion models. The emission model assumes a uniform dispersion of the pollutants within the atmosphere of concern, whereas the diffusion model uses emissions or emission rates together with physical and meteorological conditions to determine concentrations of pollutants.

A study of the air quality impacts for an airport project requires a determination of ambient air quality, local meteorological conditions, the mix, number, and paths of aircraft using the airport, and the emission rate of the aircraft in different operating modes. It also requires a knowledge of the operating characteristics and volume of ground transportation modes providing access to and services at the airport, and the point sources of pollution occasioned by the normal operation of an airport. The results of an air quality study are typically displayed on maps which show the before and after concentration of pollutants in the area of the airport, together with charts indicating the level of compliance with air quality standards.

Water Quality

Water is one of the most valuable resources on earth. Not only is it essential for the maintenance of life itself but it is also used by man in nearly all daily activities. As the population has grown, so has the demand for water, and today, that need is so great that in many areas of the world the need has outpaced the supply. The construction and operation of airport facilities can contribute to the degradation of the quality and reduction of the quantity of groundwaters or surface waters. Water quality can be affected by the addition of soluble or insoluble organic or inorganic materials into rivers, streams, and aquifers resulting in a water source which is inadequate to support aquatic life and other uses such as fishing, swimming, and water supply needs. Changes in the cover, composition, and topography of the ground in the vicinity of airport sites can cause changes in the amount, peaking, routing, and filtration of runoff and the recharge area of aquifers. Construction-related activities may cause the introduction of materials and wastes into streams and water sources, increases in the volumes of sanitary wastes and water supply demand, and increases in storm water management systems.

A water quality study for an airport facility should address both the direct and indirect effects of the project on water quality.

The direct effects include soil erosion, the amount and composition of runoff from the facility, infiltration, spills, turbidity, and the quantities of water supply and sewage disposal needs. Indirect effects include the accelerated weathering of exposed geologic and construction materials, disruption of nutrient cycles for the support of life, and the extraction of construction materials which may alter natural filtering, the degree of imperviousness of soils, and water storage capacity. Typically, a water quality study will identify the source and receptors of pollutants, and the amount of degradation which the introduction of pollutants will cause. It will also address the impact on the quantity of water sources through a determination of flow rates, flow and recharge areas, permeability, infiltration, and flow interruptions. Construction measures utilized to minimize degradation of water quality and supply include the construction of check dams, sediment traps, berms, dikes, channels, and slope drains, sodding and seeding, brush barriers, and paving.

Aircraft and Airport Noise

The effects that noise from aircraft have on communities surrounding airports present a serious problem to aviation. Since commercial jet transport operations began in 1958, the public reaction to aircraft noise has been vigorous. Because of these reactions much has been learned about the generation and

propagation of noise and about human reactions to noise. On the basis of this knowledge, procedures have been developed which permit the planner to estimate the magnitude and extent of noise from airport operations and to predict community response. Several of these procedures are outlined here.

The impact of aircraft noise on a community is dependent upon several factors including the magnitude of the sound, the duration of the sound, the flight paths used during takeoff and landing, the number and types of operations, the operating procedures, the aircraft mix, the runway system utilization, the time of day and season, and meteorological conditions. The response of communities to exposure to aircraft noise is a function of the land and building use, the type of building construction, the distance from the airport, the ambient noise level, and community attitudes

Possibility of Ecological Imbalance

The consideration of the impact of airport development on changes in the natural state of land and waterways is essential to protect ecosystems. Living and nonliving elements, plants, and animals all interact on land and in water to produce a highly interdependent system of aquatic and terrestrial ecosystems. The relationship between species and the ecosystem is essential to maintain the life support system for wildlife, waterfowl, flora, fauna, and endangered species.

Of particular importance is vegetation, plant and animal life. The principal impacts which may occur are the loss of or injury to the organisms or the loss or degradation of the ecosystem.

The use of land for airport development creates disturbances and disruptions to flora and fauna. The specific project elements often include the clearing and grubbing of land areas, changes in the composition and nature of the topography, and interferences with water shed patterns. Thus airports can destroy the natural habitat and feeding grounds of wildlife and eliminate or reduce flora essential to the maintenance of the ecological balance in the area. Particular hazards may be presented to birds and aircraft due to striking birds, and care must be exercised in choosing airport sites to avoid land which attracts birds and natural migration routes.

The assessment techniques used include the identification of the important aquatic and terrestrial organisms present in the area and a determination of the life support systems required for the different species. An analysis is performed to determine the impacts on vegetation requirements, food chains, and habitats of these species, as well as their tolerance to air and water pollution. Care must be taken in the case of aquatic species to examine the effects of soil erosion, flooding, and sedimentation on stream beds where food chains, spawning grounds, and habitats exist.

Wetlands and Coastal Zones

Improperly planned or operated drainage systems at airports can cause contaminants to enter streams, lakes, and waterways. The normal operation of an airport results in contamination potential through aircraft and ground vehicle washing, servicing, and fueling, airport and aircraft maintenance, and terminal services. In the construction phase of a project there is a high potential for contamination through clearing, grubbing, pest control, and changes in topography.

Changes in the natural drainage patterns of the area are very common due to the nature of airport development projects. Preservation of recharge areas and stream flows, the elimination of flooding and sedimentation problems, and the preservation of the quality and routing of water resources are all vitally essential to the maintenance of water quality and the protection of ecosystems.

Flood Hazards

The flood hazard potential of any development is a necessary consideration since alterations in the topography, cover, and soil characteristics on the property are inevitable. The storage capacity of local rivers, streams, canals, and groundwater areas can be exceeded due to changes in the magnitude and paths of runoff from storms and high rainfall or thawing events. The analysis of the potential for flooding is conducted by evaluating the characteristics of the ground surface, soil materials, topography, and floodplains, the historical frequency and intensity of storms, and storm water drainage and retention facilities.

If it is found that the project design increases the potential for on or off-site flooding, those areas subject to these effects are identified and the mechanisms required to alleviate the hazards are incorporated into the project design. The construction of new or increased capacity storm sewers and impounding areas, channels, and dikes are most commonly indicated. Changes in the elevation of facilities and the slope and cover of the ground surface at the site can also be of considerable benefit in reducing flood hazards.

CHAPTER IV: AIRPORT COMMERCIAL & RETAIL MANAGEMENT

Principles of Commercial Management

The following are the principles to manage airports commercially.

- a) Understand the Customer
- b) Determine What They Will Buy
- c) Create a Shopping Environment
- d) Motivate Shopping Behavior
- e) Make it Easy to Buy

Key Actions to Maximize Commercial Revenues at Airports

- a) Bring Commercial Planning Expertise to the decision making table as early as possible
- b) Work to Better Understand Customer Needs and experiences
- c) Immerse yourself in their mindset and align your retail offer to their needs
- d) Create mechanics to encourage loyalty through reward programs
- e) Create pre-awareness of what the airport has to offer through E-Commerce and strong website followed by handheld communication and airport way finding
- f) Keep up to date with retail trends and anticipate passenger needs
- g) Sweat the Space through innovation and creativity.
- h) Bring “uniqueness” and point of differentiation to the end result that is consistent with the airport’s image and brand.
- i) Minimize any negative impact that increasing the concession space may have on airport and airline operations.
- j) Airports and Retailers Need to Have a Clear Business Strategy which is jointly “owned”.
- k) Bring new concepts to market quickly – be fleet of foot.
- l) Create the right economic conditions which attract the best operators through more equitable share of risk and reward.

Limiting Factors to Optimizing Commercial Revenues

- a) Lack of investment in customer insight
- b) Poor design at the development stage
- c) Poor customer service – Service Level Agreements
- d) Poor performance monitoring
- e) Un-willingness of concessions to invest in commercial assets
- f) Lack of close working relationship with retailers
- g) Lack of innovation and flexibility to change.

Airport Retail Business Model

1. After five years of strong growth, prospects for airport retail in the mid-term remain positive even if forecasting seems to be a risky exercise in this current climate. Arthur D. Little forecasts duty-free sales will be 6 points above traffic forecasts for the period 2008-2012 (using IATA December 2008 forecasts of +2%, we estimate duty-free sales could grow by up to 9% over the period): duty-free sales should be one of the key drivers to compensate for the effects of the downturn for airports.

2. To sustain growth and outperform the market in the coming years, airports and operators will need to focus on five key success factors:

- a) Developing the density of the retail surface to maximize performance (sales per departing passenger).
- b) Adapting the offer to reflect the passenger profile.
- c) Using a range of approaches to convert browsers into buyers, and to increase time spent shopping.
- d) Extending their price advantage over city-center retailers.
- e) Expanding customer target groups to include non-travelers and arrival passengers, and diversifying distribution channels.

3. As part of their drive to optimize performance, airports are applying new criteria in their assessment of operators tendering for concession contracts. Operators' local know-how and the way they leverage it to propose the highest concession fees is no longer as important as it has been; airports are increasingly looking for operators who can demonstrate financial robustness, strong offer flexibility, international know-how and high-quality operational performance. These changes in airports' expectations reinforce global operators' competitive advantage. Indeed, the trend among operators towards internationalization and consolidation helps them reach a critical size, allowing them to improve their professionalism, increase their buying power, extend their brand portfolio and offer very competitive and robust concession fees. In order to survive, local operators are repositioning themselves in niche categories or at regional airports or entering joint ventures with global operators. In the long term, however, these smaller operators are strongly exposed. These developments however do not guarantee a monopoly for global operators in future.

4. Airports are increasingly seeking out new business models in order to optimize their revenues and Arthur D. Little expects to see international airports claiming a greater stake in the value chain through the development of joint ventures between airports and global operators. Ultimately, it is the ability of airports and operators to collaborate effectively that will determine their success in realizing the potential of the airport retail market.

- a) Perfumes & Cosmetics remains the must-have category for airports, with strong growth prospects driven mainly by a growing demand for cosmetics (skin care and make-up) and an optimum "profitability vs. space allocated" ratio, guaranteeing high concession fees to the airports.

- b) Fashion & Accessories has been a strong growth driver for the past five years thanks to an enlargement of airports' offer (space dedicated to this category, brand portfolio, etc.), a development of brands' direct operations and an upgrading of shops' merchandising and concepts. Although the economic slowdown will have the greatest impact on this category (especially luxury products) in the short term, Arthur D. Little forecasts very positive growth in the mid-term due to current segment immaturity.
 - c) Confectionary & Fine Food is the new growth driver benefiting from an increasing demand for local destination products (gift items) and the improvement in delicatessen concepts.
 - d) Two traditional categories, Alcohol and Tobacco, have lost market share (from 29% of duty-free sales in 2002 to 24% in 2008) compared with the other categories, suffering from a shift in consumption habits (health awareness) and toughening regulation (on liquids, on smoking, on advertising, etc.). However, growth prospects remain stable-to-positive thanks to the development of high-end products (single malt whisky, cigars, etc.).
5. Historically, airport retail has been dominated by local operators (incumbents), with the renewal of concession contracts with these operators being based on their local know-how, their knowledge of the airport's constraints and management, and their capacity to leverage other on-site concessions.
6. However, a number of factors have led to a change in expectations on the part of the airports. These factors include:
- a) The internationalization of passengers.
 - b) The upgrading of airport retail standards driven by "best in class" Middle East and Asia Pacific airports.
 - c) Poor experience with some local operators (limited offer renewal, overbidding resulting in systematic guaranteed minimum payment).

As a result, airports are now adapting their selection criteria leading to a possible reshuffling of competitive positioning.

Financial expectations: a new focus on financial robustness

7. The concession fees level remains a major selection criterion for airports. However, the growing pressure on retail operators to achieve higher targets and invest in offer renewal and shop concepts means airports are being more careful in assessing the robustness of the operator's business plan (through deep analysis of both the top and bottom line) and the capacity of the operator to fulfill the plan's objectives. The operator's overall buying power and proposed brand performance benchmarks are key factors for the airports in this regard.

Optimizing passenger footfall

8. Two key objectives for airports are to increase the conversion rate and to increase time spent shopping. Airports need to:
- a) Position "must-buy" products (core business categories) immediately after security checkpoints to ensure passengers complete their pre-planned buying first and therefore feel more comfortable when entering the second group of boutiques (diversification categories).

- b) Capture those passengers that spend less time airside (business travelers, for example) by positioning last minute offers for top-selling brands in core categories near boarding gates, as seen in the “Vizzit” concept at Schiphol Airport.
- c) Develop walk-through shops, as planned in Sydney where 3,500m² of walk-through will be developed.
- d) Secure “time to gate” communication to reduce pressure on passengers and maximize time spent shopping

(e.g. introduction of flight information panels inside the shops).

Promoting price advantage over city-center retailers

In order to compete with city-center retailers, airports and operators have recently introduced innovative pricing policies, securing communication around their price advantage airside (lowest price guarantee) and proposing, when permitted, a unique pricing policy airside for both Schengen and non-Schengen passengers (Copenhagen Airport, Belgian Sky Shops, etc.).

The Disadvantages of Local Operators

With their smaller brand portfolio, limited negotiating power and, in many cases, lack of international perspective on demand/supply trends, local operators will find it increasingly difficult to compete with global ones. In the short to mid term, local players tend to survive by repositioning themselves in one of three ways:

- a) In niche categories, such as local gastronomy and souvenirs, where local know-how is a key competitive advantage.
- b) At regional airports, where the concessions surface is not yet sufficiently attractive to global players and where local operators can use their knowledge of domestic passengers and local operations to secure their competitive position temporarily.
- c) In core categories at major hubs, through joint ventures with global operators, in order to safeguard their historical position.

Joint venture with local operators is part of global operators’ market entry strategy, especially in emerging markets (India, South America, etc): the local player provides understanding of local regulation and customs and a relationship with local authorities, local brands and local operations (logistics warehouse, staff, etc.) while the global operator secures purchasing efficiency and up-to-date concept set-up. Due to its joint venture with Aldeasa, for example, former state monopoly India Tourism Development Corp. (ITDC) succeeded in maintaining its incumbent position at Mumbai International Airport by winning a contract renewal in 2007. In the long term, however, local operators are strongly exposed the situation that once global players have acquired local know-how, they will compete independently for hubs’ tender offers (without their local JV partner) and will also compete for regional airport concessions in order to optimize and amortize their national logistics and purchasing structure.

No guarantee of monopoly for global operators

Developments in the competitive environment mean that global players cannot necessarily expect to establish a monopoly at the major hubs; in fact, to a certain extent, global operators’ objectives are at odds with the airports’ current priorities.

Global operators are concerned mainly with optimizing margins and less with developing turnover. As a result, they are reluctant to take risks to increase turnover, such as introducing new brands or new

concepts for which they will negotiate lower margins. By contrast, airports are paid according to turnover fees and have increasing expectations in terms of revenue optimization.

Thus success in airport retail relies on the ability of operators and airports to optimize their interface; both parties need to agree on turnover risk levels and margin targets, and to participate jointly in establishing an action plan to optimize turnover.

New business models emerge as airports seek to optimize revenues

As a result of the current inability of global and local operators to propose optimized interfaces with airports and properly integrate revenue optimization at the expense of their margins, new business models have emerged where airports have taken a greater role in order to impose their vision and optimize revenues.

The two main Airport Retail Business models that are becoming increasingly common are :

- a) **A joint venture between the airport and a global operator.** A joint venture between an airport and a global operator imposes de facto collaboration through a risk-sharing model. A local dedicated organization and governance bodies covering both sets of shareholders makes sharing information easier. By defining strategy (brand selection, investments, etc.) jointly through these governance bodies, the airport and the operator can balance margin and revenue optimization. The success of this model recently saw Milan airports (Malpensa and Linate) extending the concession contract with their joint venture with Dufry from 2020 to 2041.
- b) **Direct operation of the retail space by the airport.** Direct operation, where the airport bypasses operators to deal with brands and operate shops itself, remains embryonic and tends to be implemented in airports with critical mass and established retail operations (staff, logistics, etc.), such as Dubai, Amsterdam Schiphol and Rome Fiumicino. Direct operation gives airports complete control over the offer and the concepts and because there are no turnover fees squeezing margins, allows the airports to maintain competitive prices.

In their move to Mastering Airport Retail, airports should address the successive questions:

- a) How is the airport's retail performance with regards to best practices (gap analysis) and what revenue optimization is at stake?
- b) Which concession management model should be targeted taking into account the local context and the optimization at stake?
- c) How can airports mobilize the different competencies in order to design and set the new operating model?

Whatever the Airport Retail Business model, the ability of players in the value chain to work closely together will determine their success in meeting the challenges ahead. Effective collaboration will be vital in order to develop the offer, optimize concept quality and improve performance, all of which will help players to realize market potential and resist value chain turbulence.

Setting these different levers, however, remains a complex challenge for both airports and operators. Key success factors identified through best practices may enable players to establish a better understanding of the areas they need to address, but customizing the levers and applying them to improve retail performance effectively on a given platform is very difficult.

Moreover, these key levers encompass a wide range of functional competencies (infrastructure, purchase, logistics, legal, marketing, etc.), which makes setting them even more challenging for airports and operators who find themselves having to involve and co-ordinate a wide range of different resources.

In order to support airports in dealing with these challenges, a specific methodology is needed that enables to design long-term, win-win partnerships and to reach a lasting performance in airport retail.

CHAPTER V: AIR LAW FOR AIRPORTS

Introduction:

This chapter would discuss the various steps taken by the government in the process of privatization of aviation in general and airports in particular. It also does throw light on the various legal issues involved such as lack of integrated policies, the legislative framework for privatization, the need for changes in the existing legal frame work etc. In the wake of privatization of airports in India, there is an obvious need for perspective planning with a vision for the next twenty years and to muster the combined resources of the public and private sectors, both domestic and foreign.

India has even more aggressive plans, with an objective of 500 operational airports by 2020, including the redevelopment of currently unused airports and development of greenfield airports as well as so-called ‘merchant’ airports dedicated to cargo and logistics. The Indian civil aviation industry faces challenges like infrastructure bottlenecks, lack of high throughput distribution facilities, entire support system, cumbersome procedures and logistics efficiency. Keeping these things in mind, the Government of India started investing heavily to upgrade the aviation infrastructure in the country. It is estimated that the airport system may be handling over 300 million passengers per annum by 2020. A total of USD 30 billion investment is required, including the USD 9 billion already identified. With 82 airports already functional, the Government has already identified around 11 new Greenfield airports to be developed. Airport infrastructure in India is the one area which has huge opportunity for the investors. The airport upgrade action and modernization plan, launched by Government of India, will see an investment of approximately USD 10 billion by 2010. Mumbai and Delhi airports have already been privatized and are being upgraded at an estimated investment of USD 4 billion, Kolkata & Chennai airports are next in the list. 35 other city airports are proposed to be upgraded. After Bangalore and Hyderabad the second Greenfield airport being planned at Navi Mumbai is going to be developed using public-private partnership (PPP) mode at an estimated cost of USD 2.5 billion.

Privatisation and Airports:

The effects of liberalization, deregulation and increasing competition in the aviation industry have not spared the airport industry. Airports have evolved from being simple infrastructure providers to full fledged, multi faceted businesses contending with a range of competitive pressures by passengers, shippers, airlines and other airports.

The focus of airport management has shifted from hosting airlines to accommodating passengers. Airports today are being understood as engines of local and national economies and significant creators of employment. Accordingly, the demands on airport management have broadened beyond operations to retail management, commercial real estate, logistics, customer service, technology providers, community relations and, of course, politics.

