

M.A. Space and Telecommunications Law
NALSAR University of Law,
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Since long time I have been working with Mr K Narayanan Former Director Satellite Communications Programme Office (SCPO) ISRO HQ Bangalore in the areas of Orbit-Spectrum, I take this opportunity to thank Mr K Narayanan.

I also want to clarify that short falls in this paper, if any are entirely due to me.

K S MOHANAVELU

Lecture Topic:
**Satellite Communications Trends,
Policy and Legal Aspects**

By
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- 1 Introduction**
- 2 Trends in Satellite Communications**
- 3 Satellite Communications – Policy Aspects**
- 4 Satellite Communications – Legal Aspects**
- 5 Future Work**

Satellite Communications Trends, Policy and Legal Aspects

This lecture covers the following three topics:

Trends in Satellite Communications

Policy Aspects

Legal aspects

Studying the Field of Satellite Communications from Lawyers' Point of View

- **Trends in Satellite Communications**
 - **Discuss Domain Knowledge**
 - **Domain Knowledge is Important for Understanding the Legal Requirements**
- **Policy Aspects**

Deals with Studies, Research and Analysis Required for Policy Documentation Work
- **Legal aspects**

Deals with Contract and Agreement Documentation Work

TRENDS IN SATELLITE COMMUNICATIONS

Trends in Satellite Communications

- Right from inception of satellite communications (from sixties onwards), there has been steady increase in the importance of satellite communications.
- Geostationary Satellite Orbit – Unique Orbit
- Predominately GSO Systems are used for Commercial Satellite Communications
- Satellite Communications – Right from the beginning, Started Playing Important Roles in the national, regional and international telecommunications.
- Of all the applications, GSO Satellite TV Services are Largely Successful - Significant portion of the Revenue comes from DTH, SNG and Cable TV Distribution services.

A New Telecom Need Arose in Early Nineties

- Global Mobile Personal Communications (GMPCS) - Communications - Any time – Any where – This a New Telecom Need especially in the context of International Travellers
- LEO satellite projects were proposed in nineties but LEO Satellite Projects were not successful.
- Terrestrial Communications Networks - Mobile and Optical Fibre Network services started playing a major role to meet the GMPCS requirements - These networks have been successful mainly because of the International Level Standardization.
- Still there are issues – This type of services are not uniformly available especially in providing services in rural and remote areas.
- In addition, average internet data speeds achieved in countries like India (about 13 Mbps for mobile downlink and 53 Mbps for fixed downlink) are considered not adequate to meet the growing multimedia data exchange requirements especially because of Information Explosion due to Internet.
- Therefore Evolving Satellite Communications considered as a Way Forward

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May be the New Evolution is ... Moving towards Integrated Systems in Future

- Till now Satellite Communications Systems are being developed as stand alone systems.
- But this is considered a Road Block for Growth and Expansion of Satellite Communications.
- So as done in the case of terrestrial mobile communications services, international standards are being developed for integration of satellite communications with terrestrial mobile communications (to start with 5G type services)
- 3rd Generation Partnership Project (3GPP), a terrestrial standards body focused on developing the standard for 5G networks (in compliance with ITU's IMT-2020 requirements), has begun to work to develop standards that include satellite technology.
- It will be really a Paradigm Shift in Satellite Communications.
- Such integrated systems are expected to play a more significant and successful role in the field of telecommunications in the near future.

