

# DEVELOPMENTS IN AIRPORTS, AIRLINES AND AIR SPACE MANAGEMENT

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# Emerging Issues

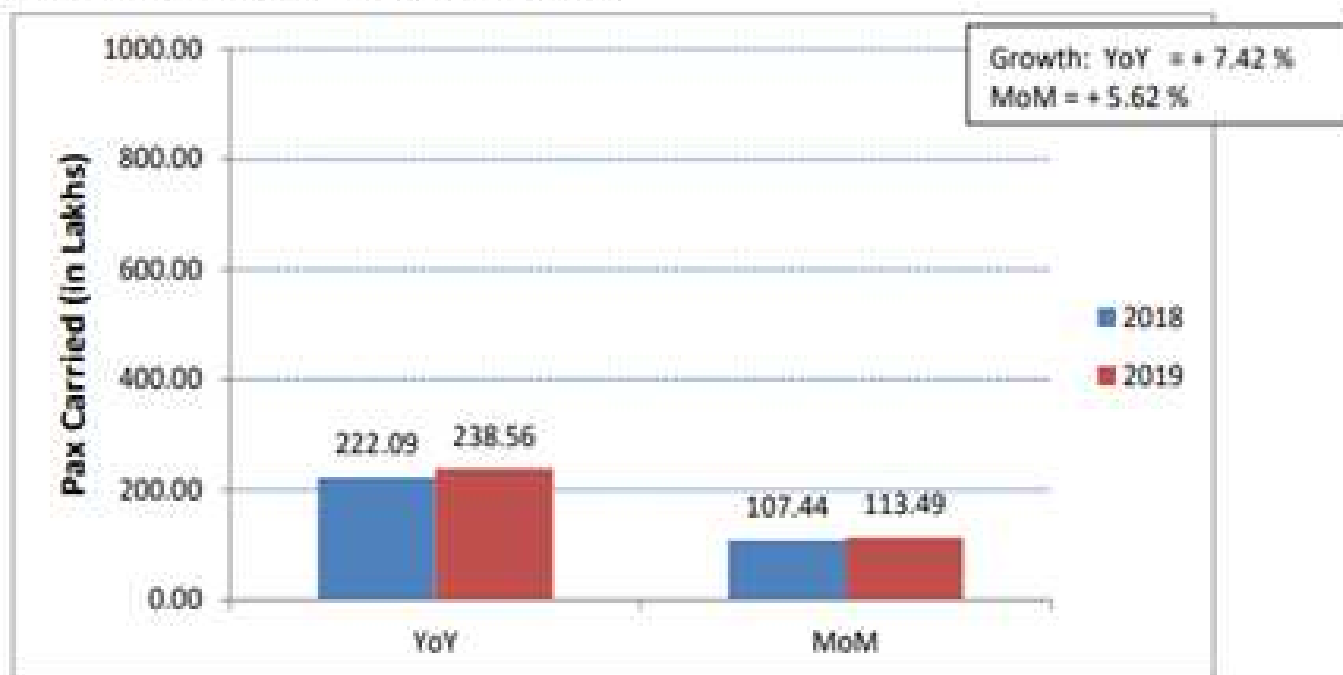
- ▣ Growth
- ▣ Environment
- ▣ Liberalization, Modernization
- ▣ Drones
- ▣ Suborbital flights

# Common Factors - Growth

- ▣ Extraordinary growth in Aviation
- ▣ Domestic air passenger traffic up 18.6% in 2018: DGCA .
- ▣ 3<sup>rd</sup> Largest aviation market.
- ▣ Next to China
  - Domestic
  - International
- ▣ Change in standard- international collaborations and bench markings

## Passenger Growth

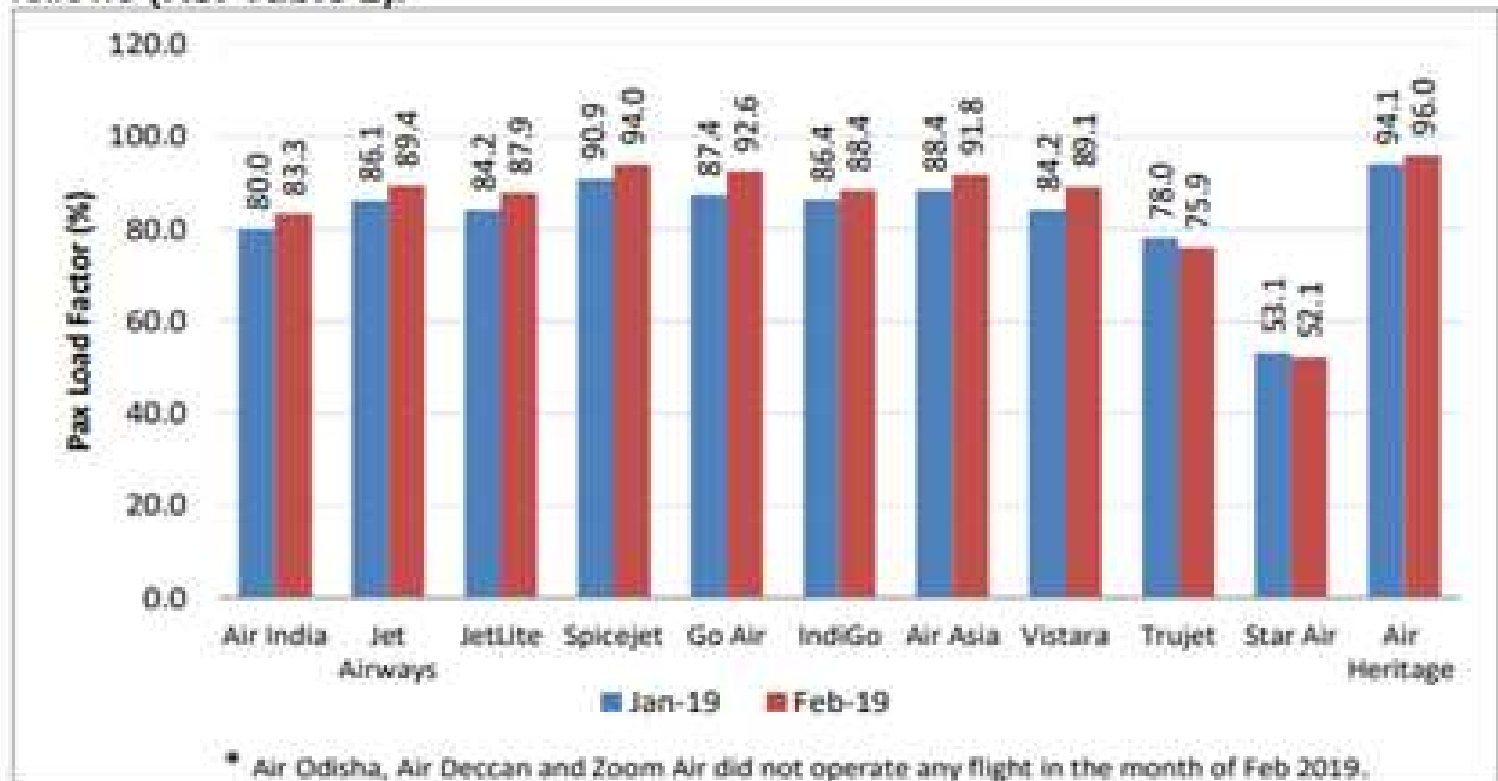
Passengers carried by domestic airlines during Jan-Feb 2019 were **238.56 lakhs** as against **222.09 lakhs** during the corresponding period of previous year thereby registering a **growth of 7.42% (Ref Table 1)**.



