CHAPTER I
ORIGIN AND TECHNOLOGICAL ADVANCES
OF COMMUNICATION SATELLITES

A HISTORICAL PERSPECTIVE:

In the larger interests of world interdependence\(^1\) the role of communications\(^2\) could hardly be exaggerated.\(^3\)

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1. Advances in the field of communication technology have interwoven the world at economic, political, social and cultural levels. See UN GA, Development and Strengthening of Good Neighbourliness Between States, Resolution 34/99 of 14 December 1979. See also, generally, Mihely Simai, Interdependence and Conflicts in the World Economy, Tr. by Istvan Veges (Budapest, 1981); John A. Pincus, Reshaping the World Economy: Rich and Poor Countries, (New York, 1968); C. Furtado, Development and Underdevelopment (California, 1964)

2. There is no single universally acceptable definition of communications. However, over the last few decades the technological and quantitative dimensions of communications have received emphasis from both scholars and policy makers. Departing from the somewhat orthodox views of communications a UNESCO study emphasizes on communications as a process and not on communications as a means. The study further asserts that... "one may speak of the so called 'information age' in which individual, group, national and international communications are coming to be seen not only as hardware and software development, but more important as behavioural and social development as well." Hamid Mowlana and Laurie J. Wilson, Communication Technology and Development, UNESCO Reports and Papers on Mass Communications, No.101 (UNESCO, Paris, 1988), p.9; See also, UNESCO, Many Voices One World: Communication and Society Today and Tomorrow, The MacBrige Report, (abridged edition), Appendix I (Paris, 1984), pp.237-38; K.E. Andersen, Introduction to Communication Theory and Practice, (Cummings, 1972), p.8; James H. Platt, "What Do We Mean by Communication", Journal of Communications, Vol. 5:1, (Spring, 1955), p.21

"Through increasingly efficient and by now worldwide communications the cushion of space and time that earlier separated cultures and societies has disappeared."⁴ It is an established fact that no single country, no matter how self-sufficient it is, can function effectively in the global arena without the co-operation of other nations. As a U.N. resolution notes, "The great changes of a political, economic and social nature as well as the scientific and technological progress which have taken place in the world have led to unprecedented interdependence".⁵

The visionary Arthur C. Clarke in his article entitled "Extra-terrestrial Relays: Can Rocket Stations Give Worldwide Radio Coverage?", foresaw in 1945 the use of artificial earth satellites in extending the reach of communication.⁶ However it was another twelve years before

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5. Resolution 34/99, n.1

In this article Clarke propounded the notion of combining rocketry and microwave engineering to provide artificial earth satellites in geostationary orbit serving as relays for transmissions from the earth. He suggested that three artificial satellites located in a triangular pattern in geostationary orbit would allow near instantaneous communications from almost any point in the world.
satellite communications were revolutionized with the launch of the 'Sputnik' an artificial satellite by the Soviet Union in 1957. The advance and change in communications technology since then has been phenomenal and came about in three phases. The first period, from the mid 1950s to the 1960s, was a period of tremendous growth in technology. The 1970s were a period of experimentation which resulted in many projects in the application of space technology. The third phase, the 1980s, has been a period of operationalization and institutionalization of previously experimental programmes at national and regional levels.

PASSIVE AND ACTIVE SATELLITE SYSTEMS

Space communication technology received a major thrust on account of the space race between the Soviet Union and the United States. Early improvisation in this direction were metallized balloons launched by rockets to sufficient altitude and placed in orbit around the earth, combined with the required ground segment, which made a "passive"

7. In fact space communications had already begun during the previous decade using the moon as a reflector for messages from the earth. For details See Edward W. Ploman, Space Earth and Communication, (Westport, Conn., 1984), pp.50-53

8. See, Mowlana and Wilson, n.2, p.32

9. For example, in the late 1960s and the 1970s The United States' National Aeronautics and Space Administration (NASA) ATS(Application Technology Satellite) satellite series and the joint United States Canadian CTS (Communication Technology Satellite) system provided the opportunity for abundant and diverse experimental programmes. See. Mowlana and Wilson. n.2. p.33.
satellite communication system possible. The United States, Echo I, launched in August 1960 and used for relay of telephonic, fascimile and other data, successfully realised this concept. The long period during which Echo I functioned satisfactorily - nearly eight years - created considerable interest in the project. But these passive type satellite had inefficient transmission power besides other disadvantages. With the advent of increasingly miniaturized electronic equipment, launch of remote-controlled transmitters became possible and experiments were undertaken with "active" satellites.