IMPORTANCE BEING GIVEN TO ALL SATELLITE ORBITS

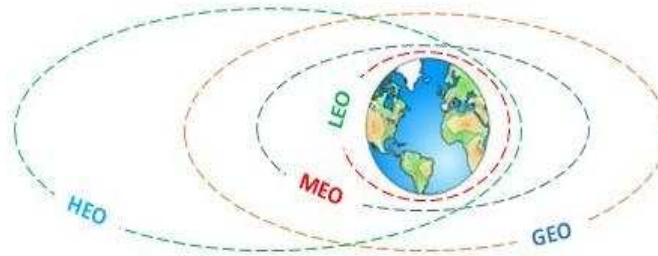
GSO, LEO, MEO and HEO ORBITS

GSO, LEO, MEO and HEO ORBIT HEIGHTS

- LEO 500-1500 KM, MEO 8000-18000 KM,
- HEO AROUND 23000 KM, GSO 35863 KM

There are 4 types of orbits, they are:

1. GEO (Geo-stationary earth orbit)
2. MEO (medium earth orbit)
3. LEO (Low earth orbit) and
4. HEO (Highly elliptical orbit)



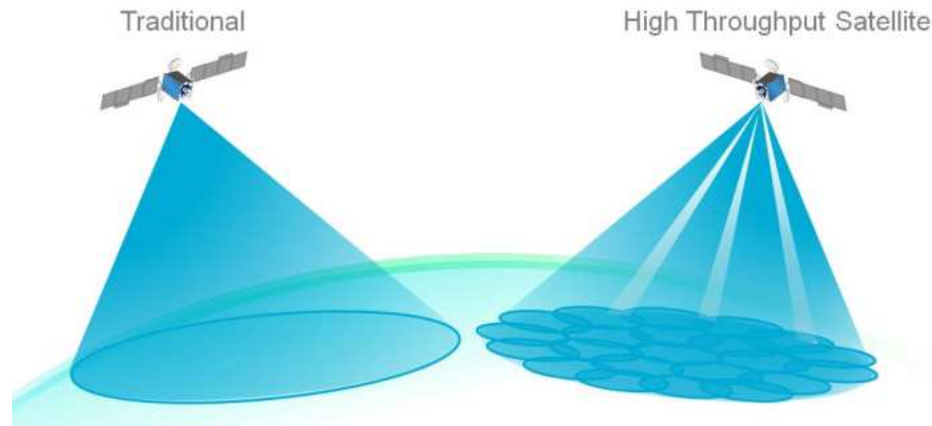
**TYPES OF
SATELLITE ORBITS**

LEO/MEO Satellite Constellations: Many Advantages as Compared to GSO Systems

- Range advantage as compared to GSO networks
- High Elevation Angle Advantage especially for high latitude geographical areas as compared to GSO Networks
- Large Scale Frequency Reuse leading to efficient use of spectrum
- High Capacity to meet worldwide demand for broadband connectivity At affordable Prices
- Low latency as compared to GSO networks
- Use of Inter Satellite Links (ISL) enabling latency better than those of fibre optics links
- Worldwide coverage – Communications Services are possible in rural, urban, oceans, airspaces, difficult terrain conditions, etc

High Throughput Spot (HTS) Satellites - An Important Development

- High Throughput Spot (HTS) Satellites using hundreds of Spot Beams cover large geographical areas.
- Global coverage of such satellite constellations; geostationary and non-geostationary based infrastructure will transform the world into a “global village”.



Difference between Traditional Satellite Beam and HTS Spot Beams

LEO / MEO Communications Systems

- Recent Successes

Taking advantage of the advances in computer and communications technologies and innovations, LEO and MEO satellite projects proposed now are becoming successful. These Systems are in implementation phase :

- Starlink of SpaceX – Plans huge number of Satellites in the Low Earth Orbit (LEO) - Very attractive offers - data speeds in the range of 50Mb/s to 150Mb/s and latency from 20ms to 40ms - Service priced at \$99 Media claims Starlink will be one step ahead of Jio in India.
- OneWeb (legally Network Access Associates Ltd) is a global communications company building a capability to deliver broadband satellite internet services worldwide. OneWeb is a network of more than 650 low Earth orbit satellites; Commenced launches in February 2019. UK, Bharti Enterprises and Hughes Network Systems own OneWeb.
- SES O3b MEO is a satellite constellation orbiting in Medium Earth orbit (MEO) and designed for telecommunications and data backhaul from remote locations. The first four O3b satellites reached orbit in 2013. The second four satellites were launched in 2014 and the O3b system started full commercial service on 1 September 2014.