# Passenger Load Factor

## Passenger Load Factor

The passenger load factors of various scheduled domestic airlines in Feb 2019 are as follows (Ref Table 2):



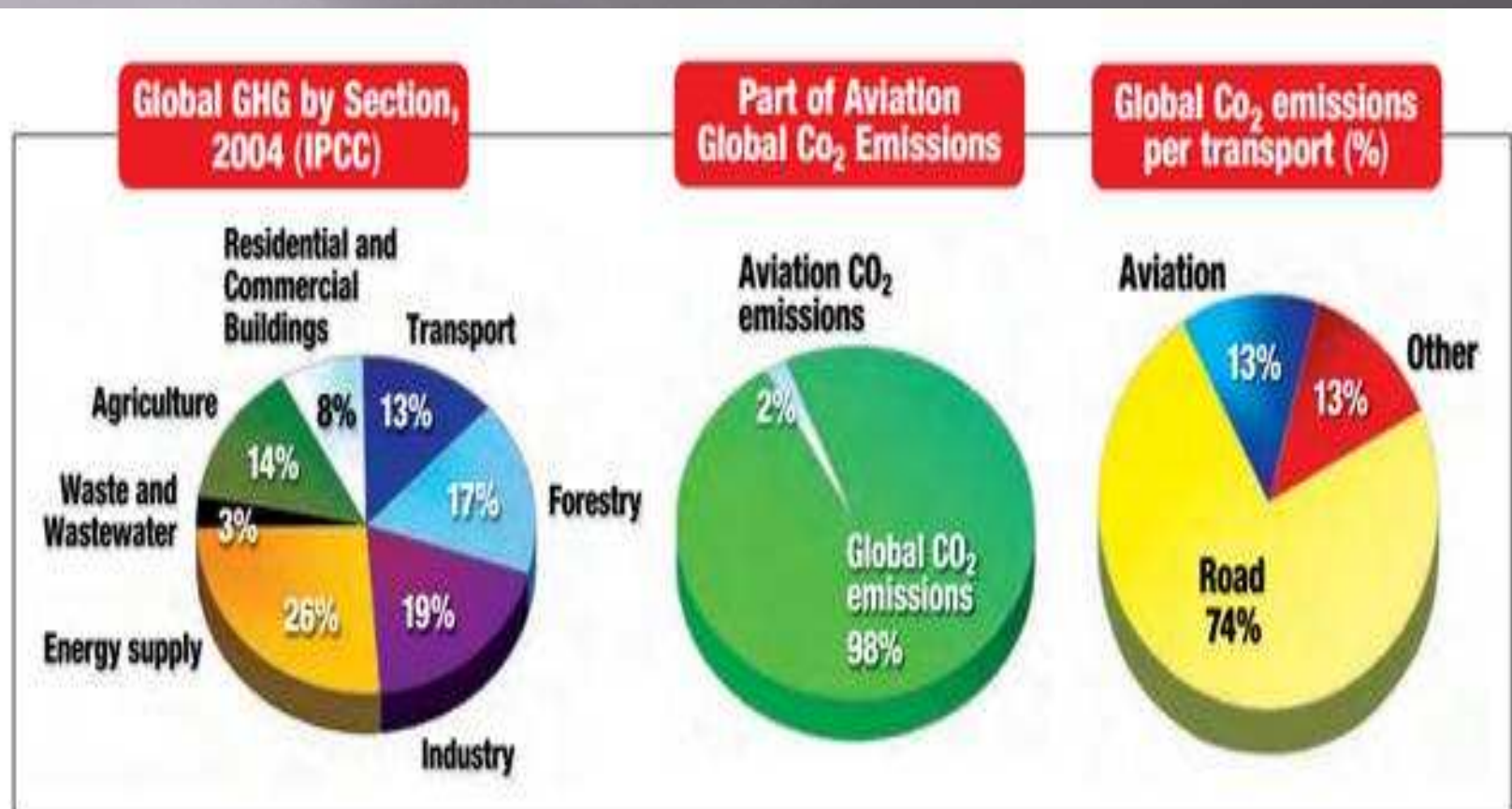
# Growth

- ▣ Requires airport infrastructure development
- ▣ MROs
- ▣ Trained Man power
- ▣ Finance