The advantages of such active satellites proved superior to the passive type so much that developments were concentrated almost exclusively on the active type of satellites. The first active satellite "Courier" was launched by the United States in 1960. And within a few years development had progressed from the use of the large balloon type reflectors to sophisticated repeaters. The Telstar and Relay satellites of the United States were a

10. A satellite communication system came to be understood to comprise both, i.e., the satellite with the necessary control and tracking facilities, known as space segment and the associated earth stations, known as ground segment.


12. An active satellite is one whose communications package, or repeater receives the signal from the earth, translates its frequencies as required, amplifies and retransmits the signal to the earth. Ibid.


14. Ibid.
major scale experiments for intercontinental, wideband communications including television transmissions. By 1962 the United States Telstar I was broadcasting the first intercontinental television demonstration between Europe and the United States.\textsuperscript{15} Thus satellite communication may be said to have passed through an "experimental period lasting about five years,\textsuperscript{16} followed by an initial utilization period which now has resulted in full operational status".\textsuperscript{17}

**MEDIUM ALTITUDE SATELLITES**

A Medium or low altitude satellite is placed in the orbit at the height of 6,000 to 12,000 miles. This system requires an elaborate scanning, tracking and high powered receiving equipment. Due to the curvature of the earth a satellite remains within the line of view of a particular pair of transmitting and receiving stations only for a short time. And a satellite can operate so long as it is within


\textsuperscript{16} In 1966 the Applications Technology Satellite (ATS) was launched by NASA for experiments in communications. Ibid.

\textsuperscript{17} Ploman, n.11, p.9
the line of view of the pair of stations concerned. Thus a medium-altitude system requires the use of several satellites for global coverage.18

**GEOSTATIONARY SATELLITES**

Clarke's notion19 became a reality when NASA launched the first geostationary satellite, SYNCOM I, in 1963.20 SYNCOM could relay one television channel21 or a few dozen telephone conversations round the clock and needed less complicated antennae on the ground.

Two years later Clarke's vision of an international satellite communication system was also realized with the launch of a similar satellite EARLY BIRD.22


19. See, page 16 of this study.


21. When a satellite provides a one-way connection from a sending station on the ground through a transponder to a receiving station on the ground that is called "Channel". If the satellite is relaying signals in both directions, as in a telephone conversation, that is called a "Circuit". Ibid, p.83.

22. The EARLY BIRD was the first commercial satellite owned by International Telecommunications Satellite Organisation (INTELSAT). It provided 480 units of utilization across the Atlantic and could connect only two earth stations at a time. See, M. Snow, *Satellite Communications: Economic and Political Issues of the First Decade of INTELSAT*, (New York, 1976), p.7.
Geostationary satellite system is an alternative to the medium or low altitude satellite system. A geostationary satellite is placed in the orbit\textsuperscript{23} at a point of some 22,300 miles (35,786km) above the equator. In this orbit a satellite circles the globe at a speed that is in synchronization with the speed of the earth's rotations. To an observer on the earth, it seems to hang in space, fixed and immobile.\textsuperscript{24} In this system one satellite is capable of covering 160 degrees of the globe except for both the polar caps. Thus the system requires only three satellites to make it possible to provide worldwide coverage.

Realizing other operational advantages of the geostationary satellite system, Ploman in a study notes that the fixed location and orientation of such satellites allow for the use of highly directive (focused) antennae capable of producing more powerful coverage of a selected area of the earth's surface.\textsuperscript{25} Of course if the satellite's radiated

\textsuperscript{23} Geostationary orbit has a characteristic that a satellite in it, moving in the direction of the rotation of the earth appears stationary when seen from the earth. This is a unique characteristic of this type of orbit, not shared by any other type. See, Zhao Lihai, "Some Legal Problems on International Direct Broadcasting Satellites" in Communications : Includes Telecommunications, Thesaurus Acroasium, Vol.XV, Session 1984 (Thessaloniki, 1987), p.169.