O3b mPOWER is a terabit-level system – Claims most powerful and competitive system.

Game Changing Innovations Enlarging New Satellite Communication Applications

Traditional Satellite Communications are: DTH, VSAT, SNG and TV distribution applications

Integration of satellite communications with terrestrial mobile communications lead to Large Variety of New Applications:

Use cases	Examples	Number of sites
Trunking and head-end feed	Service to remote areas; special events	Limited to unserved areas in a carrier's network
Backhauling and Multicasting tower feed	Surge capacity to overloaded cells, plus content delivery (e.g. video) to local caches; efficient broadcast service to end users	Thousands
Communications on move	In Flight Connectivity for Aircraft; connectivity directly to land vehicles; broadband to ships and trains	Potentially millions
Hybrid multiplay	Video and broadband connectivity directly to home or multi-tenant building with NGAT distribution in building	Potentially millions

Increasing Scope of Satellite Communications

To Sum Up

- In future international standards for integration of satellite technologies like GSO and NGSO satellite systems and advanced versions of HTS systems with 5G type terrestrial mobile communications networks will be developed and applied worldwide. Such an approach will strengthen the role of satellite communications.
- Since there are many new developments in the field of satellite communications, a lot of work needs to be done by experts in different areas of expertise like technical, radio frequency spectrum, applications, operations, finance, policy, legal, insurance, management, marketing and others.

SATELLITE COMMUNICATIONS – POLICY ASPECTS

Policy Aspects - Studies, Analysis and Research Based work

- Policy related studies, analysis and research are vital for ensuring orderly development of Satellite Communications Services and Industry in the country.
- The stake holders including Management consulting firms and Law firms participate in such studies.
- This Lecture provides preliminary information on SATCOM Policy and Space Act.
- Viewers are requested to refer to the original and latest documents.

SATCOM Policy

- In 1997-2000 time frame, the Department of Space, in partnership with the Department of Telecommunication and the Department of Science and Technology, framed the Satellite Communication Policy in 1997 (**SATCOM Policy**).
- Through the SATCOM Policy, the government aimed to develop a strong satellite communication service industry in India
- Policy to enable private companies in India to own and operate Satellite Systems known as Indian Satellite Systems (ISS).

SATCOM Policy 2000

- SATCOM Policy (1997) did not specify the manner in which the policy can be implemented
- In the year 2000, Department of Space (DOS) formulated the norms, guidelines and procedures for implementing the framework of SATCOM Policy.
- The norms and guidelines issued by the Department of Space focused on the use and development of the INSAT network, procedures for companies registered in India to own satellite systems, eligibility criteria and relaxations in FDI conditions, preferential treatment to Indian Satellite System (ISS), Indian Orbital Slot, ITU Filing through India made mandatory for Indian Satellite System (ISS), allocation of capacity for use of Indian satellites by private service providers, etc.
- However, both the SATCOM Policy (1997) and the subsequent guidelines (2000), after their initial hype, failed to generate private Satellite Ownerships (ISS) due to several reasons.

Recommendations on Satcom Policy in the National Digital Communication Policy, 2018

- There has been lot of discussions to review and revise the 1997 /2000 Year SATCOM Policy to make it at par with the emerging trends
- Consequently, the National Digital Communication Policy, 2018 (NDCP 2018) agreed to a long standing demand of the industry to review the SATCOM Policy developed in 1997 and 2000 time frame.
- NDCP 2018 accordingly suggested several measures by which the satellite communication technology can be strengthened in India.

New Satcom Policy (Draft)

- Draft Space Based Communication Policy of India-2020 (Spacecom Policy- 2020) and draft Norms, Guidelines and Procedures for implementation of Spacecom Policy-2020 (Spacecom NGP-2020) are published for public consultation by DOS.

https://www.isro.gov.in/sites/default/files/draft_spacecom_policy_2020.pdf

- The new Policy fosters promotion of Indian industry as co-traveller with DOS towards meeting the objectives.