**COMMON ISSUE –**

Environment

# Aviation Contribution Global CO<sub>2</sub> Emissions

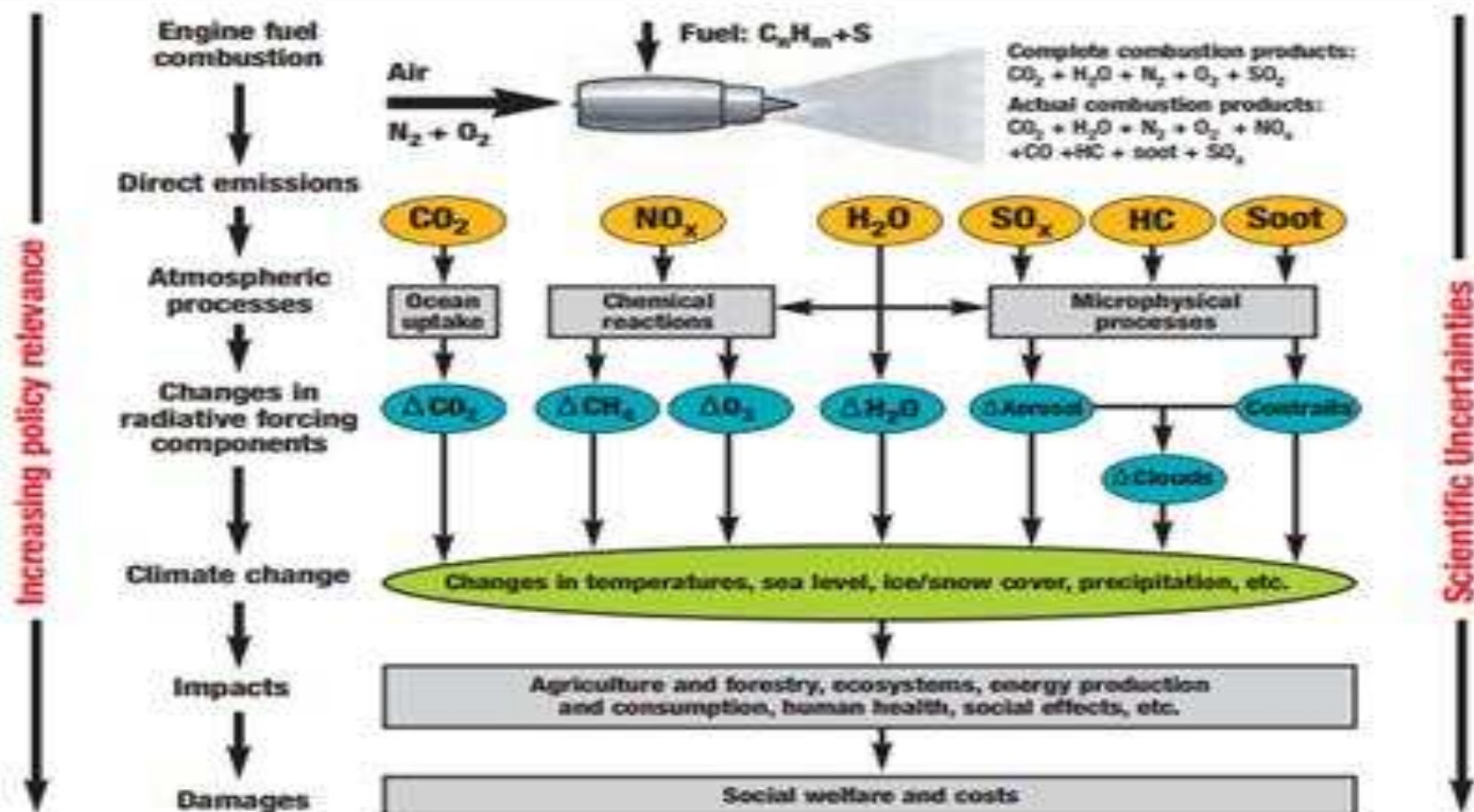


**Figure 1:** Aviation's contribution to global CO<sub>2</sub> emissions.

Source: IPCC, 4th Assessment Report, 2007, WGIII, Technical Summary and IPCC Special Report on Aviation and the Global Atmosphere (1999).



# Aircraft Emissions



Sources: Geronzi; University College in Canada; Department of Geography, University of Oxford; School of Geography, United States Environmental Protection Agency (EPA); Washington; Climate Change 1996; The Science of Climate Change; contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change; IPCC and WMO; Cambridge University Press, 1996.