\textsuperscript{25} Ploman, n.11, p.9.
signals were spread out over the entire hemisphere, the signal strength received at any location in the hemisphere would be very small. Therefore, it is useful to confine the radiated signal to geographically limited regions on the earth's surface.  

**ADVENT OF DIRECT BROADCAST SATELLITES (DBS)**

The growth of geostationary satellites can be scheduled in three successive stages:

[A] **Point-to-Point Satellite:** The satellites in use till 1972 were exclusively point-to-point (also known as fixed) satellites. The point-to-point satellite establishes communication between one earth station and one or more others. The signal sent by the satellite transmitter is relatively weak and requires wide antennae and sophisticated receiving and amplifying installations.

The International Telecommunication Union (ITU) has defined the point-to-point or Fixed satellite service as:

"a radicommunication service between earth stations at given positions, when one or more satellites are used;"

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the given position may be a specified fixed point within specified areas; in some cases this service include satellite-to-satellite links which may also be operated in the intersatellite service; the fixed satellite service may also include feeder links for other space radiocommunications services". 29

[B] **Distribution Satellite:** At the next stage comes the so-called "distribution satellites" which involves the use of community receivers. 30 The signal sent by distribution satellite is strong enough to be received by small, less complicated earth stations with less complicated and small antennae. These stations do not require highly qualified technical staff of point-to-point satellite and are relatively cheap. From the community receivers the signal received is distributed to individual receiving stations sets either by a conventional ground broadcasting station or by cable. 31

29. At the time of adoption of this definition, in 1963 it was anticipated that fixed satellites would be of such low power as to require extremely large earth stations and thus, would be incapable of direct reception by the general public. Nevertheless, it is now agreed that fixed satellites can provide adequate service to the small, individually owned receivers.


31. Ibid.
Direct Broadcast Satellite (DBS): The latest addition to the satellite broadcasting technology is the Direct Broadcast Satellites (commonly known as DBS) which will further simplify and lower the cost of communication process. In this case sound radio or television programmes transmitted from an earth station to a powerful geostationary satellite will be broadcast from the satellite for reception by individual receivers, without the need for intermediate earth stations.

It is this category of satellites i.e. the direct broadcast satellites, and the issues concerned with them, that form the subject matter of the present study.

A DBS satellite is launched and controlled in the same manner as any geostationary satellite, yet its ability to beam much more powerful signals than other satellites back to the earth makes it greatly distinct.

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32. Since the signal would not have to be retransmitted as in a point-to-point satellite system or in a distribution-type system, there would not be technical complications that are sometimes involved in the retransmission process. Direct broadcasts would also be relatively less costly, since there would be no need for expensive point-to-point equipment and large operating expenses. In fact the success of the American Satellite Television Corporation (STC) system proves that the cost of a satellite receiver is now reduced to the extent that it has been brought within the economic reach of nearly every household in the US. See, Christol, n.30, p.606. See also, Zhao Lihai, n.23, p.170.
from the ordinary communication satellites.\textsuperscript{33} Also whereas traditional point-to-point transmission is limited to a coverage area of approximately 7,500 to 10,000 square miles, an area which may be enlarged to 150,000 square miles by means of an airborne station, DBS covers a surface of about 1,000,000 square miles.\textsuperscript{34} Thus the system requires only three satellites to provide adequate worldwide coverage, as already stated elsewhere.