New Satcom Policy (Draft)

Under the ambit of Spacecom Policy-2020, the Government of India shall –

- - adopt measures to monitor and authorize use of space assets for communication to or from Indian territory.
- - ensure protection of space assets already put in place and adopt measures to bring in more space assets under the administrative control for enhancing ability to utilize space based communication for national needs.
- - promote increased participation of commercial Indian industry to provide space based communications both within the country and outside.
- - concentrate on realization of space based communication systems for addressing the requirements that cannot be effectively, affordably and reliably satisfied by commercial Indian Industry either because of national security concerns or economic factors.
- - provide a timely and responsive regulatory environment for the commercial Indian industry to establish and operate space based communication systems

What is the Important Addition in the New Draft Satcom Policy?

Creation of IN-SPACe:Satcom Authorization Centre

- As per Draft Space Based Communication Policy of India – 2020 (Spacecom Policy - 2020), Indian National Space Promotion & Authorization Center (IN-SPACe), an independent body, under Department of Space (DOS), shall accord necessary authorizations and permissions for all satcom related activities, to or from Indian territory, as per the applicable acts, regulatory provisions & exemptions and statutory guidelines.

IN-SPACe is to Ensure Independent Actions on Regulations

Web References:

- <https://www.isro.gov.in/sites/default/files/article-files/indias-space-policy-0/satcom-policy.pdf>
- <https://www.isro.gov.in/sites/default/files/article-files/indias-space-policy-0/satcom-ngp.pdf>
- <https://www.ilntoday.com/2020/07/indian-satellite-communication-policy-the-recent-reforms/>
- https://www.isro.gov.in/sites/default/files/draft_spacecom_policy_2020.pdf

Space Act

Background Information on Space Activities Bill

International Treaty Obligations on Outer Space Activities:

- Internationally, the outer space activities are governed by relevant chapters of international law in general and by United Nations' (UN) Treaties and principles evolved under UN Committee on Peaceful Uses of Outer Space (UNCOPUOS) in particular.
- Obligations of a State Party under international treaties on outer space activities are expected to be complied/ discharged through national mechanisms, namely domestic space legislations.
- Basic tenets of treaty obligations, namely, 'bearing International responsibility' and 'liability for damages caused by space activities and space objects' are more applicable to a State Party, where space activities are performed by non-governmental/ private sectors.
- Hence, non-governmental space activities are required to be licensed / authorized and continuously supervised by a State in order to comply with treaty obligations.

Drafting Space Activities Bill

- Applications and services for national needs and beyond have been rapidly growing.
- This scenario also encourages the participation of Indian industry and service providers at much higher levels in all round space activities
- Need for national space legislation for supporting the overall growth of the space activities in India
- Efforts included studies on Model Law on National Space Legislation formulated by the International Law Association (ILA), to the UN Committee on Peaceful Uses of Outer Space (UNCOPUOS) serves as a useful reference.
- A draft Space Activities Bill has been formulated with due preliminary consultations with a few relevant Ministries. It is intended to have a basic framework with very essential provisions for treaty obligations.

Draft Scope of Space Activities Bill

- The provisions of this Act shall apply to every citizen of India and to all sectors engaged in any space activity in India or outside India
- A non-transferable licence shall be provided by the Central Government to any person carrying out commercial space activity
- The Central Government will formulate the appropriate mechanism for licensing, eligibility criteria, and fees for licence.
- The government will maintain a register of all space objects (any object launched or intended to be launched around the earth) and develop more space activity plans for the country
- It will provide professional and technical support for commercial space activity and regulate the procedures for conduct and operation of space activity
- It will ensure safety requirements and supervise the conduct of every space activity of India and investigate any incident or accident in connection with the operation of a space activity.