The airport business is very dynamic not least due to major competitive forces and market pressures. Growing liberalization has given airlines the opportunity to shop around for better deals and services from airports and airports have come under pressure from their peers, airlines, passengers and local communities to offer competitive user charges, high levels of service quality and an attractive network of destinations.

Airport infrastructure optimization therefore needs to be on top of the agenda of local, national, regional and supra-regional decision makers. Significant resources will be required to provide and modernize the infrastructure needed. Those who have the resources need to be offered the right incentives to employ them.

Airports often used to be characterized as natural monopolies or businesses of monopolistic nature. Fortunately and rightly, this view is becoming extinct. Airports like competition, airports want competition, airports need competition and airports are in competition. Competition drives our industry forward, lets it grow and be innovative.

ICAO plays a vital role here, by way of Annexes 14 and 17, in creating a level playing field for the airport industry ensuring that all airports play by the same rules in these essential areas.

The fundamental postulate which establishes a global legal basis for the provision of airports is contained in Article 28 of the Convention on International Civil Aviation which provides that each Contracting State undertakes, as far as practicable, to provide in its territory, airports, radio services, Meteorological services and other air navigational facilities to facilitate international air navigation in accordance with the standards and practices recommended or established from time to time, pursuant to the Convention.¹

The worldwide trend to privatize airports has led to direct Aviation Administration to experiment with privatization. Because there always is a public interest in the operation of major commercial airports, which are both vital assets to the community and potential monopolies, it is generally impractical to transform airports into wholly private businesses. Most privatization projects involve substantial regulation of the private investors, detailing the design of airport services, the prices charged, and their openness to users.

Around the world more and more airports are moving towards privatization. This is the trend in Asia, Europe and Latin America. In India too private participation is felt necessary and, therefore, the Government has opened up this sector to the Public Private Participation (PPP) route. At first blush, it may seem that Government's efforts are too little too late but it may be worthwhile to bear in mind that air traffic in India has witnessed a 35 % average growth, year upon year, for the past about 6 years, as against the global growth of only 9% per annum.

Airports — an Increasingly Attractive Industry:

Currently, only two per cent of the world's commercial airports are managed or owned by the private sector. However, the success achieved by private investors so far is encouraging others to enter the market. Various factors that make the industry attractive for investors are listed below in their order of relevance:

¹http://www.icao.int/icao/en/atb/sgm/fal/falp/Docs/ip01_en.pdf

- Strong growth trend observed in air traffic during the last several years together with the optimistic forecasts provided
- Growth in passenger traffic leading to improved profit margins resulting from economies of scale (the upward traffic trend is also expected to have a positive impact)
- Strong commercial opportunities that still remain to be exploited in this business
- Significant barriers of entry for newer companies that allows existing participants to improve their earnings
- Reduced risk related to exchange rate fluctuations due to the fact that airports generate substantial revenues in hard currencies and both travel and tourism industries are dominated either by the dollar or the euro.

Benefits of Airport Privatisation:

There are three main potential economic gains obtained from privatization, namely improvements in operating efficiency (the private for-profit business model more often leads to a further exploration for means to cut costs and boost revenues than public management), the introduction of new management styles and marketing skills directed to serve users with a more consumer-oriented approach, and better investment decisions. However, in many cases, these investment decisions might also imply under investment or capacity reductions, which mandates the presence of a regulatory environment.

Risks of Airport Privatisation:

Regardless of all its potential benefits, privatization also involves risks and requires prudent management from the public authorities. Several policy issues have to be contemplated by the governments if the public interest needs to be safeguarded. Specifically, the eventual externality, negative or positive effect imposed by airport users over non-users or other users, generated by the provision of airport services or strengthened market position gained by the airport operator after privatization should be carefully considered. In this respect, a regulatory regime (in terms of charges, safety, quality, and noise intensity or spatial planning) should be designed before privatization takes place and the regulatory role ought to be delegated to an independent body.

Public Private Privatisation (PPP)

Public Private Privatisation (PPP) refers to contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery of transportation projects. Public Private Partnership is used for any scenario under which the private sector assumes a greater role in the planning, financing, design, construction, operation and maintenance of a transportation facility compared to traditional procurement methods. PPP can be applied to a large range of transportation functions across all modes. These include (i) Project conceptualization and origination; Design; Financial planning and finance, Construction, Operation, Maintenance; Toll Collections and Program Management.

Typical procurement packages include:

- a) Private sector operations and maintenance on a performance basis,
- b) Private sector program management for a few and/or with program cost and schedule maintenance incentives,
- c) Design-build for fixed fee on fixed time frame.

- d) Project build-operate-transfer (BOT)”
- e) Design build-operate transfer (BOT).
- f) Design-build finance-operate- transfer (DBFO); and,
- g) Build-own-operate (BOO)
- h) Build-own-operate- Transfer (BOOT)

Privatization of Airports- India:

The general legislative framework governing airports in India is embodied in three pieces of legislations:

- Airport Authority of India Act, 1994 (as amended)
- The Aircraft Act, 1934 (as amended)
- The Aircraft Rules, 1937 (as amended)

The newly-amended AAI Act appears to give sufficient authority to the Government and the Airports Authority to establish public-private joint ventures of the type contemplated.

In the joint ventures, the Airport Authority of India was to have 26% which made the AAI a minority stakeholder in the new venture. For this the government signed two agreements between Airport Authority of India and the GMR and GVK groups to handover the Delhi and Mumbai airports (Brownfield) for modernization. The modernization of the Delhi and Mumbai airports had been considered as early as 1996 by the Airport Authority of India and in June, 2003 the AAI Board approved the proposal. The privatization of New Delhi and Mumbai Airport were to be the basis for other airports as well, which includes Chennai, Kolkata and other 35 non-metro airports.

The decision of the Indian government to privatize the airports has dangerous implications for the self-reliant growth of civil aviation industry in India. Privatization of this size would give rise to a number of commercial and legal issues which have to be considered very carefully. Some of the important ones are:

- It was claimed that the lack of funds was the main reason for forcing AAI on the road of privatization. The government even while selling its stake in AAI, it has offered heavy concessions and incentives to the private investors i.e. to allow adequate returns on the investment the lease are expected to run for a period of 30 years, with an option of further extending it by 30 years.
- National security risk- All the movements of Indian Air Force are through Indian airports and are controlled by the control tower erected in every airport. If the administration of airports is handed over to foreign companies, they will have access to all information regarding the movement of our Air Force aircraft and therefore the decision of privatizing the airports was termed as ‘anti-national’.
- Employees’ resist- Over 20,000 employees working in the airport authority opposed the decision of the government and called for a country-wide movement to resist the privatization of the airports. They also moved to organize relay hunger strike. As a result the employees’ working would be taken up by the joint venture companies for a period of two years. The employment laws in India are cumbersome and onerous. Private operators will be required to comply with all relevant laws, including on employees’ pensions, redundancy and tax. They will also have to deal with the provisions of the Industrial Disputes Act 1947.

- Under Indian company law, special resolutions must be passed by at least 75% of issued voting shares. By retaining a 26 per cent holding, the Government is seeking to retain a degree of control over the joint venture companies. Subject to the joint venture arrangements to be negotiated, the Government will effectively have a veto over important business decisions of the companies, for example the issue of new shares, the granting of loans or mergers. The obvious question for the private operator is whether - in exercising such control – the Government is likely to act reasonably and give sufficient autonomy to the private operators to allow them to operate with commercial freedom.
- Foreign exchange risk- The Government regulates the charges that can be levied on airlines and others using the airport facilities. The private operator, however, will need to charge airport users at rates that allow for the recovery of capital costs and returns on investment and where appropriate (e.g. in the case of take-off/landing charges and aircraft parking fees) to levy charges in foreign currencies in order to allow the operator scope to reduce its exposure to a depreciating rupee.
- a. 100% tax exemption for airport projects for a period of 10 years.
- b. 100% FDI is permissible for existing airports; beyond 74% requiring government approval
- c. 100% FDI under automatic route is permissible for Greenfield airports.
- d. 49% FDI is permissible in domestic airlines under the automatic route, but not by foreign airline companies
- e. 100% equity ownership by Non Resident Indians (NRIs) is permitted

The purpose of the government in taking out such policy was to enhance the role of private sector in improving the efficiency of airport infrastructure in the country.

The government of India has adopted an Airport Infrastructure Policy in 1997 to utilize domestic and foreign capital for airport development. The Union Cabinet decided on September 11, 2003 that the AAI would enter into joint ventures with private companies and investors and that it would allow these players to own 74 per cent of the stake in the joint ventures, thereby reducing the AAI to a minority stakeholder in the new venture, leaving it with 26 per cent of the stake in the joint venture. This 26 per cent of share holding is crucial as it ensures that the government is able to veto certain fundamental resolutions, however a misuse of the same can be seen.

Policy on Airport Infrastructure:

The government of India constituted a Task Force on Infrastructure in 1998, to attract investments for specific projects of national and regional importance and ensuring their timely completion. As part of its mandate, the Task Force formulated a detailed Policy on Airport Infrastructure (the 'Policy'). The Policy, on an analysis of the existing scenario, identifies the following problem areas.

- There is a need to declare some additional airports as international airports.
- There is congestion in the existing international airports and also certain domestic airports. The reasons for this are limited terminal and apron capacity, bunching of flights and delay in passenger clearances, etc.
- At many airports, passenger amenities need to be upgraded for which steps are either under way or have not yet been initiated due to resource constraints.
- There are also deficiencies in respect of ground handling facilities, night landing systems, cargo handling, etc., at some airports.

The Policy clearly states that private participation is necessary for any future sustained development of airport infrastructure as the public resources for investment in airports are decreasing. The Policy indicates that the manner of private participation should be that of the corporation of airports with an aim to divest government holdings in the future.

In relation to the ownership of the airport, the Policy favors a strategy that permits the greatest latitude in the patterns of ownership and management of airports in the country, including airports that may be owned by the central government, public sector units, state governments, urban local bodies, private companies and individuals and also by joint ventures involving one or more of the above.

Similarly, in respect of the management of airports or parts of airports, the Policy specifies that this could be on a build-own-transfer, build-own-lease-transfer, build-own-operate, lease develop-operate, joint venture, management contract or wrap-around addition basis. The Policy specifies that in each individual case, the exact pattern could be negotiated, depending on the circumstances.

The Policy also provides that foreign equity participation in joint ventures relating to airport infrastructure may be permitted up to 74% with automatic approvals and up to 100% with special permission. Such participation could also be by foreign airport authorities.

To provide a framework for private participation in airport infrastructure, the Policy proposes the following mechanism.

- An Airport Restructuring Committee in the Ministry of Civil Aviation will identify existing airports, in respect of which private sector involvement for development and up gradation of infrastructure is desired. It will also prepare a shelf of projects in respect of Greenfield airports. The pre-feasibility reports will be made available to private investors.
- The AAI will create separate profit centers for all individual airports and hive them off as subsidiary companies on a case-to-case basis, for the purpose of entering into commercial arrangements or joint ventures with private parties.
- Where airport operators desire private participation in their existing airports, all patterns of ownership and management would be open to them as elucidated in the preceding section. No government approval would be required.
- In the case of Greenfield projects, either the central government, the AAI, a state government private company or a group of individuals can act as the promoter. The promoter will be required to prepare a pre-feasibility study and submit the formal proposal to the concerned state government. The state government will add its comments to the proposal in respect of acquisition of land, supply of water and power, construction of access roads, etc., and forward the proposal to the central government.
- The central government will set up an independent statutory body called the Airport Approval Commission, having adequate technical and financial expertise to examine such proposals expeditiously.

Early Steps towards Privatization

In 1998, the PM declared that world class airports must be set up in the country. The task force on infrastructure in 1999 recommended that long term lease for outsourced management should be considered as they were against corporatization. The AAI Board approved a modernization proposal in 2003. The AAI Amendment Bill was passed by the parliament authorizing AAI to transfer the operations and management of its existing airports by way of long term lease to private players. Air

traffic control remained the responsibility of AAI. A cabinet meeting of the then National Democratic Alliance (NDA) government approved a restructuring of the Delhi and Mumbai airports on a long term lease by adopting joint venture route with 74 per cent equity of a private consortium and 26 per cent of AAI. They also constituted the EGoM for implementing the decision under the chair of the Finance Minister and approved the appointment of ABN Amro as the financial consultants (FC) on December 22, 2003.

Policy on Airport Infrastructure, 1997

The Civil Aviation Ministry's Policy on Airport Infrastructure emphasizes the importance of modernisation and up gradation of airport infrastructure in line with the International Civil Aviation Organization (ICAO) standards. The ICAO was setup by 52 states in 1944 and headquartered in Montreal, Canada as a means to secure international cooperation, uniformity in regulations, standards, procedures and organizational matters regarding civil aviation.

The airports under this policy have been classified as following:-

1. International Hubs: This category will be that of 'International Hubs' which may cover airports currently classified at 'international airports' and those eminently qualified to be upgraded as such. These would at present cover Delhi, Mumbai, Chennai, Calcutta and Thiruvananthapuram. Airports at Bangalore, Hyderabad, Ahmedabad, Amritsar and Guwahati can be added to the list as and when the facilities are upgraded to the desired level. The facilities shall be of world class standards.
2. Regional Hubs: Government is keen to encourage development of regional airlines based on small aircraft to provide air-linkages in the interior areas of the country. Regional hubs will have to act as operational bases for regional airlines and also have all the facilities currently postulated for model airports, including the capability to handle limited international traffic. The identification of Regional Hubs will be made on the basis of origin-destination surveys, traffic demand and the requirements of the airlines. State Govt. will be closely associated as co-promoters of regional airlines.
3. Other operational airports: These will be developed so as to be cost-effective on the basis of individual needs to meet the requirements of traffic handled by them. Airports serving State Capitals will be given priority.

Airports play a critical role in promoting trade, tourism and economic development of a country. Airport operators are responsible for providing and maintaining airport infrastructure, providing essential services, and allocating space and resources among airlines. Operators' recover the bulk of their revenues from airport charges levied on airlines and also from commercial use of airport facilities. India has over 400 airports out of which the Airports Authority of India (AAI) manages 94 airports and 28 civil enclaves in military stations.

The AAI is the central body in charge of domestic and international airports in India and is also involved in both constructing airports on its own and partnering with the private sector for the development of new airports or terminals. It is the only provider of Air Navigational Services for all Operational airports in India and is currently planning to invest substantially in the up gradation of the communications, navigation and surveillance systems for Air Traffic Management. The investment in this is estimated to be approximately **INR 27 billion**. It is also planning to invest a significant amount in the up gradation of meteorological equipments at various airports. However, owing to the multi pronged role of this central body, there arises a conflict wherein the AAI is both a participant and regulator. Thus, the need arises for an independent and effective regulatory framework to ensure the proper functioning of airports and for the AAI to conduct its role effectively. Therefore the separate and

independent regulator envisaged to be created by the passing of the Airport Economic Regulatory Authority of India Act.

Meanwhile the Airport Authority Of India is the central body in charge of domestic and international airports in India and is also involved in both constructing airports on its own and partnering with the private sector for the development of new airports terminals. However, owing to the multipronged role of this central body, there arises a conflict wherein the AAI is both a participant and regulator. Thus there was an urgent need of an independent central regulatory authority. With the recommendation of Naresh Chandra Mehta committee and other aviation experts the parliament has enacted AERA ACT 2008, which will regulate the tariff and other charges for the aeronautical services rendered at airports. The main object of Airport Economic Regulatory Authority Act is to regulate tariff and other charges for the aeronautical services rendered at airports and to monitor performance standards of airports. This act also provides for a tribunal to adjudicate disputes and dispose of appeals between two or more service providers or between service provider and a group of consumers. The prime objective of AERA will be to create a level playing field and foster healthy competition among all major airports (Government owned, Public Private Partnership based, Private) encourage investment in airport facilities regulate tariffs of aeronautical services, protection of reasonable interest of users, operate efficient, economic and viable airports at notified airports. It also provided for setting up of an Appellate Tribunal, which would have the powers for levying hefty fines on defaulting individuals and companies. The airport regulator will provide for tariffs for every 5 years and will also keep a check on the economic and operational viability of airports. The airport operators before charging a specific development fee at the airport will have to take the prior approval of the regulator.

The Constitution of India refers to civil aviation as a subject in the Central List. Resultantly, the subject falls within the legislative competence of Parliament. The Aircraft Rules, 1937 permit airports other than Government airports to be owned by citizens of India or companies or corporations registered and having their principal place of business in India. Thus the legislative framework for privatization of airports already exists. The Naresh Chandra Mehta committee on Indian Aviation also favored the participation of private players in Airport infrastructure development. Even the committee goes on extent to the privatization of more airports. With above discussion it is crystal clear that future of Indian aviation will be a huge playground for private players. They will make their own rules and set the game. In that case to curb their monopolistic behavior and smooth functioning of aviation sector, the need of hour is to have an independent economic regulatory authority. Hence AERA ACT comes into picture.

The government's decision to modernize the airports through privatization was challenged by the Indian Airport Authority of India Officers Association (IAAIOA) in the Delhi High Court. IAAIOA contended that as per the existing laws, the modernization could not be done without the prior approval of the Parliament. IAAIOA by an order dated September 28, 2005 stating that so far as the staff is concerned, their interest is protected through the proposal of restructuring and modernization of airports and in the public interest or in the interest of better management of airports, there can be a lease deed of the premises of an airport.

All changes necessitated by this policy in the existing Acts, Rules, Regulations and other provisions should be carried out expeditiously, so as to facilitate its implementation.

Presently property tax is being levied on the properties of AAI, thus putting a further strain on the viability of the airports. This anomaly needs to be rectified, because airport land is owned by the Central Government and AAI is only a trustee.

Airports Authority of India Act 1994 And Amendment 2003.

As can be seen from the Preamble of the Act, it has been enacted with a view to provide for the constitution of the Airports Authority of India for the better administration and cohesive management of the airports and civil enclaves and for matters connected therewith or incidental thereto.

Section 3 of the Act provides for the constitution and incorporation of the Airports Authority.

Section 12 lays down the functions of the Airports Authority of India:

- Section 12(1) provides that it shall be the function of the Airports Authority of India to efficiently manage the airports, the civil enclaves and the aeronautical communication stations².
- Section 12(2) provides that it shall be the duty of the Airports Authority of India to provide air traffic service and air transport service at any airport and civil enclaves.
- Section 12(3) provides that without prejudice to the generality of the provisions contained in sub-sections (1) and (2), the Airports Authority of India may perform various functions stated there under including that prescribed under clause (a), namely, plan, develop, construct and maintain runways, taxiways, aprons and terminals and ancillary buildings at the airports and civil enclaves.

It appears that sometime in 2003, there was felt a need to improve the standard of services and facilities at the airports and to bring them at par with the international standards. To facilitate the process for such improvement, it was felt necessary to bring in the infusion of private sector investments as also for restructuring of airports. It was thought that this would speed up airport infrastructure development, improve managerial efficiency, increase local responsiveness and improve service levels as well as, in turn, generally stimulate the economy by boosting tourism and trade.