The World Administrative Radio Conference for space telecommunications, (WARC-ST) that met in Geneva in 1971, has defined broadcasting-satellite service thus:

"a radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public."\textsuperscript{35}

A footnote to this definition provides that "in the broadcasting-satellite service, the "direct reception" shall encompass both individual reception and community reception".\textsuperscript{36}

\begin{itemize}
\item \textsuperscript{33} DBS signal is so powerful that it can be picked up by a dish antenna no bigger than an umbrella. See, Singleton, n.20, p.89.
\item \textsuperscript{36} Ibid.
\end{itemize}
Individual reception is specified as:
"the reception of emission from a space station in the broadcasting-satellite service by simple domestic installations and in particular those possessing small antennae". 37

Community reception is described as:
"The reception of emission from a space station in the broadcasting-satellite service by receiving equipment, which in some cases may be complex and have antennae larger than those for individual reception, and indeed for use:
- By a group of the general public at one location, or
- Through a distribution system covering a limited area. 38

Further, signal reception techniques have been classified into three categories:

1. direct satellite broadcasts could reach into community receivers which include a receiving antenna intended to serve a school or small village with a signal distribution system.

2. direct-to-home broadcasting could require the use of augmented receivers which would have more elaborate antennae systems than normally found in home television sets.

3. the service could broadcast into unaugmented home receivers. 39

37. Ibid, p.42.
38. Ibid.
OBJECTIVES OF DBS

The Direct Broadcasting satellite has limitless potential to serve the interest and welfare of mankind. The objectives of satellite broadcasting mentioned by the Working Group on Direct Broadcast Satellites (WGDBS) at its second session in 1969\(^{40}\) include "the advancement of the principles and purposes of the United Nations; the increase of knowledge.....improved education and health benefits; greater flow of news and information of general interest; and the development of closer ties between peoples, within and between countries".\(^{41}\) The Working Group specifically mentioned that direct broadcasting from satellites into community receivers will permit the acceleration of programmes of national integration, and economic and social development in such areas as agriculture, health and family planning, community development and culture.\(^{42}\)

The purposes and objectives set out in the "Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting"\(^{43}\) are the following:

Activities in the field of international direct television broadcasting by satellite should........promote the free dissemination and mutual exchange of information and knowledge in culture and scientific fields, assist in

\(^{41}\) Ibid.
\(^{42}\) Ibid.
\(^{43}\) Adopted by the United Nations General Assembly on 10 December 1982, Resolution 37/92, Annexure.
educational, social and economic development, particularly in the developing countries, enhance the qualities of life of all peoples and provide recreation with due respect to the political, and cultural integrity of states. 44

These activities should be carried out in a manner compatible with the sovereign rights of states, including the principles of non-intervention, as well as with the right of everyone to seek, receive and impart information and ideas as enshrined in the relevant United Nations instruments, development of mutual understanding and the strengthening of friendly relations and co-operation among all states and peoples in the interest of maintaining international peace and security. 45

The objectives formulated by The United Nations Educational, Scientific and Cultural Organisation (UNESCO) refer to the expansion of the free flow of information, education, the universal dissemination of knowledge, cultural exchange, and economic, social and cultural development. 46 UNESCO stated to achieve all these objectives on the basis of international co-operations. 47

In general, the objectives and purposes of direct of broadcast satellite, set out by various fora reflect a similar theme.

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44. Ibid, para. 2.
45. Ibid, para. 3.
47. Ibid.
A THIRD WORLD PERSPECTIVE

The potential benefits of direct broadcast satellites are more important to the Third World than to developed industrial nations. As a group the Third World countries are characterized by high rates of illiteracy and widely dispersed, heterogeneous populations. As direct broadcast satellites make it possible to link together isolated rural communities and distant centres of population, it would offer immense assistance to the developing countries. A report of the United Nations Working Group on Direct Broadcast Satellites states:

"Direct broadcast satellites offer an opportunity to the developing nations which have still not developed a general telecommunications network, for this new means permits the acceleration of their national programmes of integration, economic development, health, family planning, agricultural education, community development and culture". 

Similar views were expressed by UNESCO:

"Taken in conjunction with new techniques of tele-education, space communication would enable developing countries to accelerate the educational process....furthermore satellite communication can reinforce links between communities and thus help to strengthen the bonds of national identity and contribute to nation-building".