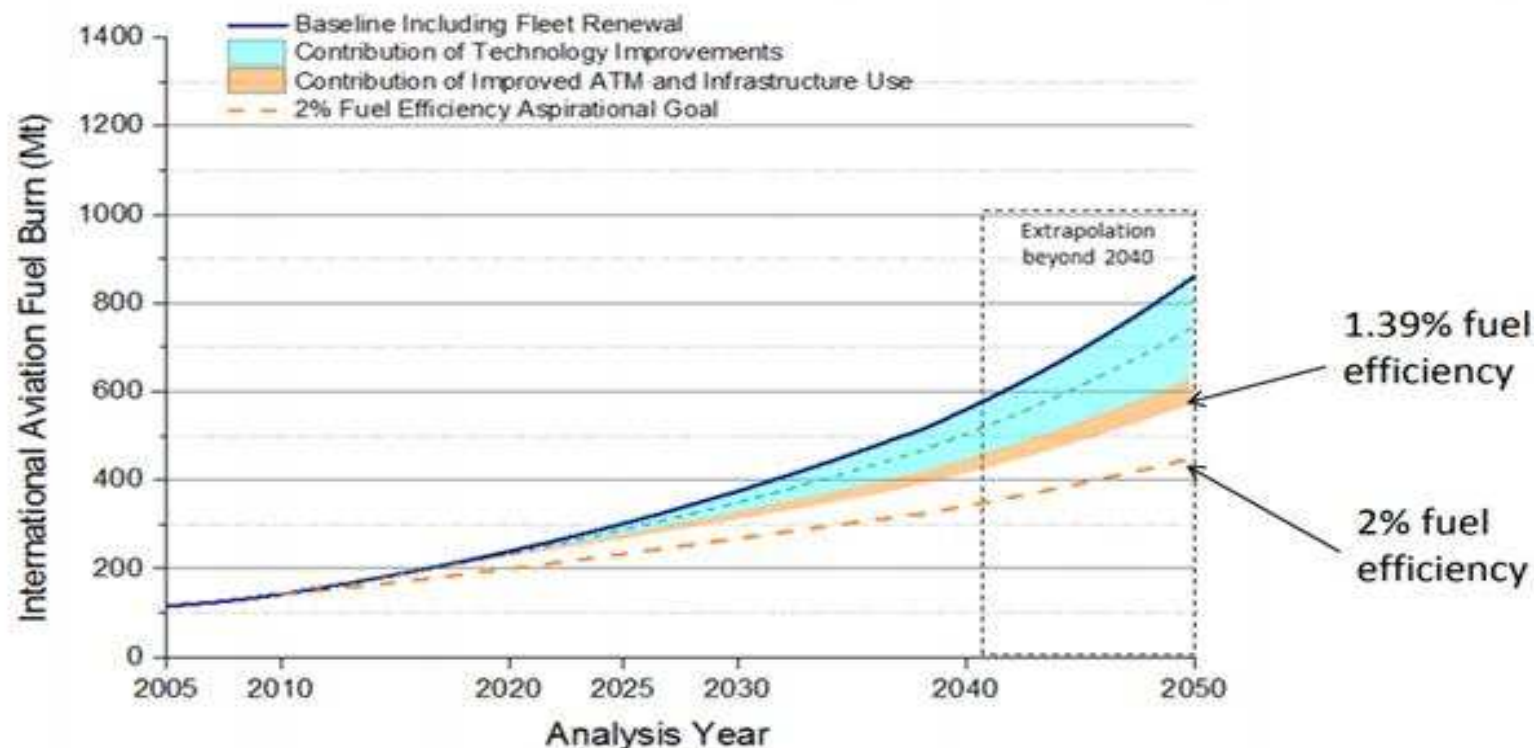
**Figure 2:** Schematic representation of aircraft emissions and their causal linkages with potential climate and social welfare impacts. Note that both the level of scientific uncertainties and policy relevance increase from characterization of emissions to social damage attributions. (Adapted from Wuebbles et al., 2007).<sup>6</sup>

# Common Factor – Environment

- ▣ Environment a major concern for airports, airlines and airspace
- ▣ ICAO target for CO<sub>2</sub> emission reduction
  - further endorsement of the global aspirational goal of 2 per cent annual fuel efficiency improvement up to year 2050;
  - a medium-term global aspirational goal from 2020 that would ensure that while the international aviation sector continues to grow, its global CO<sub>2</sub> emissions would be stabilized at 2020 levels;

# Environment - Target

- Fuel Burn Trends from International Aviation, 2005 to 2050



\*Dashed line in technology contribution sliver represents the "Low Aircraft Technology Scenario."

Note: Results were modelled for 2005, 2006, 2010, 2020, 2025, 2030, and 2040 then extrapolated to 2050.

# Common Factor – Drones

- ▣ Drones – new developments
- ▣ Regulations
- ▣ Accidents, safety issues
- ▣ Airport closure due to drones
- ▣

# Common factor –Ownership

- ▣ Ownership pattern changes –
- ▣ Airports- Govt ownership - PPP and private and PPPP
- ▣ Airlines – Govt- Pvt, foreign collaborations, Takeovers, closures ( King fisher)
- ▣ Jet, TATA Vistara, Air ASIA

# Airline Sector



# Airlines

- ▣ Change in model -Low cost model
- ▣ Vistara – not a low cost carrier originally – but responded to market conditions (– Food optional)
- ▣ Takeovers, Mergers ( Sahara, Air Deccan)
- ▣ Closures(King Fisher/ Air Deccan)
- ▣ International Collaborations

# Airlines

- ▣ Spice jet – financial problem, Takeover
- ▣ King fisher / Air Pegasus
- ▣ Jet airways – Takeover / Bailout efforts
  - Latest GoI directions to PSB
- ▣ Lease of aircrafts – financial issues- Jet Airways
- ▣ Ownership issues ( foreign direct investment cap)
  - 49% for foreign Airlines
- ▣ Competition Issues- Airfare , routes



# Airlines

- ▣ Aircraft lease related issues
- ▣ Wet and dry lease
- ▣ Takeover/ repossession of lease aircrafts
  - Cape Town Convention
  - Dues to agencies and airports
  - Recent AIC 6/19

# Airlines

- ▣ Air India disinvestment  
failed process- reasons
- ▣ State flag carrier
  - Services to North eastern states
- ▣ Recent KLM-Air France share purchase by Dutch Govt - A change in the trend