To achieve this purpose, the Airports Authority of India (Amendment) Act, 2003 (Act 43 of 2003) was enacted. It brought about the amendment to section 2 by insertion of clause (nn), insertion of new clause (aa) in section 12(3) and new sections 12-A and 22-A in the Act. These amendments were brought in to enable the Airports Authority of India to establish airports or assist in the establishment of private airports and also to lease the airport premises to private operators with the prior approval of the Central Government. By virtue of these amendments, some of the functions of the Airports Authority of India can also be assigned to lessees subject to the exception that air traffic services and watch and ward functions will continue to be provided by the Airports Authority of India³.

The Statement of Objects and Reasons to the Amendment Act throws light on the Parliamentary intention and it reads as follows: "Statement of Objects and Reasons:- At present, the Airports Authority of India is a statutory organization under the administrative control of the Government of India, Ministry of Civil Aviation. It manages 94 civil airports and 28 civil enclaves at defence airports in the country.

There is need to improve the standard of services and facilities at the airports to bring them at par with international standards. To facilitate the process for such improvement, there is need, both for the infusion of private sector investments as also for restructuring of airports. This will speed up airport infrastructure development, improve managerial efficiency, increase local responsiveness and improve service levels. It will, in turn, generally stimulate the economy by boosting tourism and trade. It has been decided to undertake the task of restructuring the airports under the Airports Authority of India as

² Sec. 12 Airports authority act 1994

³ Airports authority of India (Amendment), 2003, no.43 of 2003.

well as to encourage private participation for the Greenfield airports in the country. Since the Airports Authority of India Act, 1994 is applicable to all airports whereat air transport services are operated or are intended to be operated, significant private sector investments in such project require an effective legal framework within which the investors would feel safe and secure about their operational and managerial independence. To achieve these purposes, the Bill proposes to amend the various provisions of the said Act.

The salient features of the Bill are as under:-

1. It amends section 1 as well as section 2 of the Act to exclude the private airports from the purview of the Act except for certain limited purposes and to provide for definition of a private airport. The proposed amendment would also provide adequate comfort levels to enhance investors' confidence and to ensure a level playing field to private sector Greenfield airports by lifting control of the Airports Authority of India except in certain respects.
2. It inserts new clause (aa) in sub-section (3) of section 12 and a new section 12-A in the Act. This amendment will enable the Airports Authority of India to establish airport or assist in the establishment of private airports and also to lease the airport premises to private operators with the prior approval of the Central Government. By this amendment, some of the functions of the Airports Authority of India can be assigned to lessees subject to the exception that air traffic services and watch and ward functions will continue to be provided by the Airports Authority of India.
3. It inserts section 22-A in the Act empowering the Authority, after the previous approval of the Central Government to levy on the embarking passengers at an airport the development fees to be credited to the Authority which shall be regulated and utilized in the prescribed manner for funding and financing the costs of up gradation, expansion or development of airports and for the establishment or development of new airports in lieu of existing airports and for the investment in the equity in respect of shares to be subscribed by the authority in companies engaged in establishing, owning, developing, operating or maintaining private airports or advancement of loans to such companies or other persons engaged in such activities. This amendment will make the projects, relating to construction of Greenfield airports, economically viable by such fee collection.
4. It also inserts a new Chapter V-A relating to eviction of unauthorized occupants, etc., of airport premises. It provides for the appointment of eviction officers and a Tribunal to obviate the menace of large scale encroachment and unlawful occupation of airport premises and to decide the cases relating thereto.
5. By the amendment, clause (nn) was inserted in section 2 which defines 'private airport' to mean an airport owned, developed or managed by
 - (I) any person or agency other than the Authority or any State Government, or
 - (ii) Any person or agency jointly with the Authority or any State Government or both where the share of such person or agency, as the case may be, in the assets of the private airport is more than fifty per cent.
- 6.. In section 12, clause (aa) was inserted which reads as follows: "(aa) establish airports, or assist in the establishment of private airports, by rendering such technical, financial or other assistance which the Central Government may consider necessary for such purpose."
7. Section 12-A makes provision for lease by the Airports Authority of India and reads as follows:

7.1. LEASE BY THE AUTHORITY.

(1) Notwithstanding anything contained in this Act, the Authority may, in the public interest or in the interest of better management of airports, make a lease of the premises of an airport (including buildings and structures thereon and appertaining thereto) to carry out some of its functions under section 12 as the Authority may deem fit. Provided that such lease shall not affect the functions of the Authority under section 12 which relates to air traffic service or watch and ward at airports and civil enclaves.

(2) No lease under sub-section (1) shall be made without the previous approval of the Central Government.

(3) Any money, payable by the lessee in terms of the lease made under sub-section (1), shall form part of the fund of the Authority and shall be credited thereto as if such money is the receipt of the Authority for all purposes of section 24.

(4) the lessee, who has been assigned any function of the Authority under sub-section (1), shall have all the powers of the Authority necessary for the performance of such functions in terms of the lease."

8. Section 22A of the Act empowers the Airports Authority of India to levy development fee and reads as follows:

"22A. Power of Authority to levy development fees at airports. - The Authority may, after the previous approval of the Central Government in this behalf, levy on, and collect from, the embarking passengers at an airport, the development fees at the rate as may be prescribed and such fees shall be credited to the Authority and shall be regulated and utilized in the prescribed manner, for the purposes of-

(
A) Funding or financing the costs of up gradation, expansion or development of the airport at which the fee is collected; or

(b) Establishment or development of a new airport in lieu of the airport referred to in clause (a);
or

(c) Investment in the equity in respect of shares to be subscribed by the Authority in companies engaged in establishing, owning, developing, operating or maintaining a private airport in lieu of the airport referred to in clause (a) or advancement of loans to such companies or other persons engaged in such activities.

9. The purpose of the 2003 amendment was thus to have a new framework for the administration and management of airports in the country, wherein the Airports Authority of India would either assist a private initiative in re-developing existing airports or encourage and facilitate private initiative in establishment and development of Greenfield airports. The various provisions of the Act will have to be interpreted in the above context.

Other Issues associated with Airport Privatization:

The number of unresolved issues associated with airport privatization seems boundless. These include:

- i) Impact on and regulation of fees paid by airport users, including both airlines and the traveling public.
- ii) Impact on and regulation of fees paid by airports users, including both airlines, and the traveling public.
- iii) Impact on and regulation of fees paid by airport users, including both airlines and the traveling public.

- iv) Appropriate use the financial proceeds of a transaction.
- v) Consequences of environmental issues such as aircraft noise associated with increased airport operations.
- vi) Regulation of rate of return to reasonable levels for invested capital.
- vii) Tax status of airport-issued debt.
- viii) Customer service implications of private operations.
- ix) The extent to which the airport sponsor may be obligated to repay past federal grants, and the extent to which grant assurances will be effective post-privatization.

Conclusion:

Clear legal provisions regulating the granting of rights to private participants are required in order to bring about more certainty in this regard. A concomitant to opening up the sector for private participation would be the need to have an independent regulator for monitoring and regulating airport projects. The role of the law in a set-up that promotes private participation would be regulatory – with respect to safety, security and environmental protection.

In some respects, the Government's Invitation raises almost as many questions as it answers, although none of the issues is necessarily fatal. On any project of this size, there will always be challenges at every stage of the process. These will require informed negotiation of the legal and commercial issues specific to transactions in India and to these projects.

For the potential investor, there are without doubt unique opportunities in the Indian airports sector, but these are not risk-free. In what will be a complex process, there are a number of very different considerations that will need specialist advice. It is therefore vital that the investor's legal and commercial teams are not only familiar with the transport sector and the privatization process, but also have experience of domestic and foreign laws enabling them to anticipate and deal with the complexities and to facilitate effective project planning.

CHAPTER VI: AIRPORT MANAGEMENT IN 21ST CENTURY: CHALLENGES AHEAD

EMERGING CHALLENGES IN AIRPORT MANAGEMENT-WAY FORWARD.

INTRODUCTION: Airports have traditionally been viewed as places where aircraft operate and passengers and cargo transit. This traditional understanding is giving way to a broader, more encompassing model which recognizes the fact that along with their core aeronautical infrastructure and services, virtually all major airports have incorporated a wide variety of non-aeronautical facilities and services. Retail mall concepts have been merged into passenger terminals. Airport property beyond the terminal is being developed with hotel and entertainment facilities, conference and exhibition complexes, shopping centers, office buildings, and logistics and free trade zones. Airports also frequently offer complementary sets of facilities for airport and airline employees (such as day care centers and health clinics), as well as commercially serve residents in the local market area. Larger airports are thus taking on features of metropolitan central business districts, increasingly operating as points of multimodal surface transportation convergence with surrounding office, hotel and commercial facilities. Indeed, under the new airport city model, many airports are becoming significant employment, shopping, business meeting and entertainment destinations in their own right.

Airports are vital gateways for developing local business, and as such are a key component of local, national and regional infrastructure. At the same time, airports are much more than regulated public

service providers. They are complex commercial entities that must meet well-defined business objectives in terms of day-to-day operations, financial performance and planning for future growth. Although airports worldwide share many common business characteristics, each airport operates within its own unique local context. All are required to implement the internationally accepted guidelines specified by the International Civil Aviation Organization (ICAO), yet each must also respect the local culture, legal practices and regulatory requirements. This duality creates a complex environment for airport operators when defining these long-term development and financing plans. Accordingly, airport operators work closely with their aviation partners – the airlines, air navigation service providers, concessionaires, and local and national governments – to ensure a business process that strengthens the air transport industry.

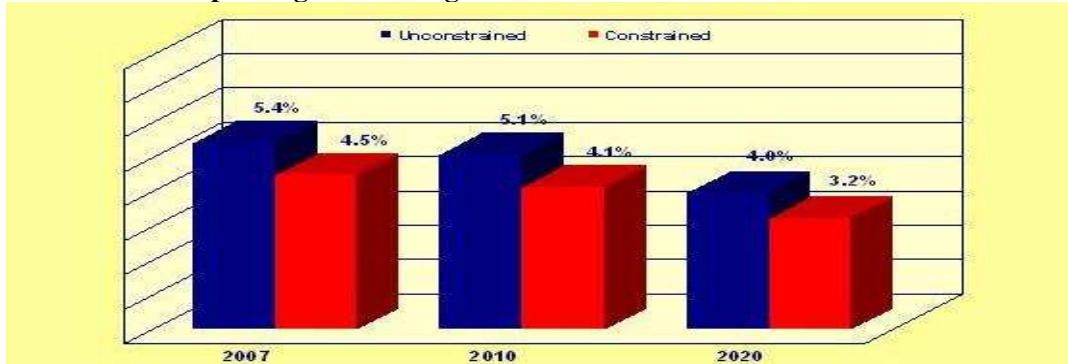
OVERVIEW: To understand the complexity of airport business, many factors need to be taken into consideration: traffic growth, capacity, competition, financial results, revenue streams, employment, capital expenditure, ownership, relations with airlines, the regulatory environment and aviation industry cooperation.

TRAFFIC GROWTH: ACI's 2005 traffic statistics show that the world's airports served a record 4.2 billion passengers, a 6.5% growth rate as compared to 2004. Several regions recorded double digit growth. Data through the first half of 2006 show the traffic continuing to grow at a 6% clip over 2005. In short, traffic has not only climbed back to pre-2001 levels, but has now confirmed a new expansion trend that is expected to continue. In emerging markets in the Middle East, Asia and Pacific, ambitious new airport development and expansion plans have been launched to handle the strong growth that is projected in both short and long term forecasts. If the industry is to avoid a serious capacity shortfall, airports will need to move quickly to complete new facilities in a reasonable time frame.

CAPACITY AND CONGESTION

In 2005 ACI forecast demand for air travel at over 7 billion passengers in 2020. The chart hereafter illustrates the devastating short-term and long-term impact of these constraints. Under these circumstances, *airports estimate that capacity to accommodate demand would fall short by nearly one billion passengers by 2020, resulting in severe congestion.* The surge in traffic affects all aspects of airport service from car parking to check-in to security screening and baggage delivery. Higher passenger numbers also put pressure on immigration and customs services to process greater numbers of travelers in and out of international gateways.

Annual passenger growth: constrained vs. unconstrained



It is important that airport capacity issues be addressed during negotiations: the best way to ensure this outcome is to have airport representatives participate in national or multi-national negotiating teams.

COMPETITION

Airports compete now more than at any time in the history of aviation. They compete for new air services, for low-cost carrier traffic, for transit traffic and for cargo services. Indeed, some 550 airports congregated in Copenhagen to talk to the carriers about new routes and route development. The chart below shows the catchment area overlaps amongst major hubs who work to capture and retain business in the Asia-Pacific region: Beijing, Seoul, Tokyo, Kansai, Taipei, Manila, Hong Kong, Guangzhou, Macau, Bangkok, Kuala Lumpur, Singapore and Jakarta.

Dubai, while geographically distant from the Asian hubs, also competes for transit traffic between Europe and Oceania and was recently estimated to be a transit hub for approximately one-sixth of all passengers travelling between Europe and Australia. In addition, a number of the world's urban areas have strong competition amongst local airports: examples are the San Francisco Bay Area, where three airports vie for domestic traffic; Moscow, which has three international airports; Washington D.C.

which has three airports serving the area, two of which are international gateways and ; the airports in the Pearl River Delta region of China – Hong Kong, Guangzhou and Macau .Airports are competing enthusiastically in the area of service quality: over 80airports worldwide have enrolled in ACI's Airport Service Quality program, which measures passenger satisfaction on a wide number of airport parameters. In this program, airports compete not only within their region, but also on a global basis, with the winners attracting international acclaim and respect for their best practices.

FINANCIAL RESULTS

It is expected that the increase in the number of passengers will maintain the trend toward stronger earnings, derived from both aeronautical and non-aeronautical revenues. As part of the culture of improved customer service, airports sometimes have to make financial sacrifices. An example was Cincinnati airport's rent relief to retail concessionaires to compensate for the downturn in traffic due to financially-strapped Delta Airlines' capacity cuts at the airport. This illustrates the intractable problem faced by airports with their planning horizons spread out over many years, while airline decisions on capacity are often taken abruptly. During the period when SARS drastically reduced air travel in the Asia Pacific region, many airports cut user charges to provide some relief to carriers until traffic recovered. A number of these airports were commended by IATA during its annual presentation of the Eagle Award for outstanding airport service.

AERONAUTICAL AND NON-AERONAUTICAL REVENUES

Traffic growth generates higher aeronautical revenues through an increase in aircraft movements and also drives non-aeronautical income higher with more passengers spending on airport products and services. Airports have been very successful in growing non-aeronautical income streams. Data from ICAO in 1990 indicate that only about 30 percent of airport revenues were from non-aeronautical sources. In recent years, ACI surveys have confirmed that the global figure is now closer to 50 percent, with a number of large airports deriving over 60 percent of gross revenues from non aeronautical sources, including retail concessions, auto parking, rental car concessions and property income from leasing of airport land.

EMPLOYMENT

Some 4.5 million persons are employed on airport sites. The vitality of airport activity means not only employment within the airport perimeter, but also provides a catalyst for business development in the surrounding area. A recent FAA study estimates that in the U.S. market alone, 11 million jobs are related to the travel and tourism industry. Airports contribute significantly to the growth of this travel and tourism, which the World Travel and Tourism Council estimates accounts for over 10 percent of all salaried jobs worldwide. Taxes on these salaries spread the benefits of travel and

tourism throughout the economy. *No progressive region can sustain growth and prosperity without good airport infrastructure and convenient connections to the global market place.*

CAPITAL EXPENDITURE

Airport operators spent a record US\$ 36 billion on new capacity in 2005, up over 11 percent from the previous record year of 2004. With passenger traffic forecast to double over the next 15 years, ACI expects continued planning and airport development to absorb the rapidly increasing number of passengers. As indicated in the section on capacity, however, these expenditures are insufficient to meet the long range growth targets of the industry. Despite these record expenditures, as pointed out earlier, airport capacity is in a race with time to keep up with booming demand.

OWNERSHIP AND GLOBALISATION

Over the past several years, *the airports industry has become a beacon of financial stability in a volatile aviation marketplace.* Recent sales of airport assets at a considerable premium demonstrate the high regard that the financial markets have for the earnings potential of airports, which have diversified revenues and have taken innovative entrepreneurial decisions to shield themselves from the gyrations of the cyclical air transport industry.

Until recently, such purchases were undertaken by investors with considerable aviation involvement (Copenhagen's investment in Mexico and BAA plc's purchase of Budapest international airport are two examples). In a sign of confidence in the industry, airlines have begun investing in airports, a strong indication of the high quality of airport investments (for example the purchase of a block of FRAPORT stock by Lufthansa and Thai International Airways' recent announcement that it is evaluating airport investments in Southeast Asia). Financial sector investors have joined the airport investment trend as well (for example Macquarie Airports' acquisition of majority stakes in Sydney, Brussels and Copenhagen airports). In the Sydney acquisition a major investor was a Canada based teachers' pension fund, yet another indication that prudent, risk-averse investors appreciate the stable performance of airports. At the same time, this latest development raises a serious issue for the industry and its regulators. Will a new breed of non-aviation investors focus purely on the bottom line, or will they respect the airport's community service role by taking firm decisions to build for the future? Realistically, the probability of a widespread outbreak of hostile takeovers in the airports community is minimal. While many airport companies are privatized, only about a dozen airport companies are actually listed on stock exchanges. Most privatisation ownership models involve groups of strategic investors and the stock is not publicly traded. Even where stock is traded, in many cases local or national governments continue to hold a majority of shares. ACI policies are neutral about airport ownership, recognising that ownership structures must serve the needs of the local community. The majority of ACI's 1640 member airports worldwide have fairly low volumes of traffic and must be subsidized to serve the public efficiently. For many of these airports, privatisation is not an option. Privatization can, however, bring an ethos of entrepreneurship to an airports company, drive down costs

and also open up new sources of capital for investment. But many government-run airports are also highly efficient and innovative. One remarkable example was Aer-Rianta, the former Irish Airports Authority, a 100% government owned entity. Aer-Rianta not only pioneered duty free sales, but it took over duty free operations for many airports in other regions due to its reputation for solid management.

RELATIONS WITH AIRLINE CUSTOMERS

As in any business, airports strive to provide customized and efficient facilities for their customers, the airlines. These services must be provided in an equitable manner to all airlines serving the destination. But this is not always an easy task, as *not all airlines require the same level of service. This obliges airports and airlines to work out acceptable solutions through an open discussion and negotiation process.* Airline fortunes can change rapidly, as recent years have shown, whereas airport infrastructure is a permanent asset of the local community. Airlines can therefore be unpredictable partners creating extremely challenging management situations for airport operators. In recent years, bankrupt airlines have obliged airports to absorb radical reductions in airline schedules and services. Even in more stable times, airlines frequently change competitive strategies, reconfiguring alliances and code share arrangements, thereby increasing the difficulty in planning for future airport development. On the other hand, when addressing future capacity needs, an airport may be faced by pressure from its current airline customers who attempt to restrict expansion plans in order to limit competition.