50. n.46, p.7.
For countries such as India and Indonesia, whose vast territories are widely scattered and remain inaccessible by traditional means of communication, direct broadcast satellites can provide better and relatively cheap communications. Ploman observes "...we now have at our disposal a communications device which does not automatically favour the cities. Once a satellite is available, it covers an entire territory and the installation of receiving equipment can be arranged according to social desirability without being dependent on distribution constraints due to lack of a communications infrastructure".51

To demonstrate the above mentioned benefits of direct broadcast satellites, the Indian experiment is of prime significance for the developing countries. In 1969, an agreement between the Indian Space Research Organization (ISRO) and U.S. National Aeronautics and Space Administration (NASA) was concluded which provided for an experimental instructional television satellite project (ITV).52 On the basis of this agreement, the world's first experimental direct broadcasting satellite, ATS-6, utilized


in support of the Indian Satellite Instructional Television Experiment (SITE) was launched by NASA on May 30th 1974. The ISRO telecast educational programmes by ATS-6 to some 5,000 Indian villages from a ground station at Ahmedabad. The programme content was agriculture, the impact on farm productivity in the receiver equipped villages was compared with productivity in control village not so equipped, and the results were considered favourable.

Despite such conceivable advantages, there is evidence of concern, even suspicion, over possible misuse of this new technology. The fear has been that inimical programmes might be broadcast from one State into another for purposes of propaganda, inciting hatred, mocking religious beliefs,

53. According to the Memorandum of Understanding, the experiment had three objectives: (1) to improve agricultural techniques, (2) to disseminate family planning information, and (3) to attain national integration. In addition to these, four secondary applications were worked out. These include general and adult education, teacher training, occupational instruction and improvement of health and hygiene. Ibid, p.5.


or causing dissatisfaction by raising false socio-economic expectations.\textsuperscript{56} There is also possibility of interference in the internal affairs of foreign states, "the invasion of national privacy, unfair economic competition against local television services by international broadcasters, and a challenge to state regulation of broadcasting including the consequences of military revelations, attacks on national morals and values, and violations of the rights of copyrights owners.\textsuperscript{57}

Unfortunately, since the beginning of broadcasting, experience has shown that sometimes it is or could be misused to contrary purposes, to incite the population of other countries to act incompatible with internal order, to incite them to war or to acts likely to lead to war, and to the general detriment of harmonious international relations.\textsuperscript{58}

These concerns focus more directly on the use of television by direct broadcasting satellites. Indeed DBS


would not create significant problems for radio broadcasting, as Chayes notes, "the international community has been living with the problems of interference, propaganda and protection of programme content created by ability of national broadcasting entities to transmit their programmes at long range across state lines". But for television the advent of direct broadcast satellite has an entirely different significance. Dauses observes, that "contrary to pure sound transmission, the visual presentation of television broadcasts has not only a far stronger effect on the public at large, but is also unimpeded by linguistic barriers". Collaborating this view, Paul Laskin and Abram Chayes in a study note that "Television has an immediacy and an impact...a capacity to engage men's mind and to move them for good or ill—that no other mass medium has".


60. Ibid, p.3. From 1968 to 1974 the UN Working Group concentrated on DBS, but from 1974 to the present it has turned its attention to DTB(Direct Television Broadcasting). The change in focus resulted from the adoption of the General Assembly Resolution 2916(XXVII) of November 14, 1972, which requested COPUOS(Committee on the Peaceful Uses of Outer Space) to "elaborate principles governing the use by states of artificial earth satellites for direct television broadcasting with a view to concluding an international agreement or agreements". See Christol, n.30, p.605.

61. Dauses, n.34, p.60

These are not presumptions only, but in reality the Third World, with its typical socio-economic and political structure, is very much vulnerable to the adverse effects of DBS. There may not be an ulterior motive in telecasting a particular programme but it is beyond doubt that what one country might deem a documentary may be seen as a propaganda in another country.

In fact the developing countries are very much inclined to avail themselves of the services of DBS. But what makes them scared is the total concentration of this technology in the developed countries, which the developing countries think, not without reasons,\(^{63}\) is detrimental to their own culture and economy.