# Airlines

- ▣ International operations –  
original rule 5/20
- ▣ Relaxation demand- by the new airlines-
- ▣ Latest position 0/20 ( 2016)

# Airlines

- ▣ Aviation Fuel
  - high prices
- ▣ High taxes
  - relaxation by some states
  - Eg – West Bengal, Kerala- for Kannur airport

# Airlines- Concerns

- ▣ Profit from airline operations
- ▣ Competition- price war
- ▣ New streams of revenue
  - - advt, baggage allowance, seats election option,
- ▣ High airport charges
  
- ▣
- ▣ Ground Handling Rules
- ▣ MRO
- ▣ Safety Issues
  - - Boeing 737 Max,
  - - Engine failure of Airbus

# Airlines – Environment

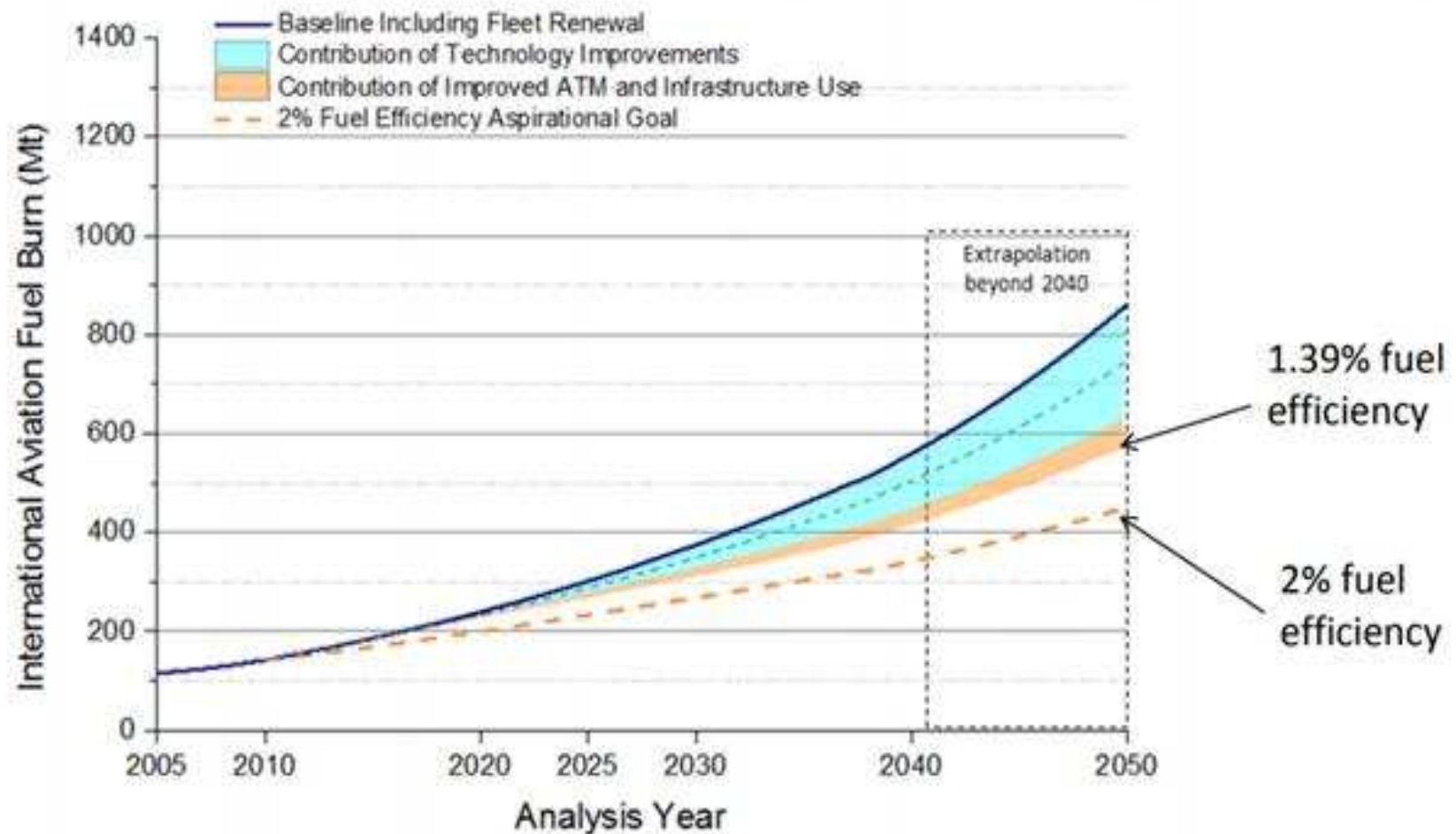
- ▣ New emission standards
- ▣ Fuel efficiency –New Aircraft Models
- ▣ Alternate fuels –
- ▣ Hybrid/ Electric aircrafts

# Airlines Environment

- ▣ Major factors
  - Emissions
  - Noise
  - Local air quality
- ▣ Emission -CO<sub>2</sub> and NO are more important – impact on climate change
- ▣ 1kg Fuel Burn results in around 3.16 Kg CO<sub>2</sub>
  - Better engine efficiency may bring it down



- Fuel Burn Trends from International Aviation, 2005 to 2050



\*Dashed line in technology contribution sliver represents the "Low Aircraft Technology Scenario."

Note: Results were modeled for 2005, 2006, 2010, 2020, 2025, 2030, and 2040 then extrapolated to 2050.