FINANCIAL PERFORMANCE BENCHMARKING

Airports worldwide are committed to implementing operating efficiency improvements. Financial performance benchmarking is a key element in quantifying these improvements. The results of a detailed survey of airport chief financial officers from all six ACI regions demonstrated that a wide segment of the airports community has been involved in sophisticated internal, regional and in some cases, global, benchmarking, of both financial performance and customer service parameters. There are many factors which complicate financial comparisons within regions and in a global context: among them differing regulatory frameworks, differences in the capital expenditure life cycle of airports, and varying ownership and governance structures. Another potential distortion in comparing airport performance is differences in the volume of passengers. Hubs in major cities can spread their costs over a large number of passengers and will, due to economies of scale, appear to rank very high in productivity and tend to have lower costs per passenger. Airports with low volumes of passenger traffic still have high fixed costs to cover, and will not fare well on either productivity or cost comparisons. To cite an extreme example, Bamako, Mali and London's Gatwick airports have one runway. Bamako handles under 400,000 passengers per year, Gatwick over 32 million. Comparing the financial performance of these two very different airports serves no useful purpose, even though they have similar runway infrastructure. But comparing Bamako's performance to the airport in Banjul, Gambia, also a single runway operation, which has about the same level of traffic and is in the same region, could yield some interesting comparative data.

PLANNING AND DEVELOPMENT OF AIRPORT CAPACITY

Perennial tensions are experienced by governments and airport owners in comparing the case for stretching existing facilities with that for the expansion of new facilities. This problem is, perhaps more prevalent in Europe where land restrictions and new noise standards impose severe constraints on the scale of airport development. A senior executive from one of the leading European airports remarked, that a very important skill set of an airport CEO is the ability to operate an airport which is bursting at its seams. In Changi, a lot of expandability and flexibility has been built into the master plan from conception. The result is that, in between the program to develop each new terminal, there is the

possibility of extending capacity of existing terminals up to a limit by building finger piers. For this purpose, sufficient land has to be safe guarded.

The other important measures include the improvement of vehicular accessibility to the terminal building, reduction in processing time for CIQ and the changes made to the public waiting areas and amenities. On the airside, a master plan review seeks to increase runway capacity through attenuation of peak hour movements and the upgrading of existing runways. The symbiotic relationship between the host carriers and the airport is a central feature in a traditional “hub and spoke” business model. Against this back drop, there is concern in some quarters that clusters of airports have emerged, each of which attempts to develop route connectivity and air traffic from the limitations of a finite market. A case in point is the Gulf States where several major airports are simultaneously expanded and, indeed, new mega airports are being developed. The traditional view is to consider the aggregate capacities of the main airports in a cluster and to relate this to the size of the underlying trends of route development.

The competition among airports in a cluster may in fact raise productivity and service quality and, more importantly, drive the development of new routes and connectivity. For example, the mega cluster of airports in the Gulf States have contributed to the rapid growth in routes between Asia and the Middle East and enhanced connectivity for carriers plying between destinations in Africa and Asia.

AIRPORT MANAGEMENT CAPABILITY

Traditionally, the capability to manage airport facilities and processes is developed organically. A typical progression begins with the setting up of an airport entity. In most cases, this takes the form of a statutory body or an entity which lends itself to be subsequently corporatised. Subsidiary entities are formed within this umbrella organization. These are tasked with the recruitment, training and development of personnel and management resources, frequently with inputs from itinerant expatriates. The resulting structure is expected to cover the full gamut of activities which underpin the operation of an airport – check-in of passengers, facilitation of passenger boarding, operation of retail and food and beverage outlets within the airport terminal building, apron or ramp handling catering and cargo handling, engineering and airport emergency support. Government ministries or agencies usually retain functions relating to air services, security agreements, CIQ and air traffic control services. At the core, the central consideration for this course of capability development is time. By the time Changi came on stream in 1981 it had more than a decade to systematically build up and hone the structure and systems, the result of which is now the fabled “Changi experience”. Given the pace with which airport capacity has to be expanded in recent years, any emerging airport –particularly one with ambitions to become a major hub – can ill afford the time for the development process to work through its full course organically. To telescope this development, the general solution is to outsource key operational functions. There is a growing number of operating and management contracting players in the international market for this purpose. Properly done, this can unleash new operational perspectives for revamping existing operational and revenue generation models. For example, in one of the airports in China such changes enabled the airport to raise its revenue by more than three fold within 5 years through more effective retail management, ramp handling and catering operations. Concurrently, the development cycle of key operational personnel is shortened considerably through the training infrastructure which a more established operator is able to provide. Usually, an operation management agreement (OMA) is executed under which the operator undertakes to implement certain specified tasks and programs for a fee. The fee may incorporate an incentive component which is determined by reference to prescribed deliverables expressed as key performance indicators. The downside to this arrangement is that it assumes that the original OMA has been framed in terms which are consistent with the longer term interests of the airport owner.

THE IMPACT OF LOW COST CARRIERS

One changing aspect of airport management and development is the whole dimension presented by the arrival of low fare airlines. Although they do take away some traffic previously served by the big carriers, their net effect is to make air travel more affordable and raise substantially the volume of passengers served. In many of the regional European airports, these airlines today accounted for more than half of the passenger volume. The case for these carriers in Europe was propelled to a large extent by the liberalization of the European aviation sector. This permits any airline within the EU to fly between any two points in the union, irrespective of the nationality of the airline or any restrictions contained in any prior bilateral agreements between the two states involved. Not unexpectedly, in the process, they exert considerable pressure on airport capacity and operational costs.

Typically an airport's response is to remodel its operations by providing a lower cost base and tailoring the facilities of the airport to the low fare product. In Singapore, this response included the development of a dedicated budget terminal where the basic operational processes can be transacted on a more cost competitive basis. Other airports have chosen to address the specific requirements of these carriers by adapting the facilities normally extended to the regular carriers.

THE CONCEPT OF AEROTROPOLIS

Airports have traditionally been viewed as places where aircraft operate and passengers and cargo transit. This traditional understanding is giving way to a broader, more encompassing model which recognizes the fact that along with their core aeronautical infrastructure and services, virtually all major airports have incorporated a wide variety of non-aeronautical facilities and services. Retail mall concepts have been merged into passenger terminals. Airport property beyond the terminal is being developed with hotel and entertainment facilities, conference and exhibition complexes, shopping centers, office buildings, and logistics and free trade zones. Airports also frequently offer complementary sets of facilities for airport and airline employees (such as day care centers and health clinics), as well as commercially serve residents in the local market area. Larger airports are thus taking on features of metropolitan central business districts, increasingly operating as points of multimodal surface transportation convergence with surrounding office, hotel and commercial facilities. Indeed, under the new airport city model, many airports are becoming significant employment, shopping, business meeting and entertainment destinations in their own right.

EXAMPLES OF AIRPORTS APPLYING THIS NEW MODEL

Beginning within the terminal, Hong Kong International houses more than 30 high-end designer clothing shops, Singapore Changi has cinemas, saunas and a swimming pool; Las Vegas McCarran has a museum along with gaming; Amsterdam Schiphol hosts a Dutch Masters Gallery Frankfurt offers the world's largest terminal clinic treating over 30,000 patients yearly; and the intensely utilized chapel at Stockholm Arlanda conducted over 450 weddings last year. Because of the critical importance of landside commercial development to revenue streams,

numerous airports are turning to the airport city model as a key component of their master plan and development strategies. For example:

(a) Beijing Capital Airports Holding is rapidly proceeding with its highly ambitious Capital Airport City, whose master plan takes an expansive definition of airport functions including, among others, shopping, entertainment, education, sports and leisure, logistics, light manufacturing, finance, trade and housing.

- (b) Aeroports de Paris established a real estate division in 2003 to act as the developer, general contractor and construction project owner and manager of landside commercial properties at Paris Charles de Gaulle and Orly international airports.
- (c) Dallas-Forth Worth's management is aggressively expanding its real estate development business, leasing its vast airport land to a wide variety of commercial tenants, including oil and natural gas exploration.
- (d) Hong Kong International Airport's Sky City is a one million square meter retail, exhibition, business office, and hotel and entertainment complex near its passenger terminal. The first major phase opened in late 2006.
- (e) Kuala Lumpur International Airport's new airport city is commercially anchored by its large Gateway Park that, in addition to retail and office development, includes motor sports, an automotive hypermarket and leisure venues drawing on the local as well as aviation-induced market.
- (f) Incheon's "AirCity" encompasses international business areas, logistics zones, shopping and tourism districts, as well as housing and services for airport city workers and residents.
- (g) Dubai World Central is a \$32 billion airport city under development 25 miles south of downtown Dubai. Corner stoned by a massive multimodal air logistics hub, the airport city will include office towers, hotels, a mega mall, golf course and housing for 40,000 on-site workers. Its airport, commercial and residential zones will be connected by an internal light rail system.
- (h) Amsterdam Schiphol, through its Schiphol Real Estate Group, has been involved for two decades in landside commercial development. These developments include office complexes, hotels, meeting and entertainment facilities, logistics parks, shopping and other commercial activities branded under the Airport City name. Nearly 58,000 people are employed at Schiphol, which integrates multimodal transportation, regional corporate headquarters, shopping, logistics and exhibition space to form a major economic growth pole for the Dutch economy.

Numerous other international airports, not quite the scale of Amsterdam Schiphol or Seoul's Incheon, have given the airport city model high priority in their master planning and strategic development (e.g., Brisbane, Calgary, Vienna, Zurich), positively affecting their financial bottom line. In fact, many airports today receive greater percentages of their revenues from non-aeronautical sources than from aeronautical sources (e.g., landing fees, gate leases, passenger service charges). These non-aeronautical revenues have become pivotal to airports meeting their facility modernization and infrastructure expansion needs, along with their being cost-competitive in attracting and retaining airlines.

REVENUE SOURCES IN THE YEARS AHEAD

Numerous airport managers have stressed that they will be increasingly dependent on revenue derived from non-aeronautical sources in the future. With airports under pressure by airlines and passengers to keep aeronautical costs under control, increasing non aeronautical revenues pose the primary means by which airports will be able to meet their financial and growth needs. In fact, most do not see expanding non-aeronautical revenues as an option, but as a necessity.

These non-aeronautical revenue-generating activities – especially retail – will increasingly take place on airport land beyond the terminal. This is because:

- 1) terminals are basically planned and built according to aeronautical needs;

- 2) most terminals have restricted operations hours due to aircraft noise constraints; and
- 3) security issues tend to pose limits (e.g., limiting shopping locations of meeters and greeters).

Other space constraints of terminals will limit the amount of retail and other non-aeronautical economic activities there, pushing these activities further out landside as the airport develops.

TRENDS AFFECTING AIRPORT MANAGEMENT STRUCTURE

Consistent with their expanding non-aeronautical roles and functions, airports are altering their operational management. Many airports – both public and private-sector operated – have established commercial and/or real estate divisions to develop their landside areas as well as foster development beyond airport boundaries to generate revenues. They include, among others, UK based airport operator BAA, Aéroports de Paris (ADP), Dallas-Fort Worth International Airport (DFW), the Metropolitan Washington Airports Authority (MWAA), Frankfurt Airport [Fraport], Amsterdam Schiphol, and Singapore Changi.

For instance, MWAA has acquired 400 acres just beyond its property to joint venture with a master commercial developer. Schiphol has formed a public-private partnership, the Schiphol Area Development Company, with the Province of Noord-Holland, the City of Amsterdam and the Municipality Haarlemmermeer to develop property in the broader Amsterdam Airport Area. And Stockholm's Arlanda International Airport is cooperating with the airport municipality of Sigtuna to develop Arlandastad (Arlanda- City) on a 1300-acre tract near the airport. Further extending their reach, some airports are buying and/or operating other airports through special investment management divisions. Leaders here are ADP, BAA, Fraport, Malaysia Airports Holding Berhad, Singapore Changi and the Schiphol Group.

These new operational structures offer testimony that airports are evolving from basic aeronautical infrastructures into complex multi-functional enterprises, serving both aeronautical needs and profitable business development. The current trend in airport operation and planning is therefore to complement traditional technical airport functions with revenue-generating terminal and landside commercial management

Airport Management

Airports are becoming the bottleneck of the air transport network. To reduce congestion, airports face three major challenges:

- (a) Satisfy customer needs with increased services and efficiency.
- (b) Increase revenues while reducing costs.
- (c) Get the right data to the right people at the right time to aid aircraft turnaround.

Management Concerns Following are the management concerns at an airport which should be addressed using systems approach:

- (a) Multi-agency environment – an airport has multiple agencies working and each tends to create its own empire with its own infrastructure.
- (b) Fragmented automation – islands of information exists at the airport and a consolidated view is lacking.
- (c) Duplication of Infrastructure – besides spoiling the aesthetics at the airport it taxes space availability and some times creates operational confusion.
- (d) Reliable flight information lacking – single point flight data is missing resulting in each agency operating its own data with its own means of acquiring information which is normally not reliable.
- (e) Analog Surveillance of Terminals - makes it tedious to track risky situations.
- (f) Security Systems not on-line – any security lapse or hazard detected cannot be conveyed to all concerned without loss of time.

The new concept in airport management essentially revolves around the following:

- (a) Creating Work flows for on-line working in Back-office automation.
- (b) Integrated systems environment.
- (c) Having a Centralized Database.
- (d) Deployment of Business performance and Intelligence Tools.
- (e) Creation of Airport Operational Control Centres.
- (f) Rugged Information Display Systems.
- (g) Intelligent Surveillance.
- (h) Resource Management System.
- (j) Access Control Systems.
- (k) Common Use Infrastructure to keep operation cost to minimum

A total automation in information management along with process definition and process based integration of systems for each of the activity performed at the airport, monitored in real-time scenario, is the crux of modern management style.

Steps in the implementation of the above concern involve the following:

- (a) A common use network and other common use facilities are created in the first step to provide a platform for further systems creation and integration.
- (b) Next step is to study and upgrade systems, wherever necessary, at the airport.
- (c) Office automation is essential to facilitate creation of database. Manual operation, if any, will remain unmanaged. It has to be avoided and kept to minimum.
- (d) Integration of the systems follows - this may be using various techniques depending upon the architecture of the consolidated system design. Simple to very complex techniques are available but it is always advisable to go for simpler techniques for easy subsequent maintenance, management and future growth.

(e) Creation of AODB⁴ - which may be created separately for an airport or it may be a customized database for the airport forming a part of a group of airports having remotely installed Centralized Servers. Larger airports can be thought of having local servers in addition to Centralized Servers.

(f) Once the AODB is available it has to be linked to the processes identified for the activities at the airport, and Workflow to carry out each process is then created and assigned to the relevant users.

(g) Control Centers are created to monitor group functions having perfect integration and data flow among them. These control centers are called AOCC⁵. Following are some of the centers' a bigger airport will have.

(i) Operation Management Center

(aa) Resource Management System.

(ab) Access Control System.

(ii) Flight Slot and Scheduling Center.

(iii) Flight Crisis Management Center.

(iv) Building Management Center.

(v) Airport and Flight Safety Control Center.

(vi) Flight Information and PAVA Control Centre.

(vii) Security Control Centre.

(aa) Security Surveillance Center.

(ab) Security Investigation Center.

(h) Helpline and Helpdesks are created for contact with the passengers, public at large and the visitors at the airport.

(j) Self-service kiosks are essential for accessing information and services availed by the passengers and visitors.

(k) An intelligent access control is also essential to restrict the access to authorized areas only.

⁴Airport Operational Database (AODB)

⁵Airport Operational Control Centres (AOCC)

Constraints

Modern management concepts have their own constraints because it is capital intensive exercise which a Finance man does not easily approve as lot of its benefits are not measurable, and cost benefit analysis becomes a difficult exercise. Then as it needs a great deal of automation a timely and accurate data input is very essential. Regularity in working is normally abhorred. Modern Airport Management needs to be technology laced and people friendly to benefit the user fraternity .Unless we resort to “**TOTAL AIRPORT MANAGEMENT CONCEPT**” we cannot usher in best solutions and services for airport users.

EMERGING CHALLENGES IN AIRPORTS MANAGEMENT

Capacity or problem of growth of traffic

The rapid air traffic growth and inadequate support facilities is one of the challenges for airport authorities.

The extent of air traffic growth was in most cases unplanned because it resulted from sudden technological breakthroughs. Huge traffic loads occurred so quickly that there was no time to plan and expand the facilities. This resulted in congestions and delays. Finding a solution to what appears to be a never ending demand is a big challenge

Skilled professionals

There is potential shortage of skilled manpower. Some specialized courses has to be introduced to meet the requirement

Capital incentive

The development of airports is capital incentive. Lot of investment is required so private participation should be encouraged.

Environmental problem:

Airports do have negative impacts. The impact of changing technology on the environment was not fully appreciated in the beginning. Failure to provide solutions to environmental disbenefits caused serious constraints on effort by airlines and airports to supply facilities to accommodate future growth in traffic

Potential pollution of the local environment adjoining airports must be recognized early and dealt with effectively to preclude or minimize adverse impacts. The smells and visible smoke of burned fuel and pollution of local water by inadequately protected surface drainage system may add other dimensions to the unfavorable imprints of airports on their environs.

Noise problem:

The noise produced by the jet aircrafts has four primary effects on people:

1. Annoyance is caused by jet sound of an enlarged percentage of high frequency tones. Medical tests have shown that the average human ear can accept about 30DB more of low frequency than of high frequency sound at the same level of discomfort

2. Masking of speech is more likely to occur as a result of the higher frequencies in jet sources that obliterate consonant sound.
Remote airports may be relatively noise-complaint free but the access time and costs will reduce the demand for travel. Noise pollution correction at the source is expensive, but if used will expansion and operational constraints be alleviated? Improved flight path control, steep approaches and quieter propulsion systems are being tried to reduce noise pollution
3. Interference with TV and radio is twofold. The masking effect plus overall intrusion of the jet noise is a distraction. In the case of TV there is also the interference of the flyover causing image flutter on the picture tube
4. Frequency and tone also exerts distracting forces on the hearer. When a repeated flyover persists over a period of time, the hearers tolerance drops markedly.

Planning Problems:

The site of the new airports must be as close as possible to the communities they serve to reduce the ground access time, yet must not be so close as to involve low flight and noise over populated areas. The planning must be modular and facilities flexible to preserve services life in the face of threatened obsolescence arising from the new technological developments.

Problems of airports users:

Airport users are irritated when facilities provided for their comfort and convenience are costly or do not meet their needs. Excess costs, long distance, travel time to and from airports, processing procedures, are the usual causes of dissatisfaction.

Problem of safety:

Aviation's rapid growth is putting fresh impetus to ensure air safety, but the safety hurdles are many, ranging from inadequate satellite and reliever airports to ageing and often obsolete air traffic control systems.

Security:

Compliance with ICAO requirements should be ensured. Additional measures in line with national security perspectives. Nearly 25 years after the bombing of "Emperor Kanishka" an Air India Boeing 747 over the Irish coast when a bomb concealed in the hold baggage of the aircraft exploded killing all 329 passengers and crew on board, the discovery of crude bomb-like device in the cargo hold of an ATR aircraft (IT4731) of the Kingfisher Airlines on March 21 2010 at Thiruvananthapuram airport has revived chilling memories of that horrific incident.

Even as the aviation industry has had to deal with a sustained level of heightened security threats in the aftermath of 9/11 and also had to contend with impact of the global financial crises, the incident had rung alarm bells. Press reports indicate that the device did not contain a detonator which could have triggered an explosion. While it may not have been the immediate intention of the perpetrator to set off an explosion on this flight. It was quite clearly a deliberate act, unless it was dummy test by an authorized aviation security agency that subsequently failed to recover the device. It can be assumed that the ongoing investigation would focus on: 'when', 'where', 'how', and by 'whom' the device was planted on the aircraft; its destructive potential and the intention of the perpetrator/s.