**NEED FOR DBS REGULATIONS**

The Direct broadcast satellite from the very outset, is a world-wide undertaking. Hence it encompasses wide political, social, cultural, economic, legal and ideological problems. These problems include the concept of free flow of information across national boundaries, political, technological and cultural dimensions of state sovereignty, state responsibility, prior consent, spillover, frequency distribution, signal piracy, issues related to copyrights

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\(^{63}\) DBS was assessed early as another possible channel for capital expansion, particularly into the markets of the Third World, which had already proved to be profitable outlets for the sale of American films, television programmes, advertising, periodicals and other cultural products. Sara Fletcher Luther, *The United States and the Direct Broadcast Satellite: The politics of International Broadcasting in Space.* (New York. 1988). p.5
and neighbour's rights, right to privacy and human rights, unfair practices concerning advertisement and conflict of national laws, cultural imperialism etc.

Last but not the least, the number of parking slots over the equator are limited. By 1990 the number of satellites in the orbit were expected to double, potentially creating problems of interference between the satellites and a shortage of parking slots.64

However, whether the debates focus on sovereignty or free flow of information, cultural imperialism or prior consent or any other aspect, the basic issues ultimately rest upon fundamental differences over what constitutes acceptable information and how such information should be regulated.65 Indeed the 25-year debates in various fora over the appropriate regulation of the DBS activities have revolved mainly around the efforts to establish methods for controlling the limits of permissible programme content.

In order to make direct broadcast satellites a global reality it is pertinent to resolve the issues which are impeding the smooth functioning of DBS at international level.66 The various national, regional and international fora which have been dealing with the issues related to DBS have felt the need for regulations for such an international

64. Singleton, n.20, p.94
65. See, Lihai, n.23, pp.169-207
activity. For example, the International Telecommunication Union (ITU) has contributed towards international agreements on certain aspects of DBS activities. Yet the unresolved issues require a uniform set of rules to give DBS a real international character.

Before discussing these issues at length, it would be appropriate to have a brief account of the existing operational systems of satellite broadcasting.

EXISTING OPERATIONAL SYSTEMS

The fora concerned with the activities of direct broadcast satellites could, on the basis of their working nature, be categorized into two distinct groups:

1. Bodies concerned with the regulatory aspects of DBS, such as UN COPUOS, ITU, UNESCO, and similar other bodies, and

2. Bodies concerned with the operational aspects of DBS, such as the International Telecommunications Satellite Organization (INTELSAT), European Telecommunications Satellite Organisation (EUTELSAT), the International

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67. The World Administrative Radio Conference on Space Telecommunications (WARC-ST) has taken measures and adopted resolutions concerning the definition of broadcasting satellite service, the use of frequencies of space radio-telecommunications services by all countries on a basis of equality. It has also revised the table of frequency allocations: determined, inter alia, the necessity of introducing new provisions with regard to the use of the geostationary orbit.

Maritime Satellite Organization (INMARSAT), International Organisation of Space Communication (INTERSPUTNIK), International Organisation of Space Communications (INTERSPUTNIK) etc. These bodies could further be classified as International, Regional, and National. What follow here are brief accounts of these systems.

INTELSAT

The phenomenal development in the field of space communications led the United States to enact the Communications Satellite Act of 196268 "to serve the communication needs of the United States and other countries, and which will contribute to world peace and understanding".69 Ploman observes that "the two major objectives of United States foreign policy on satellite communication were to protect the national interest and to further international co-operation under American leadership".70 Early international contacts had mainly been conducted by NASA with the telecommunications agencies of other countries.71

The purpose of the 1962 Act was to create a Communication Satellite Corporation (COMSAT)72 which had to work through an international organization, to achieve

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69. Ibid.
70. Ploman, n.7, p.75
71. Ibid.
72. COMSAT was incorporated on February 1, 1963, in the District of Columbia. For a historical chronology of COMSAT, See, COMSAT: Communications Satellite Corporation Magazine, No.12, (1983)
the goals of the Act. At this stage, with the participation of a few countries formal negotiations started in February 1964, to form an international forum for a global satellite telecommunications network. As a result of the negotiations these countries signed interim agreements establishing the well known International Telecommunications Satellite Consortium (INTELSAT) on 20th August, 1964. The interim agreement was complemented by a "special agreement" at the insistence of the Americans who

73. Section 102 of the Act reads:

"The new and expanded telecommunication services are to be made available as promptly as possible and are to be extended to provide global coverage at the earliest practicable date. In effectuating this programme, care and attention will be directed toward providing such services to economically less developed countries and areas as well as those more highly developed, toward efficient and economical use of electromagnetic frequency spectrum, and toward the reflection of the benefits of this new technology in both quality of service and charges for such services."