# Aircraft Engine CO<sub>2</sub> Emissions

- ▣ 6 March 2017 – The 36-State ICAO Council has adopted a new aircraft CO<sub>2</sub> emissions standard which will reduce the impact of aviation greenhouse gas emissions on the global climate.
- ▣ Contained in a new Volume III to Annex 16 of the Chicago Convention (Environmental Protection), the aircraft CO<sub>2</sub> emissions measure represents the world's first global design certification standard governing CO<sub>2</sub> emissions for any industry sector.
- ▣ **The Standard will apply to**
  - new aircraft type designs from 2020,**
  - aircraft type designs already in-production as of 2023.**
- ▣ Those in-production aircraft which by 2028 do not meet the standard will no longer be able to be produced unless their designs are sufficiently modified.

# DGCA- New CAR- Environment

Enforce

## SECTION 10 - AVIATION ENVIRONMENT PROTECTION

| CAR Series Part        | Issue No. and Date     | Subject                                                                       | Most recent Amendment No. | Date of Amendment |
|------------------------|------------------------|-------------------------------------------------------------------------------|---------------------------|-------------------|
| SERIES A               |                        |                                                                               |                           |                   |
| <a href="#">Part I</a> | 18.12.2014             | Noise Management of Aircraft Operations at Airports                           | No revisions              |                   |
| SERIES B               |                        |                                                                               |                           |                   |
| <a href="#">Part I</a> | 05.08.2015             | Climate Change Initiatives and Local Air Quality Monitoring in Civil Aviation | No revisions              |                   |
| SERIES C               |                        |                                                                               |                           |                   |
| <a href="#">Part I</a> | Issue I,<br>24.12.2018 | Carbon Offsetting And Reduction Scheme For International Aviation (CORSIA)    | No revisions              |                   |

# Airlines Environment

- ▣ Directions of airline – reduced stock of news papers, water, blankets
- ▣ New aircrafts with better efficiency

# National Green Aviation Policy

- ▣ The watchdog would assess and understand emissions from all aviation related sources, their contribution to the local air quality and their effect on compliance with local air quality regulations, as per the paper.
- ▣ The ministry would create a "favourable regulatory regime for clearances of aviation projects such as new airports development and expansion".

# DRONES

- ▣ DRONES and RPAS
- ▣ Use – Military and civil
- ▣ Agriculture, cargo, transportation etc
  - Amazon – delivery



# Drones related shutdowns

- ▣ Dec 19 ,2018 -Gatwick Airport endured three days of drone-related security delays which cost 33 hours cost airlines an estimated £50 million (\$64.5 million). -100 drone sightings over three days
- ▣ 09 Jan 19 - Heathrow Airport was briefly shut down after a drone sighting, and Gatwick Airport endured three days of drone-related security delays
- ▣ 15 Feb 19- Dubai Airport - Unauthorized drone activity caused the Dubai International Airport to ground all of its outbound flights for over 30 minutes on 15 Feb 19 morning

# Drones

- ▣ DGCA's RPAS Guidance Manual-
- ▣ Regulations will be effective from 1<sup>st</sup> December, 2018 Operations of Remotely Piloted Aircraft System (RPAS) to be enabled through Digital Sky Platform
- ▣



# Salient Points

- ▣ Ensure Drone (except Nano in uncontrolled airspace upto 50ft) is Digital Sky “No Permission- No Take off” (NPNT) Compliant
- ▣ Obtain Unique Identification Number (UIN) from DGCA for operating in controlled airspace and affix it on your drone
- ▣ Obtain Unmanned Aircraft Operator Permit (UAOP), if applicable from DGCA for commercial operations and keep it handy
- ▣ Obtain Permission before each flight through Digital Sky Platform

# Air Space Management

# Air Space

- ▣ ATM and Air space Management  
Airport based ATM,  
Airspace management
- ▣ Indian Airspace management - AAI
- ▣ International traffic – overflying aircrafts
- ▣ Military- Civil corporation-better utilization of Air Space
- ▣ GAGAN- mandatory w.e.f 2020

# Airspace

- ▣ Effect of increase in passengers, air traffic
- ▣ Number of aircrafts in the air at any given time
- ▣ Major sectors

Reorganization of airspace management

Civil military coorporation

Performance based Navigation(PBN)

Upper Air Space integration

Integration of RADARS

Air Traffic Flow management

New routes

# Air Traffic Flow Management (ATFM) / Collaborative Decision Making (CDM)

- ▣ ATFM is an enabler of air traffic management (ATM) efficiency and effectiveness. It contributes to the safety, efficiency, cost-effectiveness, and environmental sustainability of an ATM system.

# Air Traffic Flow Management

- ▣ Mission - balance air traffic demand with system capacity to ensure a safe, efficient utilization of the National Airspace System.
- Appropriate application of traffic management initiatives provides operational benefits:
  - Minimizes delay and congestion
  - Increases throughput
  - Increases system safety
  - Lowers cost through fuel savings
  - Provides scheduling predictability