In India, as elsewhere in the world, civil aviation security is a shared responsibility between government agencies (CISF) and airline and airport operators, each being assigned specific security functions. This

model was adopted after the Hijacking of IC 814 to Kandahar in 1999, where after security at airports was augmented and the CISF replaced state police forces at over 50 airports to professionalize Aviation security functions. While the CISF plays the most visible and nodal role, airline and airport operators also undertake critical security functions. The Bureau of Civil Aviation Security (BCAS) in the Ministry of Civil Aviation (MCA) serves as the coordinating authority between different agencies as well as the regulatory and auditing watch dog for civil aviation security in India. All these entities must view the incident as a challenge and review the security architecture and its weakness in light of emerging terrorist methodologies.

This architecture of shared responsibility, in which the Govt.(MCA) assumes overall control and lays down the policy framework in discharge of its sovereign obligations but assigns some important security duties to other stake holders and assumes that those who own assets would do their utmost of safeguard them. The policy is also dictated by issues of practicality, particularly resource generation, for security in countries with hundreds of commercial airports. Creating the required synergy and uniform standards of systemic and human performance across this complex security matrix rests to a large degree on the commitment, professionalism, integrity and probity of all national stake holders, some of whom tend not to invest adequately in this task.

The ICAO, the global regularity and coordinating authority for civil aviation security and safety, leaves it to member states to choose their organizational constructs as long as they implement the mandatory and recommended standards procedures and outcomes enunciated by it.

Breaches in aviation security protocols and processes are not uncommon in various parts of the world, because of systemic or human factor failure or absence of appropriate technology with required capabilities to interdict terrorists using innovative methods to evade existing security procedures and processes. Instances of passengers, without malifide intention, getting through security undetected with banned items like pistols, ammunition and sharp edge objects are known to happen at various airports around the globe. There have also been instances of seriously disgruntled airport airline security and other staff, resorting to threatening activity endangering civil aviation operations or being involved with crime and drug syndicates operating at airports. An insider job is now one of the primary threats in view of the massive and diverse employment profiles at international airports. The possibility of dry runs by terrorist organizations particularly the Al-Qaida and its affiliate's like LET who have an abiding attraction for iconic targets particularly aircraft and airports, must also be factored.

In the instant case the intention of the perpetrator cannot be assumed other than being malifide. The entities directly responsible for security of the kingfisher flight were the security staff of the air carrier who are responsible for the anti sabotage check of the aircraft before take off as well as screening and monitoring loaders and other staff with access to the cargo hold. It also need to be established how the explosive material entered a restricted area airside where access is strictly controlled and even authorized staff must undergo mandatory screening by hand held and door frame metal detectors and all article must pass through X Ray machines. Identifying weakness in the system and taking remedial measures is an urgent imperative

Problem of airport access:

There is a general frustration by the fact that constant improvement, in the speed of air travel have not been matched by the time taken to reach an airport. Since introduction of jet aircraft, it is now quite common for the trip to and from the airport to take as much time as the trip in the air or even more for shorter flights. Something must therefore be done to reduce travel time to airport otherwise the quantity of local air travelers may drop. One of the obvious solution is to establish a separate route to the airport

to avoid the congestion and delays that occur on city roads during peak hours, to permit high speed travel to airports. some countries like USA and UK have railroads to provide faster access to airports. The alternative which is most desirable from economic and speed point of view should be found through a cost effectiveness analysis.

Maintenance:

The induction of new larger aircrafts (NLA) by airlines had created a new type of problem for airports in terms of space and maintenance turnaround time.

Public relations:

The image of any airport depends on the public relation of the airport staff with the passengers. So the behavior of staff should be monitored and the staff have to be given training in dealing with all the situations with passengers.

IDENTIFIED CHALLENGES

The business model for airports has changed. The regulatory framework for

Airport operations, planning, and capital projects was instituted when the airport's principal mission was to provide basic infrastructure for airlines and other aeronautical users. Today airports support a wide array of businesses, more like an industrial or commercial center or in some cases, a small city.

The major areas of changes are :-

Privatization of airlines

Privatization of state owned airline has been one of the prominent transformations in international air transport, where airlines in all but a handful of states had been government owned until recent times. The motives for privatization ranging from few purely economic considerations to improving operating efficiency and competitiveness, to a more pragmatic desire to reduce the heavy financial burden for governments for financing capital investment in new equipment.

Low cost airlines

Another recent development in the airline sector is the introduction of low –cost business model. Low cost carrier also known as no frills or discount carrier is an airline that offers low fares but eliminates most traditional passenger services. The common features of this model are, a single type of aircraft reducing training and servicing costs, point to point network focusing on short haul routes ,high frequencies ,single low fare structure ,high density single class with no seats assignment ,simple in flight services staffing flexibility and minimal overheads ,and intense use of electronic commerce for marketing and distribution. They also use less congested cheaper secondary airports to ensure short turn rounds and high on time performance.

Airline forecasts points to almost a 2.7 fold increase in passenger traffic, and of doubling of aircraft movements by the year 2020. These forecasts are predicted on the assumption that sufficient system infrastructure and capacity will be available to handle the demand. It is relatively easier for the airline to meet the growing passenger flows by moving to higher capacity aircraft whereas airport sector is a different ball game.

Capacity constraints

When we talk of airport capacity, it is a combination of runway and terminal capacity. The runway capacity is determined usually in terms of number of movements taking in to account such factors as the physical characteristics of the runway and surrounding area, type of aircraft involved and air traffic control capabilities. Whereas, terminal capacity is the amount of passengers and cargo which the airport can accommodate in a given period of time sometimes referred to as passenger or cargo throughput. Aircraft size is another factor that can affect terminal capacity. Airport capacity can also be adversely affected by external factors such as environmental restrictions air traffic control capabilities.

Capacity is essentially controlled through regulatory framework within which slot allocation mechanisms are employed at global, regional and national levels. Shortage of airport slots is an important physical constraint on market access. Some of the airports resort to auctioning of slots or price the slots to control the demands.

Consumer interest:

Growing dissatisfaction with the conduct of airlines staff and similar concern on quality of services such as facilitation at the airports are matters of increasing passenger concern. The point to remember is that consumer interest issues are gaining momentum and they need to be carefully examined to make sure that the service quality has adequately been dealt with by the current commercial practices by airlines and airports.

Change of airport ownership:

In the current economic climate, there is an increasing pressure to reduce or redirect government spending and that makes it more and more difficult for public involvement in airport infrastructure. Therefore there is an increasing trend in the airport ownership by way of leasing and private participation.

Common technique for private participation involves Build-Own-Transfer (BOT), Build-Own Operate-Transfer (BOOT), Lease-Develop-operate -management –Contract (LDC). Financing of airport projects however continues to be the critical constraint and a major challenge for the airport sector.

Also airports are challenged to re organize themselves and cope with the organizational stress in the wake of ownership changes. Additionally, airports will have to face the conflicting demands from airlines for increased capacity due to the changes in their own business models and high service expectations of customers and stake holders, at the same time there is a mounting pressure from environmentalists seeking to ensure that progress will not be made at the expense of environment.

STRATEGIES TO MEET THE CHALLENGES

Strategic options and management techniques to maximize airport revenue

Airport revenues are broadly classified as

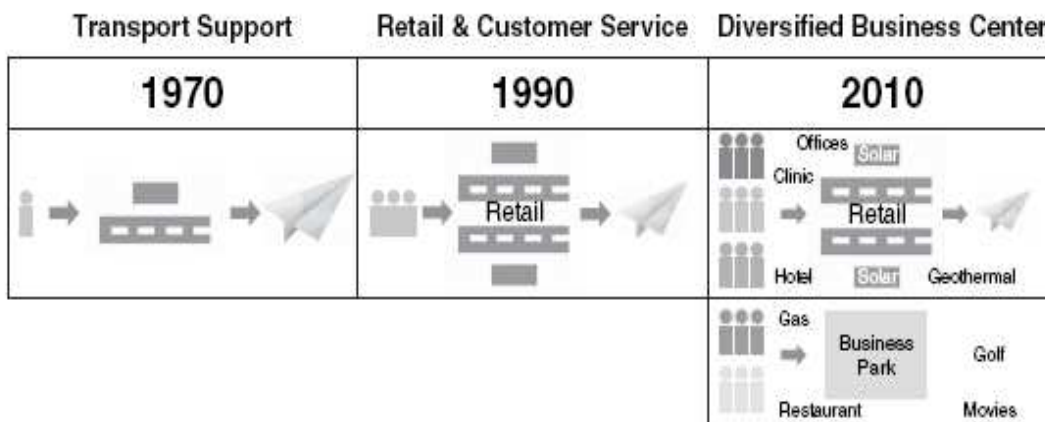
1. Aeronautical and
2. Non-aeronautical revenues.

Aeronautical revenues generally include airport and air navigation charges. These charges are to defray the costs of providing facilities and services for civil aviation. The ICAO recommends, "As a general principle it is desirable that the users shall ultimately bear full and fair share of cost of providing the airport and its facilities"

Non –aeronautical revenues consist of fees for the rights to operate business activities at the airport, rentals of leased land and premises and other receipts from all other commercial activities by the airport itself. Most common services include duty free shops, banks or foreign exchange facilities , airline catering, airport advertising, airport parking , restaurants ,fuel throughput etc

Most airports prefer to arrange for non aeronautical/commercial activities to be conducted by outside parties specialized in the relevant business, while retaining the overall control through contractual arrangements. some airport themselves operate activities such as automobile parking hotel/guest houses, etc

As the airline industry consolidates and strives to achieve greater efficiencies and lower costs, airports are responding to an environment where demand for facilities and revenue streams have become less predictable. To address a higher level of risk, airports are striving to more fully utilize their land and facilities and diversify their revenue streams. The transformation in airport revenue source is clear from the figure given below



Today, because airports are now complex businesses, the master plan has become part of a larger planning framework where many airports have a strategic plan as well as a master plan, business plan, and marketing plan. But it is the strategic

planning process that formulates the vision and direction for the airport. The strategic plan sets forth the foundation for airport initiatives and defines the roadmap that the airport could follow to achieve its vision and goals. All other planning initiatives should be aligned with the strategic plan.

Planning for non-aeronautical Development

Non-aeronautical development requires attention to a planning process that parallels the planning framework that is typical for aeronautical facilities. Revenue diversification would be incorporated into the strategic plan, and options and risks considered. Development plans would be included in the master plan and specific near-term action items would be carried out in the business and marketing plans. In more concrete terms a non-aeronautical development would include the following steps:

1. Articulate the vision, short- and long-term goals for revenue diversification consistent with the airport's vision.

2. Complete a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats)
 - a. Evaluate the airport's assets—traditional and nontraditional
 - i. Land, location, market for goods and services
 - ii. Natural resources
 - iii. Non-aviation assets (corporate headquarters, hospital, university, training facilities).
 - b. Understand realistically the customer base for the airport's assets
 - i. Passengers
 - ii. Employees
 - iii. Community
 - iv. Research and development
 - v. Cargo and logistics
 - vi. Other location-sensitive businesses
 - vii. Our airport is attractive because. . . .
 - c. Know constraints and limitations on non-aeronautical development
 - i. Grant assurances and obligations
 - ii. Other legal, physical, and environmental constraints on property development
 - iii. Infrastructure and site preparation costs.
 - d. Consider the competition
 - i. Other airports in the region
 - ii. Local retail centers, industrial or business parks
 - iii. Parcels of land available for development close to the airport
 - iv. Airports outside the region seeking similar “movable assets and businesses.”
3. Evaluate development options
 - a. Land use plan
 - b. Civil engineering analysis
 - c. Demand analysis
 - e. Real estate market analysis
 - f. Estimate of capital expenditures
 - g. Identification of highest and best uses for available parcels
 - h. Potential stakeholders
 - i. Constraints and obstacles
 - j. Potential projects and partners
 - k. Timeline
 - l. Cost/benefit and economic impact.
4. Prepare a business plan (short- to medium-term action plan)
 - a. Set measurable objectives
 - b. Department-level action plan that guides day-to-day implementation
 - c. Marketing and public relations plan when appropriate.
5. Execute the business/action plan.
6. Monitor, evaluate, improve.

This approach to non-aeronautical activity can be integrated into an all airport land planning effort or completed separately.

MODULE VI- STARTING OF A NEW AIRPORT: LEGAL AND POLICY CHALLENGES

CHAPTER-I: Starting of an Airport in India : Future Scope

Introduction: In January 2019, the Government of India hosted the Global Aviation Summit in Mumbai in which there were participants from 83 countries. The government of India unveiled the Vision 2040 document for civil aviation in India during the summit. That event was hosted in the backdrop of double digit growth of Indian civil aviation for over a decade, except for the present pandemic times. India has 103 functional airports and the number is set to almost double by the year 2040. India is poised to become the third largest aviation market by 2024 moving ahead of the UK. As per IATA forecast, investment to the tune of INR.420-450 billion is expected on India's airport infrastructure over the next few years. Creation of a hundred new airports within a span of 20 years will need enormous economic activity and trained manpower. Creation of these airports will propel development of many more heliports across India. Corona pandemic has also thrown a challenge that is giving rise to the use of smaller aircraft as well as helicopters for corporate and leisure travel to avoid public transportation. The government also plans to create water airports in India. Many greenfield airports have been given clearances while many more existing airports are slated to be made operational.

Process of Making an Airport: Conceptualising and creating an airport is a major economic, socio-political and technical activity involving various agencies, huge amount of resources including land pool. It is a time-consuming and expensive activity which needs the highest consideration as it also involves national security. Airport Development Reference Manual issued by the IATA remains the most useful of the documents for guidance on the process of making an airport. Airport Planning Manual, Doc 9184 of the International Civil Aviation Organisation (ICAO) gives the additional operational guidance to the airport planning.

In most of the cases, there are different entities that come together to undertake the whole process of creating an airport. Present-day trend is for public private partnership (PPP) between the government bodies and consortia of companies that generally get into action for converting an idea of creating an airport into an operational airport. Indian Companies Act 1956 as amended in 2013 remains the document on the issue of Company Law matters with respect to creation and functioning of companies in India.

Ministry of Civil Aviation (MoCA) has issued guidelines for setting up of greenfield airports including greenfield airport policy. These guidelines are very elaborate, clearly describing the process that is involved in creation of an airport including the clearances that are required to be obtained from various agencies for making a greenfield airport. In case of a brownfield airport, some of the existing clearances and approvals may have to be reviewed or visited.

Acquisition and requisitioning of property is listed under the concurrent list of the Constitution of India under schedule VII. Land Acquisition Act 1894, archaic though, is still relevant for acquiring land for public purposes. In addition, there are laws and regulations within the states. Special Economic Zones Act 2005 has provisions for land acquisition for specific purposes.

Land acquisition in India, is a matter of controversy in many cases and the support from the state government as well as local population is very essential. The difficulties in land acquisition continue to remain despite the fact that the Companies Act 2013 has made many changes in terms of corporate social responsibility to be taken up by each company. ICAO Annex 14, Aerodromes and Aerodrome Design Manual, Doc 9157 are the two ICAO Publications that elaborate on the procedural aspects of airport design including construction of runways, taxiways, lighting, markings etc.

Airport Services Manual (Doc 9137) outlines the services to be planned and catered for at an airport including air-traffic control, communication and navigation systems, meteorological services, aviation fuel stations, emergency services etc. These services are required to be planned with adequate future scope for expansion as well as technological upgradation and need a lot more technical understanding as most of them are critical for operations. Master plan and layout plan give the overall perspective to the aerodrome. Design of an airport will be based on the objectives set out for the airport. If the airport is required to serve as an aerotropolis, the commercial space around the airport will be as important as the operational and technical space. Similarly the landside planning has a lot of relevance to the revenues at an airport.

It is experienced that converting an idea of creating an airport into actual operation is a complex activity involving multiple agencies enormous amounts of resources, endless coordination and cooperation from various agencies and of course support from the government as well. The guidance material required for planning and execution of various activities that need to be undertaken in constructing an airport are found dispersed in a large number of laws, policies, manuals, circulars etc.

Airport Development Reference Manual: The IATA Airport Development Reference Manual (ADRM) is recognized as one of the aviation industry's most important guides for airlines, airports, government authorities, architects, engineers and planning consultants engaged in planning new airports or extending existing airport infrastructure. The ADRM brings together aviation industry best practices with respect to the development of world-class airports through better comprehension, briefing and design. Its content represents the consolidated recommendations of world renowned industry specialists and organizations seeking to promote the development of sustainable world-class airport facilities.

The ADRM should be used by airport planners worldwide as a complementary source of best practice airport design guidance. Other key ICAO references include Annex 14 (in particular for airfield and apron design), the Airport Planning Manual (Doc 9184), the Aerodrome Design Manual (Doc 9157), and the Airport Services Manual (Doc 9137). IATA recognizes that international standards will vary from region to region around the world. While the ADRM should be the initial source of design guidance for airport development, the airport design professional should always seek to clarify national standards and decide appropriately on any potentially conflicting requirements. Professional engineering and architectural guidance should be used to assess and resolve differences between the ADRM and national standards. The ADRM should be used in conjunction with relevant international and national legislation, regulations and standards.

The revised format allows the new ADRM to adopt a flexible structure that can be adjusted as and when required. The ADRM currently has two primary sections:

- Forecasting
- Planning

Forecasting

Forecasts of future levels of aviation activity form the basis for effective decisions in airport infrastructure planning. Forecasts should provide a plausible and robust guide to future activity levels based upon the latest available data. Forecasts should:

- Use appropriate forecasting techniques;
- Be supported by information in the study; and
- Provide an adequate justification for airport planning and development.

Any activity that could potentially create a facility need should be included in the forecast.

The level of effort required to produce a planning forecast will vary significantly from airport to airport and project to project. The use of elaborate forecasting tools and techniques may be warranted in the case of large airports and more complex projects. An existing forecast may be all that is required for simpler projects. Stakeholders should agree on the appropriate level of forecasting effort required in the pre-planning and scoping phase of the study. Aviation activity forecasts used for airport infrastructure planning are typically developed for a 20- to 30-year time horizon due to the capital intensive nature of airport infrastructure projects and their life cycle. Forecasts are usually presented in five-year increments. Annual forecasts may be desirable for the first five-year period.

Aviation forecasts provide the basis for:

- Determining the airport's role in the aviation system;
- Determining the improvements to the airfield, terminal facilities, apron areas, landside access, car rental, and parking facilities needed to accommodate growth in demand;
- Estimating the potential environmental effects, such as noise and air quality, of the airport's operation on the surrounding community
- Assessing market risk; and
- Evaluating the financial feasibility of alternative airport development proposals.

This section provides an overview of the information required and approach to developing airport forecasts for passenger volumes, air cargo tonnage, and air transport movements (ATMs). The section is organized into the following key components:

- *Economic Base for Air Travel* provides a summary of the key socioeconomic indicators that drive the underlying or latent demand for air travel.
- *Historical Aviation Activity* provides an overview of the types of aviation activity data and their sources. The purpose of this chapter is to provide a context for how air carriers

have added supply in response to the latent demand for air travel (passenger demand) and the need to ship goods (air cargo demand).