See, n.68, Section 102.

74. The countries were Australia, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, the Netherlands, Switzerland, the United Kingdom, the United States of America and the Vatican City State.


75. The Agreement was divided into two parts designated as "Agreement" and "Special Agreement". The Agreement to be signed by states and Special Agreement to be signed by governments or their designated telecommunications entities, public or private.

See, "Agreement Establishing Interim Arrangements for a Global Commercial Communications Satellite System and Special Agreement". 15:2 UST 1705(1964)
wanted to provide an arrangement whereby a formally non-governmental organization like COMSAT could enter as partner in these international contractual arrangement. 76 After an interim period of operation the Consortium became a permanent entity on 12 February 1973 with the signing of an intergovernmental "Agreement" and "Operating agreement". 77 The Consortium was renamed as the International Telecommunications Satellite Organization, retaining its original acronym, INTELSAT.

The preamble of the INTELSAT Convention provides 78 that INTELSAT has been established with the notion that satellite communications should be available to the nations of the world, as soon as practicable, on a global 79 and non-discriminatory basis. The preamble was derived from the United Nations General Assembly Resolution No.1721(XVI). 80

6. Ploman, n.7, pp.77-78


78. The INTELSAT Convention, Preamble.

79. Matte notes that "though the intention was to create a single global system, this goal was not accomplished from the outset because of Soviet bloc non-participation and insistence upon creating INTERSPUTNIK as a separate system."

80. See, United Nations General Assembly Resolution 1721(XVI) of 20 December, 1961
The membership of INTELSAT is open to any nation, subject to two provisions i.e., (1) it should belong to The International Telecommunication Union, (2) it should abide by the rules laid down under the INTELSAT Agreements. Since the prime objective of INTELSAT was to provide satellite communication services "on a global and non-discriminatory basis", the system was made available to non-members as well at the same charges.

Ownership of INTELSAT is shared by the member nations contributing to the capital requirements by subscribing to investment shares, the size of which are decided in accordance with their use of satellite services. The somewhat controversial methods for calculating these partly resulted in the quota for COMSAT of the United States being 61 percent, 30.5 percent went to the Western European countries and the rest to Australia, Canada and Japan. These quota would be changed with the adherence of further countries but in no case would the United States share drop below 50.6 percent.

INTELSAT is organised into four constituent parts, namely, the Assembly of parties, the Meeting of Signatories, the Board of Governors, and the Executive.

81. See Background Paper, n.74
82. Ibid.
83. Ibid.
84. Ploman, n.7, p.78
85. Ibid.
The Assembly of Parties as a principal organ looks into those activities of INTELSAT which are primarily of interest to the parties as sovereign states, including general policy and long term objectives of INTELSAT.\(^86\) The Assembly of Parties meets every two years and each member state has one vote in setting goals and policies.

The Meeting of Signatories is composed of the signatories to the INTELSAT Operating Agreement. It concerns itself with the technical, operational and fiscal aspects of INTELSAT.\(^87\) The signatories, having one vote each could participate through their telecommunications entities, whether public or private. It also sets general regulations and policies for the guidance of the Board of Governors on the basis of their recommendations for the operation and management of the INTELSAT system.\(^88\)

The Board of Governors is the main managing unit of INTELSAT. It is responsible for all decisions regarding the design, development, construction, establishment, operation and maintenance of the INTELSAT space segment and any other activity undertaken by the system.\(^89\) The Board meets as often as necessary, but at least four times a year. The Board is composed of the Governors\(^90\) and each governor controls a number of votes, equal to the investment share of

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86. *The INTELSAT Convention*, n.77, Article 7(b)
87. Ibid, Article 8(b)
88. See, *Background Paper*, n.74
89. *The INTELSAT Convention*, n.77, Article 10(a)
90. Ibid, Article 9(a) of the Convention deals with the composition of the Board of Governors
the signatory or group of signatories that he represents.\textsuperscript{91} The annual determination of the investment shares is based on how much a signatory utilizes the space segment.\textsuperscript{92} INTELSAT also convenes meetings of users of its satellites, as frequently as necessary, in order to consult with them on matters such as allocation of channels on new or proposed satellites.