<https://www.thehindu.com/sci-tech/science/the-hindu-explains-what-is-the-space-activities-bill-2017/article20680984.ece>

https://www.prsindia.org/sites/default/files/bill_files/Draft%20Space%20Activities%20Bill%202017.pdf

SATELLITE COMMUNICATIONS – LEGAL ASPECTS

Satellite Communications – Legal Aspects

- Satellite operators need to enter into contracts and agreements for collaborating with various agencies like government/authorities, vendors, customers, business partners, etc.
- This Part of the Lecture briefly discusses Satellite Contract, Satellite Transponder Lease Agreement and Orbital Slot Agreement.

SATELLITE CONTRACT

- Satellite operator entering into contract with satellite manufacturer for manufacturing of the satellite is an important activity.
- Technical specifications of the satellite to be built are predetermined by the satellite operator.
- Occasionally such technical specifications can be jointly also decided by satellite manufacturer and the satellite operator.
- In the Satellite Contract, a provision is built for in-orbit delivery of the satellite at the nominal Orbital slot / orbital parameters specified by the satellite operator and in such cases launch vehicle related work is also the responsibility of the satellite manufacturer.
- While satellite communications engineers and experts are responsible for the technical specification related work, professional lawyers or law firms play important role in dealing with the legal aspects of the satellite contract clauses.
- Annexure 1 of Lecture Transcript lists the key topics addressed in the satellite contract for information and academic study purpose. Web References are also given.

Satellite Transponder Lease Agreement

- The main business of the satellite communications is lease of satellite transponder capacity to service providers like DTH Service Provider, VSAT Service Provider, etc.
- The leases could be lease of the entire capacity on the satellite or only the selected transponders only. The lease periods also vary from short term to long term.
- Annexure 2 of Lecture Transcript lists the key topics addressed in the satellite transponder lease agreement for information and academic study purpose. Web References are also given.

Orbital Slot Agreement

- Orbital Slots and Frequencies (Orbit-Spectrum Resources) need to be internationally coordinated in accordance with ITU Radio Regulations and Notified with ITU BR (Radiocommunication Bureau). Only such coordinated and registered Orbital Slots can ensure interference free operations of satellites and thereby enjoy international legal rights in the form of international recognition and protection.
- Under normal circumstances, organisations/Countries responsible for internationally coordinated and registered Orbital slots cannot transfer the rights to other Organisations/Countries as per ITU radio Regulations.

Orbital Slot International Responsibility Requirement as per ITU and UN

- Organisation/country holding coordinated and internationally protected Orbital Slots may nominate other organizations to make use of such internationally coordinated Orbital Slots for a specified period through an Orbital Slot Agreement. The satellite must be launched and operated within the validity period of the ITU Notification.
- Organisation / country which coordinated and registered the Orbital Slot continues to be responsible to ITU for use of the Orbital Slot.
- The key requirement of the Orbital Slot agreement is that the State (Government) concerned must be responsible to ITU for use of the coordinated and registered Orbital Slot. It may be mentioned here that ITU is a specialized agency of the United Nations (UN).

Drafting Orbital Slot Agreement

- Orbital Slot Agreement between parties needs to be drafted carefully taking into account the various provisions of ITU Radio Regulations, approvals and regulations of national level authorities, international Orbital Slot coordination rights and obligations, nomination period, terms of nomination, terms of payments, effective date of agreement, various rights and responsibilities of parties, Termination Clauses, Penalty Clauses, Representations and Warranties, Liability and Indemnification, Dispute Resolution, Applicable Law, Arbitration, Force –Majeure, etc.
- Legal experts play an important role in drafting the Orbital Slot Agreement documents.

Future Work

- In the field satellite communications, there are wide range of topics like licence/authorization agreements, finance, investments, foreign direct investment, insurance, mergers, acquisitions, competition commission regulations, antitrust issues and operational matters like international communications, international gateway operations, interconnection agreements for national and international communications, tariff sharing, etc involve Policy and legal considerations.
- As said in the beginning, this lecture provides only outlines with certain examples and further work is necessary to elaborate the ideas discussed in this lecture.

THANK YOU