- *Competitive Analysis* describes the competitive position of the subject airport including strengths and weaknesses that may affect future aviation activity volumes.
- *Review of Existing Forecasts* evaluates the previous forecasting efforts in order to understand available data, assumptions, and methodologies.
- *Common Forecasting Techniques* provides a narrative summary of aviation forecasting methodologies used to develop aviation forecasts, including time series, econometric/regression, market share, and consensus techniques.
- *Passenger Activity Forecast* discusses the key segments of passenger traffic: domestic versus international, Origin and Destination (O&D) versus transfer, and segmentation.
- *Baggage Forecast* provides guidance on how to derive baggage forecasts from the passenger forecasts using bags-per-passenger ratios.
- *Air Cargo Activity Forecast* discusses the primary demand and supply factors, impact factors, and key activity segments (e.g., belly versus freighter, import, export, and transfer) that should be considered when developing an air cargo forecast.
- *Air Transport Movement (ATM) Forecast* summarizes how to develop ATM forecasts for key segments of activity (i.e., passenger, cargo, general aviation, and military) and provides guidance on how to develop aircraft fleet mix forecasts.
- *Peak Period Forecast* provides an overview of methodologies employed to convert annual forecasts into peak hour equivalents. The chapter also discusses the importance of understanding peak hour flows by direction and the development of day flight schedules.

CHAPTER-II: **Planning**

Once the forecast has been established and agreed to by all parties, airport development enters the planning phase. Logically, the planning process moves from the more general level of detail through to the more specific where the different elements that comprise the airport are examined together and separately. The update of the ADRM is structured to reflect this progression. The Planning Section begins with a discussion of Master Planning. And continues with a comprehensive chapter on planning the Passenger Terminal. Passenger terminals are certainly one of the most interesting and complex elements at any airport. This chapter also addresses Levels of Service (LoS) from both a quantitative and passenger perception point of view. LoS continue to be of interest as airport infrastructure particularly terminal facilities, continue to be stretched by the overall growth in aviation.

Master Planning

Many airports currently lack a master plan or vision of the future. As a consequence, they run the risk that their short- to medium-term capacity enhancement projects could be ill-judged, misconceived, inappropriately sized and/or poorly located, thereby restricting their ability to attain the airfield's ultimate potential. A master plan is required so that all airside, landside and airport support facilities can develop, expand and improve the operational flexibility and

efficiency of their business in a structured, balanced and orderly fashion. This, without adversely impacting on the business of their neighbors on or adjacent to the airport. In so doing, the potential of the available land and the capacity of the airport's runway system and terminal area will be maximized.

All airports should have a master plan to guide their future infrastructure development in a logical, cost efficient and affordable manner. Without a master plan, there is a risk that short-term decision making will result in projects for capacity enhancement being poorly located or inappropriately sized, resulting in wasteful expenditures or restrictions on the airport's overall capacity or performance. In the absence of qualified internal subject matter experts, the master plan should be prepared by independent consultants with global experience and a proven history of delivering plans that enable incremental modular expansion when demand triggers development.

Passenger Terminal

Contemporary airport passenger terminals serve many different functions, accommodate a wide variety of stakeholders who frequently have diverging objectives, and have to respond to one of the world's most dynamic industries. Airport terminals need to be functionally and operationally efficient, commercially viable and offer passengers as effortless and straightforward a travel experience as possible. This chapter of the Airport Development Reference Manual (ADRM) addresses the key requirements associated with typical airport passenger terminals and provides guidance on many of the specific challenges associated with airport facilities.

Although many airport terminals face similar design challenges, every airport is unique and has to satisfy many varying parameters, including:

- Volumes of passenger traffic in annual, busy (design) hour and peak hour numbers;
- Growth projections with different design and construction phasing requirements;
- Compositions of aircraft fleet traffic (e.g., wide-body/narrow-body/regional);
- Mixes of passenger traffic (e.g., domestic/international, long haul/short haul, origin and destination, transfer, first-class/business class/premium economy/economy);
- Types of airline operations (e.g., multiple carriers/dominant alliances, full-service airlines, New Model Airlines, home-based carriers);
- Environmental and sustainability objectives;
- Local, regional and national security/immigration/emigration/customs requirements;
- Adoption of Internet processing facilities, self-service desks, self-service bag drop facilities and biometric immigration/emigration facilities;
- Level of Service standards (e.g., process times, bag drop times, security process times, immigration and emigration process times and transfer process times);
- Local customs with significantly different numbers of “meeters and greeters” and “well-wishers”;
- Cultural/religious behaviors regarding proximity, orientation and availability of amenities;
- Average number of checked baggage and/or cabin baggage;

- Requirements for “front of house” or “back of house” checked baggage screening;
- Demand and opportunity for retail and food & beverage offers;
- Perspectives on utilization of advanced technology/engineering systems; and
- Kinds of intermodal connections to public transit, vehicles, rail, etc.

As a consequence of these numerous variables, it is wholly misleading to surmise that the rigid application of the information contained within the ADRM will necessarily deliver the most appropriate solution.

Airport Planning Manual, Doc 9184: Part-I (Master Planning): This manual is directed at authorities responsible for the planning and development of airports and particularly those which may not have experienced planning departments or staff. It is compiled in a manner intended to be suitable for use by these authorities and their planning staff in such matters as supporting requests to higher authorities for finance and in advising airport consultants, engineers, and planners of the airport authorities’ requirements for development work.

In this manual, problems of airport planning are analysed. The widest and most general aspects are treated first, followed by more detailed consideration of specific areas and facilities. From basic premises deductions are made and conclusions drawn by process of analysis and this is continued through all relevant stages. This approach is applicable to both existing and new airports regardless of size or location, and to the initial planning and also subsequent development and expansion of facilities.

One of the problems of airport planning is that basic facts and principles have not been presented comprehensively. This is especially true in respect to passenger facilities. Formal analysis is essential for any reasonably satisfactory future development. Therefore, basic facts need to be stated so that they can be challenged and tested throughout the world and, if found incorrect, replaced by others which can be similarly tested until a faultless body of data is compiled. The deductions made and the principles established should be similarly arrived at by analysis so that the present situation of conflicting “options” is replaced by data. It is hoped that the method of presentation used here may help to lay the foundation for a set of agreed facts and principles on which a general approach to airport problems can be based. From such facts more functional airports may evolve.

Flow planning is the basis of transport, and thus of airport development. Therefore, throughout the document the parts of an airport are dealt with as flow routes and facilities are considered at the appropriate functional stage on the flow routes. Air transport is part of the world’s transport system and airports cannot be considered in isolation. Thus this manual includes consideration of factors beyond the airport boundary, but only to the extent necessary for airport planning, as detailed consideration of all aspects of these associated factors would be impossible and inappropriate. Design solutions are not dealt with. Planning is a specialized phase of airport development which is necessary before design can begin. A clear recognition of the distinction between planning and design is essential for the most beneficial use of this manual.

Use of this Manual: The chapters in this manual can be read as self-contained treatments of the subjects covered by their titles. However, cross references are provided for the benefit of

authorities which may be planning more than one airport element, and to avoid duplication and repetition. References to other ICAO documents and to other significant publications are given at the end of each chapter. These references are intended to supplement this manual, giving guidance on the use of specialized skills and methods for airport planning. A glossary of aeronautical terms is presented in the appendix for use by those who may not be familiar with a particular technical terminology.

The document does not attempt to duplicate the large body of information already available on airport design. Its aim rather is to assist in the definition of requirements and in the logical analysis and solution of problems associated with the preparation of a basic overall framework or plan. This, in turn, provides the sound foundation necessary for realization of the maximum advantages of good design, prudent investment and efficient operation and management.

Organization of this Manual: This manual is comprised of four principal sections, namely: Airport Planning Process; Air Side Development; Land Side Development; and Airport Support Elements. Chapters are arranged within each of these sections to present related subject matter in a logical order.

Section One - Airport Planning Process: This section outlines the planning process and the important factors which authorities must consider in preparing an airport master plan. It explains the importance of consultation and co-operative planning and the need to develop a systematic approach in determining future airport requirements. Further, the purpose and objectives of an airport master plan are described together with guidance as to how the master plan should be used, once it has been completed.

Within Section One are four chapters describing the significant features of the airport planning process.

Chapter 2 – Pre-planning Considerations. The purpose of this chapter is to identify the most important of pre planning considerations which, if followed, will provide the framework for an effective and feasible airport master plan.

Chapter 3 - Forecasting for Planning Purposes. Aviation forecasts provide basic data for determining the needs and required capacity of an airport and are the basis for projection of airport revenues.

Chapter 4 - Financial Arrangements and Controls. The economic analysis establishes a programme for providing the necessary funding of the aerodrome. This chapter delineates the more significant elements which need to be considered relative to forecasting and economic planning.

Chapter 5 - Airport Site Evaluation and Selection. In order for the airport to have the longest possible useful life and in order to maximize the substantial capital investment required in airport development, sufficient ground area should be available to accommodate progressive development commensurate with the growth in air traffic. This chapter describes the process of site selection and evaluation including an assessment of the shape and size of the area required

for the airport, the location of sites having potential for development, and an examination and evaluation of alternative sites.

Section Two - Air Side Development

Before plans can be developed for facilities for the many functional requirements which an airport has to meet, concepts for the various operational systems have to be considered and compared. The principal factors to be considered are outlined in this section. Because of their physical characteristics and the land required and all the other factors which affect them and limit free choice of layout, runways and taxiways are the first to be considered. After determination of the dimensional criteria, pavement strength, and airfield capacity and configuration, other elements of the air side of the airport, namely the apron and navigation and traffic control aids are covered in turn.

Chapter 6 - Runways and Taxiways. Because of the large areas of land they require and their relationship to the large airspaces necessary for aircraft operations, runways and their associated taxiways serve as a starting point for consideration of Sport layout. A substantial body of information exists on the subject of planning and design of airport runways and taxiways. The information contained in this chapter serves the purpose of informing the Sport planner on matters pertaining to dimensional criteria, pavement strength, runway length, and airfield capacity. It illustrates the relationship and importance of these elements in the overall airport master planning process.

Chapter 7 - Aprons. The greater portion of this chapter brings together, in a capsulized manner, the significant concepts and considerations needed to satisfy the planning objectives for aircraft aprons. The chapters cover, inter alia: locations, layouts, number of stands required, facilities for passengers and cargo to board and leave aircraft, and facilities for aircraft servicing.

Chapter 8 - Air and Ground Navigation and Traffic Control Aids at Airports. Planning of airports must include provision for facilities which will support the air traffic control system, for navigation aids for aircraft approaching the airport, and finally for control of aircraft and vehicles on the surface of the airport. The purpose of this chapter is to describe the requirements for such control aids as they pertain to airport master planning.

Section Three - Land Side Development: This section provides specific planning guide lines for that area of the airport to which the non-travelling public has free access, as well as for the non-public portions of airline operations and cargo facilities, airport administration and government facilities. Major elements comprising land side development include the passenger building, cargo facilities, and ground transport and vehicle circulation and parking.

Chapter 9 - Passenger Building. This chapter deals with planning for facilities to accommodate those activities associated with the transfer of passengers and their baggage from the point of interchange between ground transportation and the passenger building to the point of connexion with the aircraft, and with the transfer of connecting and in-transit passengers and their baggage between flights. For many airports to which this manual is directed, passenger facilities will be contiguous with one general location on the airport. However, in certain circumstances, particular functions, such as air cargo processing, may be situated at locations remote from the

main passenger building. Planning principles, factors affecting the type and scale, and specific planning details of various passenger building functions are among the topics covered in this chapter.

Chapter 10 - Cargo Facilities. The same considerations which influence the siting of the passenger facilities also apply to the cargo area. The priority accorded to this area in deciding the compromise necessary to achieve over all compatibility will depend on the nature of the traffic for which the airport is intended. The purpose of this chapter is to examine some aspects of problems likely to be found when planning cargo facilities. One of the main considerations involved is the space required for this facility.

Chapter 11 - Ground Transport and Internal Airport Vehicle Circulation and Parking. This chapter deals with the planning of that element of the airport which will accommodate the ground transport of passengers, baggage and employees to, from and within the airport. Planning of roadways and vehicle parks to accommodate these airport users will be based upon forecasts developed according to Chapter 3 and upon surveys conducted at the airport.

Section Four - Airport Support Elements: A number of buildings and operations for special purposes are necessary to support the functioning of an airport. The need for all or some of the buildings described in this section will vary from airport to airport, as will the specific space requirements. In general, their number and complexity will depend on the volume of traffic. Their locations in the airport or individual master plans should be determined by the functions they are to fulfil and their compatibility with the major features of the plan.

This section further describes the importance of making adequate provision for airport security.

Chapter 12 - Airport Operations and Support Facilities. Buildings for a variety of operational purposes are required at an airport. These include accommodation for meteorological, air traffic control, communications, rescue and fire fighting services, fuel depot and all the facilities for administration and maintenance, staff, aircraft operators, general aviation facilities and police, etc., and sometimes a hotel. This section describes the function of each of these support facilities and their relationship with other elements of the airport covered in this manual.

Chapter 13 - Aircraft Fuel Facilities. The handling of fuel at airports is an important subject to be taken into account when planning airport facilities since special requirements have to be met with regard to safety, minimizing aircraft gate occupancy times, and movements of large and heavy vehicles. This chapter describes storage capacity, location of fuel storage, various systems for fuelling of aircraft and design requirements related to fuelling systems.

Chapter 14 - Security Considerations. All airports require that a level of security be maintained, the exact level being dependent on the situation existing in a particular State. In order for security to be effective, a systems approach is required and this includes the basic plan for the design of the airport. All the measures listed in this chapter need not be implemented at every airport but they should be considered against the level of security which it is desired to effect and they should be implemented in such a way as will cause a minimum of interference with, or delay to, passengers, crew, baggage, cargo and mail.

CHAPTER III: Airport Planning Manual, Doc 9184: Part-II (Land use and Environmental Control)

The Airport and its Environs: The compatibility of an airport with its environs is an ideal that can be achieved by proper planning of the airport, control of pollution-generating sources, and land-use planning of the area surrounding the airport. The aim is to provide the best possible conditions for the needs of the airport, the community in the surrounding area and the ecology of the environment. Airport planning must be recognized as an integral part of an area-wide comprehensive planning programme. The location, size and configuration of the airport need to be coordinated with patterns of residential, industrial, commercial, agricultural and other land uses of the area, taking into account the effects of the airport on people, flora, fauna, the atmosphere, water courses, air quality, soil pollution and other facets of the environment.

Within the comprehensive planning framework, airport development and operations should be coordinated with the planning, policies and programmes for the area where the airport is located. In this way, the social and economic impact, along with the environmental effects of the airport, can be evaluated to ensure to the greatest extent possible that the airport environs are compatible with the airport and, conversely, that the physical development and use of the airport is compatible with the existing and proposed patterns of land use. To the extent that technical considerations permit a choice, decisions on runway alignment and other airport development should take into account their potential effects on the environment in order to prevent or minimize environmental conflicts. In effect, “land-use control” is a term which describes only a portion of the total planning process, and even highly innovative controls can have little impact unless they are imposed within the context of sound policies and careful ‘planning. “Land-use planning” or “planning for compatible land uses which takes into account the needs of airport development” more adequately describes the process of achieving an optimum relationship between an airport and its environs.

The Need for Environmental Control: In recent years there has been increased public concern regarding the protection of the environment from the impact of transportation, and consequently, a growing emphasis on the need to employ effective measures to minimize such impacts. Since pollution may be generated within an airport as well as within the area surrounding it, environmental controls should be applied at the airport and its environs.

The environment has been defined as including:

- a) air, land and water;
- b) all layers of the atmosphere;
- c) all organic and inorganic matter and living organisms; and
- d) the interacting natural systems referred to in a) to c).

Since all of these components interact, disruption to one may have a profound effect on the entire system. Therefore, to lessen local and global impacts, it is important that the entire civil aviation industry endeavours to control harmful emissions.

Pollution occurring in and around the airport has the potential to affect not only the immediate area, but also the surrounding areas. Because it can have an effect on human health and the

ecology of the surrounding area, efforts should therefore be made towards pollution prevention. Environmental controls thus provide a means of either decreasing pollution at the source or reducing the potential for negative environmental impacts. Controls such as air and water quality guidelines, aircraft engine noise limits, waste management plans, environmental emergency plans, and environmental management plans are necessary.

Airports can operate with limited environmental impact by incorporating environmental management plans and procedures with land-use planning. In the past, environmental management has concentrated on pollution abatement or control by finding ways to dispose of waste after it has been produced. More recently, organizations have been shifting toward pollution prevention, which focuses on reducing or eliminating the need for pollution control. Pollution prevention can be defined as “the use of materials, processes or practices that reduce or eliminate the creation of pollutants and wastes at the source.” It includes practices that reduce the use of hazardous and nonhazardous materials, energy, water or other resources. Anticipatory action is used to pre-empt the need for control or remedy.

The Need for Land-Use Planning: The need for some public control of land in the vicinity of an airport was recognized in the early history of civil aviation. In general, these early measures were usually concerned with height control of possible hazards or obstacles to flight into or out of airports. Also recognized was the need to control potentially conflicting activities, such as:

- a) activities that could cause electrical interference with radio communications and navigation aids;
- b) lights that might confuse pilots in the clear interpretation of aeronautical lights; and
- c) the production of smoke that reduces visibility.

Although litigation regarding aircraft noise did occur in the early 1960s, it was only after-the widespread introduction of commercial turbo-jet aircraft that the compatibility of land use with noise exposure in the vicinity of airports became a major consideration. Today, aircraft noise is probably the most significant form of pollution caused by aircraft operation and is therefore a major factor influencing land-use planning in the vicinity of airports.

The requirement for land-use planning in the vicinity of an airport is twofold, namely:

- a) to provide for airport needs, e.g. obstacle limitation areas and future airport development, and
- b) to ensure minimal interference to the environment and the public, e.g. by locating residential areas away from zones subject to excessive noise or other pollution and by preserving parklands.

CHAPTER-IV: GUIDANCE ON PLANNING, DESIGN AND CONSTRUCTION

Airport Planning Manual, Doc 9184: Part-III (Guidelines for Consultant/Construction Services): This manual is intended to provide information and guidance to those individuals and authorities responsible for the planning, design and construction of airports and airport facilities. This information and guidance is specifically related to the processes for selection of international consultants and contractors and the preparation, negotiation and administration of contracts for the work which they have been retained to perform. There are considerable differences between the organization, the processes and frequently the legal requirements of contracting for consulting services vis-a-vis contracting for construction services, The two are, therefore, dealt with separately in this manual, Chapters 1 through 6 of the text being devoted to consulting services and Chapter 7 to construction contracts.

ICAO Annex 14- Aerodromes: This Annex contains Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at aerodromes, and certain facilities and technical services normally provided at an aerodrome. It also contains specifications dealing with obstacles outside those limitation surfaces. It is not intended that these specifications limit or regulate the operation of an aircraft.

To a great extent, the specifications for individual facilities detailed in Annex 14, Volume I, have been interrelated by a reference code system, described in this chapter, and by the designation of the type of runway for which they are to be provided, as specified in the definitions. This not only simplifies the reading of Volume I of this Annex, but in most cases, provides for efficiently proportioned aerodromes when the specifications are followed.