# Applying ATFM

## Planning and Coordination

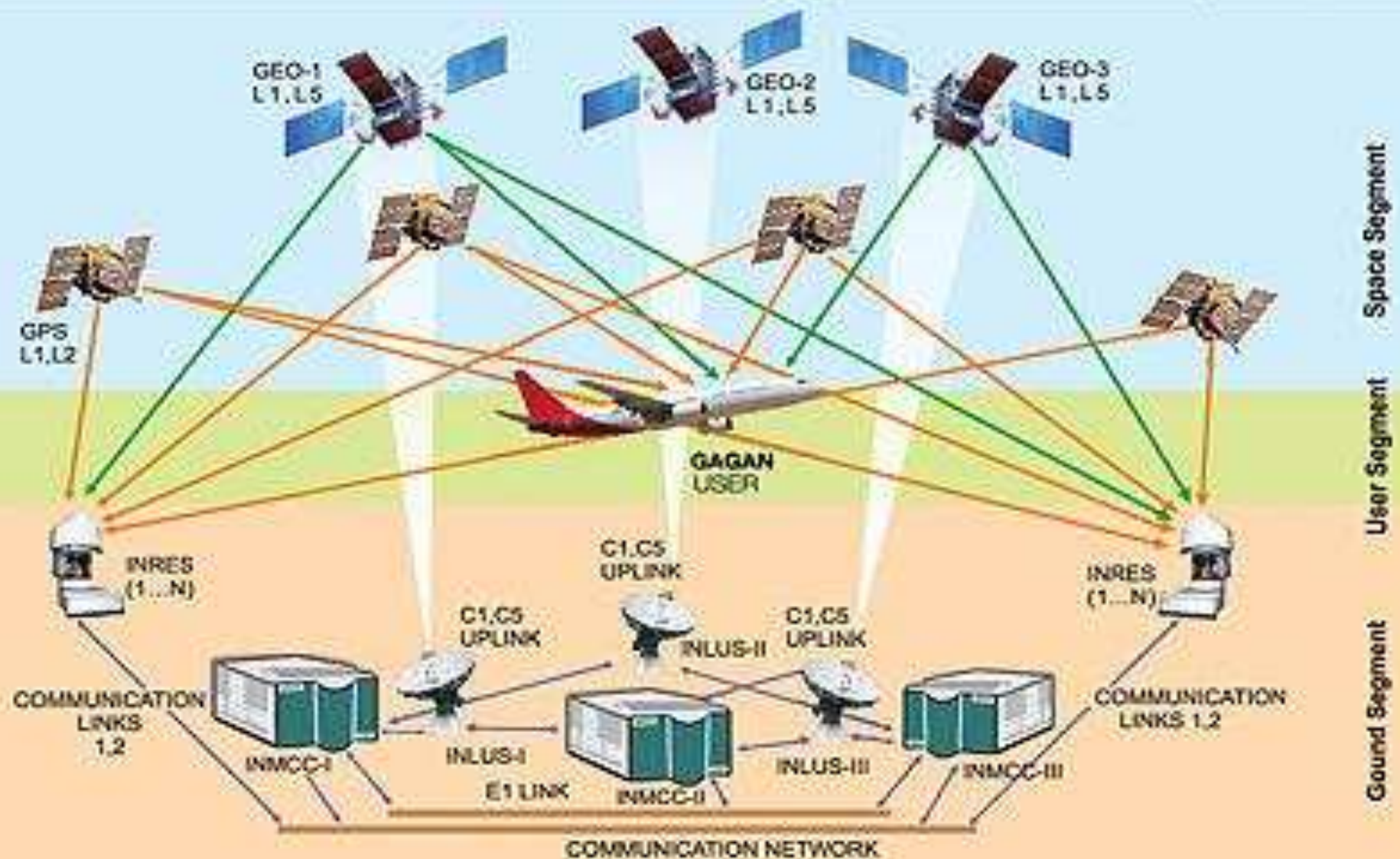
- ▣ Day begins with collaborative discussion on forecasted weather impacts to the system, with continuous review throughout the day.
- Operations Plan is developed with customers, field facilities and the AOCC.
- Plan is revisited and updated every 2 hours throughout the day.
- Specific airport and regional initiatives are managed by Traffic Management Coordinators and field facility experts in collaboration with the customers
- Capacity and constraint data is shared via automated means with all parties



# GAGAN

- ▣ GPS Aided Geo Augmented Navigation- GAGAN project as a Satellite Based Augmentation System (SBAS) for the Indian Airspace.
- ▣ GAGAN provides the additional accuracy, availability, and integrity necessary for all phases of flight, from enroute through approach for all qualified airports within the GAGAN service volume.
- ▣ GAGAN Payload is already operational through GSAT-8 and GSAT-10 satellites.