This document sets forth the minimum aerodrome specifications for aircraft which have the characteristics of those which are currently operating or for similar aircraft that are planned for introduction. Accordingly, any additional safeguards that might be considered appropriate to provide for more demanding aircraft are not taken into account. Such matters are left to appropriate authorities to evaluate and take into account as necessary for each particular aerodrome. Provisions for the accommodation of more demanding aircraft at existing aerodromes can be found in the PANS-Aerodromes (Doc 9981). Guidance on some possible effects of future aircraft on these specifications is given in the Aerodrome Design Manual (Doc 9157), Part 2. It is to be noted that the specifications for precision approach runway categories II and III are only applicable to runways intended to be used by aeroplanes in code numbers 3 and 4.

Annex 14, Volume I, does not include specifications relating to the overall planning of aerodromes (such as separation between adjacent aerodromes or capacity of individual aerodromes), impact on the environment, or to economic and other non-technical factors that need to be considered in the development of an aerodrome. Information on these subjects is included in the Airport Planning Manual (Doc 9184), Part 1. Guidance material on the environmental aspects of the development and operation of an aerodrome is included in the Airport Planning Manual (Doc 9184), Part 2.

Aviation security is an integral part of aerodrome planning and operations. Annex 14, Volume I, contains several specifications aimed at enhancing the level of security at aerodromes. Specifications on other facilities related to security are given in Annex 17 — Security and detailed guidance on the subject is contained in the ICAO's Aviation Security Manual.

Aerodrome Design Manual, Doc 9157

Part 1- Runways: The need for a manual providing guidance on the design of aerodromes was recognized by the Aerodromes, Air Routes and Ground Aids (AGA) Division of ICAO at its Sixth Session in 1957. The Air Navigation Commission, after considering the recommendations of that Division, together with other information from the Jet Operations Requirements Panel, the Third Air Navigation Conference and Regional Air Navigation Meetings, agreed to the publication of an aerodrome manual which was progressively revised and added to from time to time. The structure of the Aerodrome Manual was later revised and it now comprises three distinct documents: *The Airport Services Manual* (Doc 9137), *The Aerodrome Design Manual* (Doc 9157), and *The Airport Planning Manual* (Doc 9184).

This part of the Aerodrome Design Manual fulfils the requirement for guidance material on the geometric design of runways and associated aerodrome elements, namely, runway shoulders, runway strips, runway end safety areas, clearways and stopways.

Part 2- Taxiways, Aprons and Holding Bays: The purpose of this manual is to assist States in the implementation of the specifications for proper design of taxiway systems and help ensure their uniform application. Future editions of this manual will be updated to include any experience gained.

A properly designed taxiway system ensures a smooth, continuous flow of aircraft ground traffic, operating at the highest level of safety and efficiency and contributes to optimum aerodrome utilisation. Subsequent to the Fourth Edition in 2005, new specifications on taxiways have been developed based on reliable, demonstrable and scientifically tested information. Revised specifications are expected to significantly improve efficiency, reduce construction and maintenance costs in addition to having a positive impact on the environment.

Part 3- Pavements: The purpose of this manual is to assist States in the implementation of the specifications for proper design of taxiway systems and help ensure their uniform application. Future editions of this manual will be updated to include any experience gained.

A properly designed taxiway system ensures a smooth, continuous flow of aircraft ground traffic, operating at the highest level of safety and efficiency and contributes to optimum aerodrome utilisation. Subsequent to the Fourth Edition in 2005, new specifications on taxiways have been developed based on reliable, demonstrable and scientifically tested information. Revised specifications are expected to significantly improve efficiency, reduce construction and maintenance costs in addition to having a positive impact on the environment.

Part 4- Visual Aids: Proper design and installation of visual aids are prerequisites for the safety of airport operations. Part 4 provides information on the characteristics of visual aids used at airports. Some of the topics covered are: functional requirements of visual ground aids; surface

marking and markers; approach lighting systems; light characteristics for precision approach runways and taxiways; runway lead-in lighting systems; runway and taxiway lighting; surface movement guidance and control systems; taxiing guidance signs and obstacle lighting.

Part 5- Electrical Systems: The Aerodrome Design Manual - Part 5 discusses the general features of electrical practices and installations and also addresses those features which are of special significance for aerodrome installations. It is assumed the readers of the manual will be familiar with electrical circuits and design concepts, but may not be familiar with certain features of aerodrome installations which are less frequently encountered in other installations.

Part 6- Frangibility: Proper design and installation of visual and non-visual aids (e.g. approach lighting towers, meteorological equipment, radio navigational aids) are prerequisites for the safety and regularity of civil aviation. At airports, various visual and non-visual aids are located near runways, taxiways and aprons where they may present a hazard to aircraft in the event of accidental impact during landing, take-off or ground manoeuvring. All such equipment and their supports shall be frangible and mounted as low as possible to assure that impact will not result in loss of control of the aircraft.

Much of the material included herein is closely associated with the specifications on frangibility of visual and non-visual aids contained in Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations* and Volume II — *Heliports*. The purpose of this manual is to assist States in the implementation of these specifications and thereby help to ensure their uniform application.

Annex 14 — *Aerodromes* contains both Standards and Recommended Practices for objects to be made frangible. However, since the objective of this manual is to provide guidance on frangible design, distinction between the two types of specifications will not be made.

The manual incorporates guidance material on the design, testing and installation of frangible structures at airports and heliports and is based on the conclusions of the Fifth and Sixth Meetings of the ICAO Frangible Aids Study Group held in 1998 and 2003, respectively, as well as on current practices of several States.

Airport Services Manual Doc 9137

Part 1 — Rescue and Fire Fighting: The principal objective of an RFF (rescue and fire-fighting) service is to save lives in the event of an aircraft accident or incident occurring at, or in the immediate vicinity of, an airport. The RFF service is provided to create and maintain survivable conditions, to provide egress routes for occupants and to initiate the rescue of those occupants unable to make their escape without direct aid.

This service must assume at all times the possibility of and need for extinguishing a fire which may:

- a) exist at the time an aircraft is landing, taking off, taxiing, parked, etc.; or
- b) occur immediately following an aircraft accident or incident; or
- c) occur at any time during rescue operations.

The rupture of fuel tanks in an aircraft crash and the consequent spillage of highly volatile fuels, and other flammable liquids used by aircraft, present a high degree of probability of ignition if these liquids come into contact with hot metal parts of the aircraft or because of sparks caused by the movement of wreckage or disturbance of the electrical circuit. Fires may also occur through the discharge of accumulated electrostatic charges at the time of ground contact or during fuelling operations. A distinctive characteristic of aircraft fires is their tendency to reach lethal intensity within a very short time. This presents a severe hazard to the lives of those directly involved and can hamper rescue or evacuation efforts.

For this reason, the provision of adequate and special means of dealing promptly with an aircraft accident or incident occurring at, or in the immediate vicinity of, an airport assumes primary importance because it is within this time frame that there are the greatest opportunities of saving lives. The extent of aircraft fires which may affect rescue is influenced largely by the quantity and disposition of fuel carried by the aircraft and the location of any fuel released as a result of the accident or incident.

Emergency exits and their ability to be opened from the inside and outside of an aircraft is of primary importance in rescue and evacuation operations. The provision of special tools for rescue crews in order to gain access to the interior of a fuselage is essential. However, their use can only be regarded as an extreme measure to be taken whenever normal means of access (including emergency exits) are unavailable or unsuitable for use. The most important factors bearing on effective rescue in a survivable aircraft accident is the training received, the effectiveness of the equipment and the speed with which personnel and equipment, designated for RFF purposes, can be deployed.

The proposals set out hereunder concerning these services are intended as a general guide, to be applied to the fullest extent practicable.

Part 2 — Pavement Surface Conditions: The purpose of Part 2 is to assist States to ensure that adequate measures are taken to overcome problems resulting from contaminants on, or weathering of, the movement area. This manual includes material concerning basic factors affecting friction, the correlation between friction measuring devices on paved surfaces, descriptions of some friction measuring devices, and practices for measuring and reporting friction on snow-, ice- and water-covered surfaces. It also provides information on the collection and dissemination of pavement surface condition information, and clearance and removal of contaminants and debris from the movement area.

Part 3 — Bird Control and Reduction: On 7 September 1908, while piloting the Wright Flyer, Orville Wright had what is believed to be the first collision between an aircraft and a bird, what is now known as a bird strike. Less than four years later, on 3 April 1912, at Long Beach, California, Calbraith Perry Rodgers, the first man to fly an aeroplane across the United States, became the first person to die as the result of a bird strike. His Wright Flyer became entangled with a gull that jammed the aircraft's controls, causing it to plunge out of control into approximately 1.5 m of sea water. The frail structures and power plants of the early aeroplanes meant that they were susceptible to bird strike damage. Fortunately, their slow speed gave pilots and birds/wildlife plenty of time to take any evasive action necessary.

Development of aircraft progressed to the point that they were robustly constructed and, consequently, more resistant to bird strike damage. Nevertheless, serious bird strikes did occur to such aircraft, usually involving the cockpit, the windshield and surrounding structure. Occasionally, injuries to flight crew did result from these bird strikes. During the 1950s, many metal, propeller-driven aeroplanes were gradually replaced by the faster and more efficient early jets; however, today, well into the 21st century, many propeller-driven aircraft are still in active flight operation.

Ironically, just at the dawn of jet passenger travel, two accidents involving propeller-driven airliners caused the aviation industry to more closely examine the danger that bird strikes pose to aircraft. Both occurrences involved a relatively new type of aircraft propulsion system, the turboprop. The first accident took place on 4 October 1960 at Boston's Logan International Airport. The aircraft, a Lockheed Electra L188, struck a flock of starlings (*Sturnus vulgaris*) just as it became airborne. The birds were ingested into three of the aircraft's four engines, causing the aircraft to lose power, stall and crash into the harbour. Of the seventy-two passengers and crew on board, sixty-two died. Two years later, on 23 November 1962, a Vickers Viscount struck a flock of Whistling Swans (*Cygnus columbianus*) over the State of Maryland, while flying at 6 000 feet. One of the horizontal stabilizers was penetrated by a swan, weakening the structure and causing it to separate from the aircraft which subsequently crashed and killed all on board. This crash resulted in the bird impact criteria for horizontal stabilizers being raised to eight kilograms (8 kg).

With the proliferation of jet aircraft and the increases in traffic that occurred throughout the 1960s and 1970s, modern jet-powered transport aeroplanes, with their greater speed, were seen to be at greater risk than their propeller-driven predecessors. Newer generations of aircraft continued to come into service, servicing ever increasing traffic needs and replacing older and less efficient aircraft. In many parts of the world, successful wildlife conservation has led to increasing numbers of birds and other wildlife that are known to represent a risk to aviation. There is also increasing recognition that birds are not the only wildlife species to pose a threat to aviation safety. Some species of mammals and reptiles also pose a serious threat to aircraft safety.

It is apparent that data on bird/wildlife strikes need to be collected in order to better understand the dynamics of the bird/wildlife strike problem. The ICAO Bird Strike Information System (IBIS) is ideally suited to this task. A complete description of IBIS can be found in the Manual on the ICAO Bird Strike Information System (IBIS) (Doc 9332). IBIS provides analyses of bird/wildlife strike reports received from States. An analysis of this data reveals that approximately ninety per cent (90%) of bird/wildlife strikes occur on or in the immediate vicinity of airports..

Part 5 — Removal of Disabled Aircraft: Aircraft may become immobilized on an airport for a variety of reasons ranging from incidents, such as a burst tire or an aircraft running off a runway or taxiway, to major accidents involving partial or complete disintegration of the aircraft. In the past, the equipment and organization required to deal with any of these incidents have not been extensive, but in recent years aircraft have increased in size and mass, greatly increasing the

difficulty of the task. Whereas it was once possible to remove an aircraft in a matter of hours, removal of a large aircraft after an accident or incident may now take much longer.

If the disabled aircraft is on a part of an airport where it interferes with the movement of other aircraft, expeditious removal is important to the travelling public, to other operators and to the airport authority as well as to the registered owner or operator concerned. Since lifting and removing a disabled aircraft is a complex and potentially dangerous task, it will not always be possible for the airport to be cleared as quickly as the airport authority would wish, particularly as any further damage to the aircraft during its removal should be avoided as far as possible.

Responsibilities:

Large aircraft. The control of the actual lifting and removal of a large aircraft shall be the responsibility of the registered owner or operator concerned, who will seek advice where necessary from the insurance representative, the aircraft manufacturer, a local airline or a contractor. The airport authority may not possess the knowledge or experience needed to ensure that the lifting and removal are effected as speedily as is consistent with safety to the personnel concerned and with the avoidance of further damage to the aircraft. However, if the registered owner or operator cannot remove the aircraft or is dilatory in doing so, the airport management should have authority to act for the owner or operator with minimum delay.

To ensure that secondary damage does not occur, it is important that such authoritative provisions do not imply that other than proper recovery procedures may be used for removal of disabled aircraft.

Small aircraft. With small aircraft, the task will often be much simpler and it may be possible for the airport authority, with the agreement of the registered owner or operator concerned, to undertake the removal of the aircraft.

Apart from this immediate responsibility in each case, a considerable responsibility falls on both airport authority and aircraft owner or operator if the task of removal is to be started and completed as quickly as possible. An efficient recovery operation requires adequate planning before an accident occurs, as well as the availability of the right equipment. The manner in which these responsibilities are shared between the airport and the owner or operator varies from one airport to another according to local circumstances.

Part 6 — Control of Obstacles: The effective utilization of an aerodrome may be considerably influenced by natural features and manmade constructions inside and outside its boundary. These may result in limitations on the distances available for take-off and landing and on the range of meteorological conditions in which take-off and landing can be undertaken. For these reasons certain areas of the local airspace must be regarded as integral parts of the aerodrome environment. The degree of freedom from obstacles in these areas is as important to the safe and efficient use of the aerodrome as are the more obvious physical requirements of the runways and their associated strips.

The significance of any existing or proposed object within the aerodrome boundary or in the vicinity of the aerodrome is assessed by the use of two separate sets of criteria defining airspace

requirements. The first of these comprises the obstacle limitation surfaces particular to a runway and its intended use detailed in Chapter 4 of Annex 14 - Aerodromes. The broad purpose of these surfaces is to define the volume of airspace that should ideally be kept free from obstacles in order to minimize the dangers presented by obstacles to an aircraft, either during an entirely visual approach or during the visual segment of an instrument approach.

The second set of criteria comprises the surfaces described in the Procedures for Air Navigation Services - Aircraft Operations (PANSOPS) (Doc 8168, Volume I - Construction of Visual and Instrument Flight Procedures). The PANS-OPS surfaces are intended for use by procedure designers for the construction of instrument flight procedures and for specifying minimum safe altitudes/heights for each segment of the procedure. The procedure and/or minimum heights may vary with aeroplane speed, the navigational aid being used, and in some cases the equipment fitted to the aeroplane.

The surfaces of Annex 14 are intended to be of a permanent nature. To be effective, they should therefore be enacted in local zoning laws or ordinances or as part of a national planning consultation scheme. The surfaces established should allow not only for existing operations but also for the ultimate development envisaged for each aerodrome. There may also be a need to restrict obstacles in areas other than those covered by Annex 14 if operational minima calculated using the PANS-OPS criteria are not to be increased, thereby limiting aerodrome utilization.

Part 7 — Airport Emergency Planning: The material in Part 7 relates to the pre-planning for handling airport emergencies, as well as coordination between different airport agencies (or services) and those agencies in the surrounding communities that could be of assistance in responding to an emergency. Some of the topics dealt with by the manual are: the preparation of an airport emergency plan; agencies involved including their responsibilities and roles; emergency operations centre and mobile command post; offices to be contacted; triage and medical centre; care of ambulatory survivors; care of fatalities; communications; airport emergency exercises; and review of the airport emergency plan.

Part 8 — Airport Operational Service: Part 8 brings together the various technical functions that are required to be fulfilled by an airport to ensure safety and continuity of operations. The manual treats two aspects of providing airport services. In the first two chapters the overall organization and the staffing of operational services are discussed. The remaining chapters discuss particular services to be provided at the airport.

Part 9 — Airport Maintenance Practices: This manual consolidates in one document a review of the maintenance practices required at an airport to maintain the safety, efficiency and regularity of aircraft operations. It is only concerned with those facilities which are normally the responsibility of the airport authority. In other words, maintenance of such facilities as radio navigational aids and meteorological equipment is not discussed.

Proper maintenance of airport facilities is important both for the safe operation of aircraft and extending the life of the facilities. Nevertheless, maintenance is frequently overlooked or reduced when establishing budgets for airports. It is hoped that this manual will establish the proper position of maintenance in the over-all airport programme. Differences between the facilities

provided at an airport, differences in the local environmental conditions and differences in use make it impossible to name specific maintenance requirements. The manual attempts to overcome this by identifying the various types of maintenance required for airport facilities. It remains for each airport authority to decide if a particular maintenance check is appropriate for its airport and to establish the appropriate maintenance schedule.

CHAPTER-V: GOVT OF INDIA POLICIES ON GREENFIELD AIRPORTS

Ministry of Civil Aviation (MOCA) Guidelines for Setting up of Greenfield Airports: The Central Government has notified the Policy for Greenfield Airports. A Steering Committee has also been constituted to coordinate and monitor the various clearances required for setting up of Greenfield airports. These guidelines are being issued pursuant to the above Policy and details the procedure to be followed for submission, appraisal and approval of proposals received for setting up of an airport.

Institutional structure: All proposals for setting up of airports in whichever category would be routed through the Steering Committee. The applicant would be required to apply for clearances from various Departments/Ministries of Government of India but all proposals would be submitted to the Steering Committee. Ministry of Civil Aviation would serve as the secretariat of the Steering Committee and would be responsible for processing proposals received by the Steering Committee, convening the meetings of the Steering and coordinating with various stakeholders.

Applicability : These guidelines will apply to the setting up of all airports, heliports and upgradation of airfields. However, airports set up for private use, i.e. use of the aerodrome for non-commercial purposes shall not be subjected to these guidelines.

Site Clearance granted by Steering Committee: The applicant proposing to set up an airport would make an application to the Steering Committee in the format enclosed at Annex-III for site clearance. The proposal received would be forwarded to the AAI/DGCA for their comments. AAI/DGCA would undertake site visit based on which they would submit their report to the Steering Committee. Site Clearance would be granted by the Ministry of Civil Aviation based on the report submitted by the AAI/ DGCA.

In case the proposed project is located within the Restricted Air Space (Air Space under the jurisdiction of Ministry of Defence) the approval of Ministry of Defence would also be solicited while granting site clearance.

The Steering Committee would convey its recommendations regarding the Site Clearance within three months of the application being made to the Steering Committee.

Appraisal and 'in principle' approval by the Steering Committee : After obtaining the Site Clearance the applicant would make an application to the Steering Committee in the format enclosed at Annex-IV of these Guidelines. Applications for seeking clearances from Ministry of Defence, Ministry of Home Affairs and Ministry of Finance would be submitted in the

prescribed format directly to these organizations under intimation to the Secretariat of the Steering Committee.

Guidelines: Guidelines for the purpose of granting approval would be issued by the various agencies. These guidelines shall be modified from time to time if the need arises. Ministry of Defence has issued these guidelines for seeking clearance of Ministry of Defence for setting up of Greenfield airports. The applicant would submit the application seeking NOC from Ministry of Defence as per the format placed at Annex-VI of the Guidelines.

Grant of License by DGCA: After obtaining the "in principle" approval of the Steering Committee the applicant would make an application to the DGCA in the prescribed format for the grant of Aerodrome License.

Time-Lines for the approval and appraisal process: It would be the endeavour of the Central Government to ensure that all approvals and clearances are given in a timely manner. Pending occurrence of any specific issue, it would be the endeavour of the Steering Committee to adhere to the following time schedule:

- (a) Site Clearance: within 3 months of date of application
- (b) "in principle" approval: within 3 months of date of application

Proposals which need to be referred to the Ministry of Civil Aviation or the Central Government would require time beyond the above time limit.

Monitoring: The Steering Committee would monitor the progress of proposals granted "in principle" approval. If no significant progress is made in achieving specified milestones within a stipulated time period the Steering Committee may take the view to revoke the approval granted to the project.

Greenfield Airports Policy: India is presently on a high economic growth trajectory with GDP growth reaching 9% since 2005-06. This is also manifested in a phenomenal growth in air traffic that has been enabled by liberalized policies. Since 2002 the growth rate of passenger traffic has steadily increased crossing 20% in 2004-05. Expansion of air services in a competitive environment has brought it within the reach of large numbers that were hitherto not using air travel as their preferred mode of travel. This rapid growth in passenger traffic has put enormous pressure on airport infrastructure causing severe congestion at major airports. Airport services at non-metro airports are also not geared for handling this increased flow of traffic.

In the past, government policy relating to greenfield airports was restrictive and aimed at protecting the financial viability of the existing airports. However, the spurt in traffic suggests a liberalized approach towards setting up of greenfield airports with a view to bridging the growing deficit in airport infrastructure. The anticipated investment in airport development during the Eleventh Plan is over Rs 40,000 crores, both from public and private sources, including for greenfield airports. It is, therefore, necessary to lay down the policy guidelines that would govern proposals for setting up greenfield airports, other than defense airports.

Legal framework : The Constitution includes aerodromes in item 29 of the Union List, which implies that the Central Government alone has the legislative and executive powers relating to airports. The primary responsibility for development of airports rests with the Central Government. The Union alone has competence to legislate in respect of:

"Airways, aircraft and air navigation; provision of aerodromes; regulation and organization of air traffic and of aerodromes; provision for aeronautical education and training and regulation of such education and training provided by States and other agencies"

The Aircraft Act, 1934 (the "Aircraft Act") and the Rules made thereunder by the Central Government govern the development, maintenance and operation of all airports, including greenfield airports. Under the Act, Central Government has the sole right to grant a license for setting an airport, and the operations of the airport would be subject to its licensing conditions (Rule 78 of the Aircraft Rules).

Airports Authority Act (the "AAI Act") was enacted by the Central Government in 1994, which stated that all government airports are to be developed, financed, operated and maintained by Airport Authority of India ("AAI"). However, the AAI Act enables AAI to grant a concession to a private entity for financing, development, operation and maintenance of an airport being managed by AAI. As such, greenfield airports to be developed by the Central Government could adopt the concession route if private participation is envisaged.

Airports other than those managed by AAI are governed by the provisions of the Aircraft Act and the Rules made thereunder. An entity other than AAI (hereinafter referred to as an "Airport Company") can set up an airport. The Airport Company must function under a license from DGCA to be issued under the Aircraft Act. Such a license can be granted only to the following (Rule 79 of the Aircraft Rules):

- (a) A citizen of India; or
- (b) A Company or a body corporate either in the Central sector, State sector or the private sector registered under the Companies Act, 1956 subject to the following conditions:
 - (i) it is registered and having its principal place of business in India
 - (ii) it meets the equity holding criteria specified by the Central Government from time to time; or
- (c) the Central Government or a State government or any company or any corporation owned or controlled by either of the said Governments; or
- (d) a Society registered under the Societies Registration Act, 1860

Thus an airport can be developed and operated either by AAI or by an Airport Company that has been given a license by DGCA as per its license conditions. The Rules also allow the Central Government or a State Government to obtain a license.

Operations of airports: Airports managed by AAI must be operated according to the provisions of the AAI Act as well as the Aircraft Act. All other airports would have to be operated under the provisions of the Aircraft Act and the conditions of license.

Regulation of Airports

- (i) ***Safety Regulation.*** The process to regulate the technical and safety standards of all airports are vested in DGCA under the provisions of the Aircraft Act. AAI airport as well as those owned by Airport Companies must, therefore, conform to the technical and safety standards laid down by DGCA under the Aircraft Act.
- (ii) ***Economic Regulation.*** Economic Regulation of all airports would be governed by the proposed Airport Economic Regulatory Authority (AERA) as and when enacted.

Development and Financing of Greenfield Airports

- (i) ***AAI Airports.*** Greenfield airports to be set up by AAI would be preferably constructed through Public Private Partnership (PPP) and such airports would be financed substantially through PPP concessions. However, land for such airports would have to be provided by AAI. Further, financing gaps, if any, can be bridged through the Viability Gap Funding scheme, which provides for a capital grant of upto 20% of the project cost. The concessions for development of greenfield airports would be awarded through open competitive bidding based on model bidding documents. In the north eastern areas where it may not be feasible to follow the PPP route, AAI could set up greenfield airports by itself, as may be approved by the Government on a case to case basis.
- (ii) ***Other Airports.*** Financing and development of any other airport would be the responsibility of the Airport Company seeking the license. Land for this purpose may be acquired by the Airport Company either through direct purchase or through acquisition by the State Government as per extant policy.

In case a State Government wishes to promote the setting up of airports in the State, it could either:

- (a) apply to DGCA for a license itself, in which event the State Government would be responsible for development and operation of the airport; or
- (b) an entity of the State Government could apply for a license to DGCA, in which event such entity would be responsible for development and operation of the airport; or
- (c) the State Government or its corporation may select a private entity and form a Joint Venture Company (JVC) in the private sector and in such an event, the JVC would be responsible for development and operation of the airport under a license from DGCA; or
- (d) Allot land to a private Airport Company for development and operation of an airport under a license from DGCA.

In case a State Government wishes to facilitate setting up of the airport, it could provide the following incentives to an Airport Company:

- (a) land, concessional or otherwise;
- (b) real estate development rights in and around the airports;
- (c) airport connectivity; rail, road;
- (d) fiscal incentives by way of exemptions from State taxes; and
- (e) any other assistance that the State Government deem fit.

State Governments may evolve their respective policies for providing any or all of the aforesaid incentives to an Airport Company. If the selection of a private entity or JVC partner is to be made by the State Government or its entity it shall be done through open competitive bidding. While granting land and other benefits, the State Government may, if it deems fit, stipulate the rights and obligations of the Airport Company as conditions of such grant.

State Governments cannot enter into any concession agreement with the Airport Company as they do not have the powers to grant airport concessions under the Constitution. As noted above, the powers to grant a license for operating an airport rests solely with the Central Government under the provisions of the Aircraft Act, 1934. However, the State Governments can provide any or all of the incentives/ assistance stated above.

State Governments can also provide land to AAI for development of greenfield airports through concessions to be granted to private entities in accordance with the provisions of the AAI Act. States may also provide any of the above concessions to AAI for facilitating the development of airports in their respective States. All such airports would be developed as PPP projects.

Reserved activities: On any greenfield airport to be developed under these Policy Guidelines, activities relating to Air Traffic Services (ATS), security, customs and immigration would be reserved for central government agencies. Provision of these services would be governed by the policy to be laid down by the Central Government from time to time. Prior to grant of license, an applicant for license shall procure the following clearances:

- (a) Defence clearance: An applicant seeking a license would need prior clearance from the Ministry of Defence. Guidelines for this purpose would be issued by the Ministry of Defence from time to time.
- (b) Air Traffic Services (ATS): Functions related to ATS are being discharged by AAI. The applicant will have to enter into a CNS/ ATM Agreement with AAI for the provision of ATS services at the proposed airport. ATS would be provided on a cost recovery basis and AAI would publish a standard agreement for this purpose. The Airport Company would also provide the required infrastructure to AAI free of cost for provision of ATS.
- (c) Security: The applicant will have to enter into an agreement for provision of security by the concerned authority. The cost of providing security will have to be borne by the Airport Company. Guidelines for this purpose would be issued by the BCAS, Ministry of Civil Aviation from time to time.
- (d) Customs: In case of an international airport, the applicant will obtain clearance from the Department of Revenue for provision of Custom services. The cost of providing these services will have to be borne by the Airport Company. Ministry of Finance would issue the necessary guidelines from time to time.
- (e) MHA Clearance: The applicant seeking a license would need prior clearance from the Ministry of Home Affairs regarding location of the airport, acquisition and installation of security equipment and verification of credentials of the developers.
- (f) Immigration: In case of an international airport, the applicant will procure clearance from the Ministry of Home Affairs for provision of immigration services. The cost of providing these services will have to be borne by the Airport Company. Ministry of Home Affairs would issue the necessary guidelines from time to time.

- (g) BCAS Clearance: The applicant seeking a license would need prior clearance from BCAS regarding location of the airport and acquisition and installation of security equipment.
- (h) Airport Meteorological Services: The applicant will have to enter into a CNS/ATN agreement with IMD for provision of meteorological services at the proposed airport to be provided by India Meteorological Department (IMD). The meteorological services would be provided on a cost recovery basis and IMD would publish a standard agreement for this purpose. The airport company would also provide the required infrastructure to IMD free of cost for provision of meteorological services.

A memorandum of understanding would be entered into between the Airport Company and each GOI agency/ department providing the following Reserved Activities, setting out the terms and conditions on which the said services shall be provided by the relevant GOI agencies/departments:

- (i) Customs Control;
- (ii) Immigration Services;
- (iii) Health Services;
- (iv) Plant Quarantine Services; and
- (v) Animal Quarantine Services

The memorandum of understanding would be issued and revised from time to time by the Ministry of Civil Aviation.

Conditions of license: As a condition of license, the licensee would be required to:

- (a) make available its airport services, free of charge and to the extent necessary, for meeting exigencies such as war, natural disaster/calamities, internal disturbances etc. in accordance with the provisions of the Union War Book;
- (b) provide uninterrupted landing and parking facilities for defence and other para-military aircrafts, free of landing and parking charges, and also provide the infrastructure facilities and equipment required for defence operations;
- (c) make available to the security agencies access to the airport for periodic and surprise inspections;
- (d) obtain approval of the relevant agencies for hiring of foreign nationals for senior decision making positions in the management of the private airports;
- (e) adhere to the security measures laid down by the BCAS and DGCA;
- (f) obtain prior verification of the credentials of foreign firms to be engaged for construction, ground handling or other important activities at the airport;
- (g) obtain clearance relating to the FDI limits in the construction/development of private airports from relevant authorities. Any change in the control or ownership shall be subject to security clearance from national security angle;
- (h) ensure the requisite infrastructure for handling international passengers and crew who must pass through immigration and customs; and ensure appropriate arrangements for health services and plant quarantine at international airports.

The authorities noted above shall, on a best endeavour basis, provide their response to the applications within 60 days.

Guidelines of Central Government to DGCA: The Central Government may from, time to time, notify guidelines to be followed by DGCA for grant of license to operate a greenfield airport. While granting a license, DGCA would keep these guidelines in view. For the present, the following conditions shall be kept in view by DGCA while granting a license.

- (a) No greenfield airport would be allowed within an aerial distance of 150 Km of an existing civilian airport.
- (b) In case a greenfield airport is proposed to be set up within 150 Km of an existing civilian airport, the impact on the existing airport would be examined. Such cases would be decided by the Government on a case to case basis.

Procedure for Approval of a Greenfield Airport : A greenfield airport to be set up by AAI or an Airport Company that is in compliance of the above guidelines and is beyond 150 km of an existing civilian airport would not require prior approval of the Central Government. DGCA would be competent to grant license for operation as per the extant Rules and Notifications.

A greenfield airport to be set up by AAI or an Airport Company that is beyond 150 km of an existing civilian airport but seeks exemption/relaxation from any of the other guidelines or extant Rules and Policies, would be considered by the Steering Committee constituted under paragraph 10. The Committee's recommendations would be forwarded to the Ministry of Civil Aviation. If the Steering Committee is unable to reach a consensus, the proposal would be placed before the competent authority (Union Cabinet) for a decision. DGCA would consider such proposals for grant of license only after the approval of the Central Government is conveyed.

In case of an application by the AAI or an Airport Company to set up an airport within 150 km of an existing civilian airport, the application shall be considered first by the Steering Committee. The Steering Committee shall consider all relevant facts and circumstances including contractual liabilities, if any. The Steering Committee shall also take into account whether the applicant has obtained the approvals required under the applicable laws from the authorities concerned. After considering the application, the Steering Committee shall make a suitable recommendation to the Central Government (Ministry of Civil Aviation). The Central Government (Ministry of Civil Aviation) shall consider the recommendation and decide whether approval for the airport project should be granted or not. DGCA shall consider a proposal for grant of a license to the applicant only after approval has been granted by the Central Government (Ministry of Civil Aviation).

Where an application to set up a greenfield airport is within 150 kms and also seeks exemption/relaxation from any extant Rules and Policies, the application shall be considered first by the Steering Committee. The Steering Committee shall consider all relevant facts and circumstances including contractual liabilities, if any. The Steering Committee shall also take into account whether the applicant has obtained the approvals required under the applicable laws from the authorities concerned. After considering the application, the Steering Committee shall make a suitable recommendation to the Central Government (Ministry of Civil Aviation). The

Ministry of Civil Aviation shall place the matter before Union Cabinet for its consideration. DGCA would consider such proposals for grant of license only after the approval of the Central Government is conveyed.

Airports for cargo and/or non-scheduled flights and for heliports need not be submitted for approval of the Ministry of Civil Aviation and these cases may be considered and decided at the level of DGCA, subject to applicable laws.

Constitution of a Steering Committee: Since the grant of a license for a greenfield airport involves several agencies, a Steering Committee would be set up under the chairmanship of Secretary (Civil Aviation) to coordinate and monitor the various clearances required for setting up of an airport. The Committee would consist of the following:

- (a) Secretary, Civil Aviation - Chairman
- (b) Secretary, Ministry of Home Affairs, or his representative not below the rank of Additional Secretary;
- (c) Secretary, Ministry of Defence, or his representative not below the rank of Additional Secretary;
- (d) Secretary, Department of Economic Affairs, or his representative not below the rank of Additional Secretary;
- (e) Secretary, Department of Revenue, or his representative not below the rank of Additional Secretary;
- (f) Secretary, Planning Commission, or his representative not below the rank of Additional Secretary;
- (g) Director General, India Meteorological Department;
- (h) Chairman, Airports Authority of India;
- (i) Director General of Civil Aviation; and
- (j) Joint Secretary, Ministry of Civil Aviation - Convener

Ministry of Civil Aviation would convene a meeting of the Committee once every 3 months in case applications for grant of clearances/licenses are pending.

Considering the fact that India is poised to embark upon huge expansion in the network of airports and heliports, there is a dearth of trained manpower in matters which are pertinent in creating airports and heliports. The human resource is required to be technically skilled and knowledgeable man the positions at various levels. In order to give a broad view of the process involved, a chapter on the process of creating an airport is considered essential.

Private Participation in Airports: Legal Issues and Challenges

Nature of Legal Issues: The advent of LPG has paved for many countries to privatize their airports by means of equity divestitures, leases and incentive laden management contracts. As many countries adopted the concept of airport privatization more than a decade had experienced but many of the benefits of airport privatization are becoming more discernible. Recognizing

some of the benefits, doesn't mean that the concept is not free from any legal issues. The following are the legal issues which may be confronted due to the Airport Privatization in India:

- i) *Airport Based Issues:* Special Economic Zones, Land Acquisition Rehabilitation, Infrastructure, Resettlement, Slot Allotment, Landing Rights, Airport operation, refueling Infrastructure ownership and Investments, Airport Licensing, Air Traffic controllers, Air management etc.
- ii) *Agreement based Issues:* Concession Agreements, Operation Maintenance Development Agreement, Open Sky Policy, Public Private Partnership etc.
- iii) *Airlines based Issues:* Cabin crew Safety, Leasing and Financing of Aircraft, Slot Allocation, Code Sharing Alliances, Air carrier Liability (Montreal Convention), Survival of Low Cost Carriers (LCC), Project Finance in Airlines etc.
- iv) *Aviation based Issues:* Aviation Insurance, aviation ombudsman, consumer protection, aviation education, aviation consultancy, dispute settlement and arbitration process, consolidation in aviation industry, bio fuel, etc.
- v) *Charges based Issues:* Passengers Service Fee (PAF), User Development FEE (UDF), Airport Development Fee (ADF) Route Navigation facility charges (RNFC) etc.
- vi) *Communication based Issues:* Communication, Navigation and Surveillance (CNS) Satellite Communication- Aeronautical Communication etc.
- vii) *Corporate Based Issues:* Competition Law and Policy, FDI and Changing dimensions of ownership, Investment and Finance, Joint Venture in Civil Aviation, Leasing and Financing of Aircraft, Mergers and Acquisitions, Predator Pricing, Tax, Closure of Airport. Etc.
- viii) *Environmental based Issues:* Air Quality, Noise Pollution, Third Party Risk, Biodiversity, Climate Change, Land Use Planning, Emissions and Planning, Congestion in the skies etc.
- ix) *IPR based issues:* Patent, Trademark, and designs etc.
- x) *Labour Based Issues:* Labour and Management relations, Employment, working conditions, Occupational Health Hazard, Trade Unions, and Ratification of ILO's Conventions
- xi) *Safety Based Issues:* Mid-air collision, runway Incursions, Calculating Aircraft Performance Data and Fatigue related accidents, Liability of Pilot and Air Traffic Controller Officers, Bird Strikes Cabin Crew Safety etc.
- xii) *Security based Issues:* Cyber Crimes, Computer Hacking, Screening and Radiation, and Technological etc.

Conclusion:

Privatization of airports is yet another stage in the evolution of the ownership and management of Airports. It is very much needed for the infrastructural development of the aviation industry as governments cannot afford huge funds. There are many modes through which an airport can be privatized and it is for the state to choose the one that suits its economic and social conditions. Since this industry is strategic to the safety and security of any nation the governments should be vigilant while privatizing it. The states must take the aid of the international Organization ICAO which has been industrious in formulating policies that accommodates the changes in Airport Management and Ownership, the recent conference is an instance to it. However it is unfortunate that these policies have not been properly understood and applied by the functionaries of the states. It is hence important to create awareness about the importance of these policies.

Turning towards the Indian perspective of Privatization of Airports, the mode of Public Private Participation (PPP) is suitable to our conditions. However there is a need for amendments in all laws regarding airports to suit the mode of privatization. Although few legislations like the Airports Authority of India Act, 1995 has accommodated private airports under its purview, there are some issues like employees interests, the solutions while the clauses in special agreements is against the legislations. Further the existing regulatory regime will not be sufficient to meet the future challenges of privatization. Corona Pandemic has upset the business models in the Airport Sector.

Finally, it is concluded that, '*AIRPORT PRIVATISATION*' is in a budding stage, hitherto applied by many countries. The experience of airport privatization shows that whatever the ownership model chosen, the goal is to enable the airport operator efficient business that brings customer satisfaction. It is possible that privatized airports have more flexibility so that they can introduce new business models especially when are not exposed to excessive controls by government. On the other hand, private investors are much skeptical due to low traffic volumes and government legal operational policies. Indeed, they need government subsidies to continue to operate like in some developing countries including India. Hence, it is opined that any model opted for 'Airports Privatization' has its pros and cons in its outlook despite the fact that India has witnessed many success stories in PPP model.