# GAGAN- Schematic Diagram

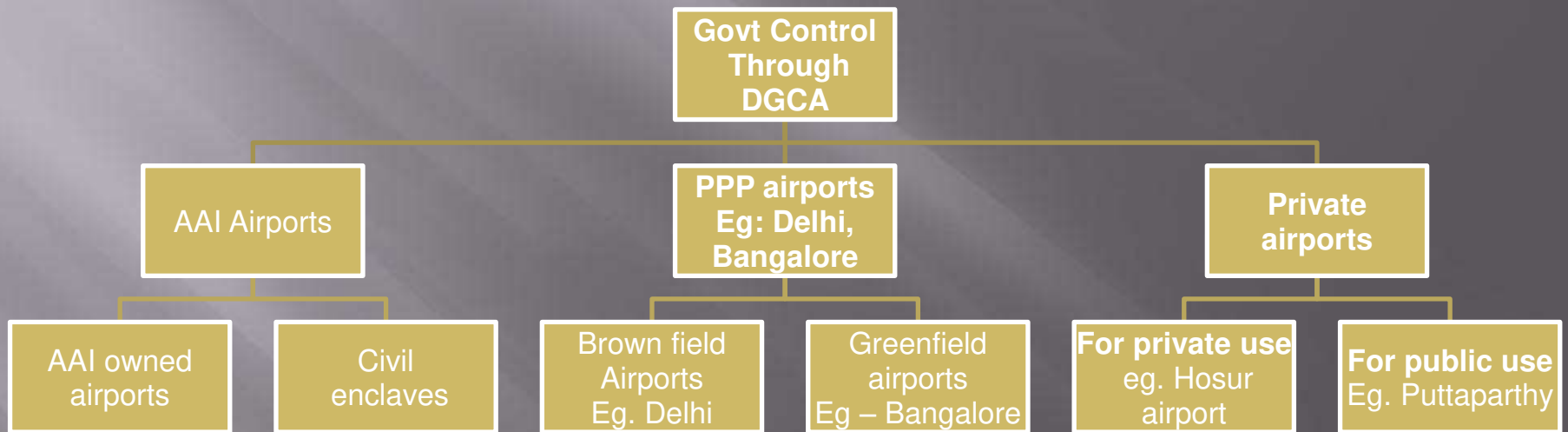


# Airport Sector

# Airports

- ▣ Growth – Need for infrastructure Development
- ▣ Nationalization- Privatization
- ▣ International trends- **Except US**
- ▣ DGCA – to IAAI, NAA- to AAI
- ▣ Amendment to AAI Act
  - for enabling Privatization
- ▣ Privatization of brown field airports- BOM, DEL  
Model – 76 :24
- ▣ Private Green field airports – HYB and BLR

# Airports In India - organisation



|                      | Brown field PPP                                       | Greenfield PPP                                      |
|----------------------|-------------------------------------------------------|-----------------------------------------------------|
| Scope                | OMD of AAI airport                                    | Build operate new airport                           |
| Structure of Company | AAI-26%,<br>private entity 74%                        | AAI – 13%<br>State Govt 13%<br>Private entities 74% |
| Land                 | AAI land on Lease                                     | Land procured by State Govt and leased out          |
| User Charges         | UDF, DF                                               | UDF                                                 |
| Agreements           | OMDA                                                  | Concession Agreement                                |
| Revenue Share        | DIAL 45.99%<br>MIAL 38.7.%<br>of Gross revenue to AAI | 4 % of gross revenue to GoI                         |
| Competition          | Monopoly 150 Kms                                      | Monopoly 150 Kms                                    |



# New Model Vs Old Model

|                                        | OLD                                  | NEW                                                                                           |
|----------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------|
| Bidding parameter /Revenue Share       | Share of Total Gross Revenue         | Amount per passenger on monthly basis<br>(+Administrative fee of Rs 20 per passenger to AAI ) |
| Income for the operator from Passenger | No restrictions                      | Capped at certain Level ( with inflation adjustments)                                         |
| Need of regulation of Aero charges     | AERA to regulate all charges         | Max revenue per passenger fixed                                                               |
| Tariff Structure                       | cost-plus model                      | Pre-determined tariff structure                                                               |
| Scope                                  | Develop, build, operate and transfer | Develop, build, finance, operate and transfer                                                 |
| Concession Period                      | 30+30 years                          | 50 years                                                                                      |



# New Privatization Model

- ▣ Pre determined Tariff – 'Maximum Blended Aeronautical Yield' (MBAY)
- ▣ MBAY of INR 400 per passenger in FY 18-19.
- ▣ Negative Concession Fee
- ▣ -There is a possibility that at certain airports, bidders may feel that the proposed MBAY is not adequate to cover their expenses and business risks. Bidders may be allowed to quote a 'Negative Concession Fee'.
- ▣ If no bidder quotes a zero or positive number as Concession Fee at an airport, the bidder with the lowest Negative Concession Fee shall be declared as the highest ranked bidder. The lowest Negative Concession Fee shall then be added back to the proposed MBAY to arrive at the actual MBAY for that year.
- ▣ There would be no Concession Fee at such an airport and the winning bidder will only pay the Administrative Fee to the Concessioning Authority every month.

# Legal Frame Work

## AAI Airports

Aircraft Act 1934,  
Aircraft Rules 1937  
AAI Act 1994,  
AERA Act 2008,  
CAR, AIC,

## Private Airports

Aircraft Act 1934,  
Aircraft Rules 1937,  
AERA Act 2008,  
CAR, AIC  
AAI Act

-(applicable partially )

Airports Authority of India  
(Major Airports) Development  
Fees Rules, 2011

Concession Agreements

# Aviation Policy 2016

## Remote Connectivity Scheme

- ▣ Remote airports
- ▣ Minimum facilities. Eg Aerobridges,
- ▣ MoCA Auctions the routes
- ▣ Financial assistance to airlines – RCS fee in trunk routes
- ▣ Security by State Govt
- ▣ Active participation by State Govts

# Aerotropolis

- ▣ New Airport model
- ▣ Mega Airports – Aerotropolis is the trend
  - ▣ A metropolitan sub region , infrastructure, finance are centered on an airport
- ▣ Istanbul new airport
- ▣ Navi Mumbai airport
- ▣ Non Aeronautical revenue to be more than aero revenue.
- ▣ Non aero nautical activities to overtake the aero activities, golf course, hotels, export parks

# Airports – Environment

- ▣ DGCAs initiatives for mode of pushing the aircraft
  - Single engine taxiing
- ▣ Solar Energy usage
  - Cochin airport - Worlds First 100% solar energy based airport - wins UN Environment award
  - Other airports to follow the same- Delhi, Bangalore
- ▣ Bangalore Airport – planning forest inside the airport
- ▣ Bangalore - Recycling of water - 100 % water self sufficient
- ▣ ACI – Airport Carbon Accreditation –  
eg Bangalore – Level 3+ neutrality

# Aerospace Flights

## Virgin Galactic's VSS Unity



13 Dec 2018 -Virgin Galactic rocketed two test pilots beyond Earth's boundaries and brought them back safely, in a giant leap toward finally making commercial space tourism a reality.



# Space Activity

- ▣ Space Tourism and Suborbital are going to be reality.
- ▣ Suborbital Flights -This will change the aerospace scenario.
- ▣ Integrated aero space control may come up.
- ▣ Spaceports/ airports may be handling aerospace flights- suborbital flights .

Thank you