Acting on the basis of policies and directives of the Board of Governors, the Executive is responsible for the everyday management functions of INTELSAT.\textsuperscript{93} The Executive is headed by a Director-General.

The worldwide functioning and co-operation on part of the member nations has established INTELSAT as an effective and highly successful organization. Yet certain developments seem to imperil the cherished goals of INTELSAT. Discussing the threat to INTELSAT, Matte states that the dream of a universal telecommunications network accessible on a non-discriminatory basis is threatened by two sources of competition. First, the move by the United States towards the establishment of private corporations\textsuperscript{94}

\textsuperscript{91} Ibid, Article 9
\textsuperscript{92} Ibid, Article 9(b)
\textsuperscript{93} Ibid, Article 11(b)
\textsuperscript{94} With the announcement of an "open sky" policy by the Federal Communications Commission (FCC) of USA the era of privately owned, domestic communication satellite began. In 1985 the FCC authorized three pending applications for private international telecommunications network. See "FCC Opens the Skies to DBS", \textit{Broadcasting} (June 28, 1982). p.27: See also Matte. n.79. p.69
of international satellite telecommunications services. Second, the advance of telecommunications cable technology into fiber optics.\(^9^5\)

**INTERSPUTNIK**

The prime position held by the Americans changed when, on 14 October 1965, the Soviet Union launched its first communications satellite, type MOLNYA. The MOLNYA satellites were heavier and larger than the American Satellites and were used for many purposes at one time i.e. for telecommunications, television transmission, and meteorology.\(^9^6\) The Soviet Union also initiated moves to establish an international satellite communications system, at the time when INTELSAT was being shaped. Prior to this the Soviet Union was formally invited to participate in the preliminary inter-governmental discussions which were held in October 1962 for the formulation of the Agreements to establish the INTELSAT, but it did not respond. The Soviet group expressed its view that the United States was bent upon commercial exploitation of communications satellites in a discriminatory fashion.\(^9^7\)

In 1965 the Soviet Union put forth a proposal to other socialist countries to undertake joint action in the

\(^{95}\) See, Matte, n.79, pp.66-75

\(^{96}\) Ploman, n.7, p.83

exploration and use of outer space. Accepting the proposal nine countries\textsuperscript{98} met in Moscow in the same year and again in 1977 to workout method of co-operation. In 1970 the second meeting reached an agreement on a programme of joint space activities, which was named as INTERCOSMOS.\textsuperscript{99}

INTERCOSMOS projects\textsuperscript{100} relating to space communications led to the creation of INTERSPUTNIK. A preliminary draft agreement on the creation of INTERSPUTNIK, as an international organisation, had been adopted by the representatives of the above mentioned countries at Budapest conference in 1968. The intergovernmental agreement on the establishment of INTERSPUTNIK as an international space communication system and organisation was signed in Moscow in 1971, which entered into force on 12 July, 1974.\textsuperscript{101}

INTERSPUTNIK is open to the states who have signed the 1971 agreement or acceded to it. The system comprises a space segment and an earth segment. The Space segment

\begin{itemize}
\item The nine countries were: Bulgaria, Cuba, Czechoslovakia, the German Democratic Republic, Hungary, Mongolia, Poland, Romania and The Soviet Union
\item See Background Paper, n.74
\item Ibid, p.28
\item The projects undertaken by INTERCOSMOS included: investigations of the ionosphere and magnetosphere, solar activity, cosmic rays, Space biology and medicine and a number of space flights. These flights involved cosmonauts from other member countries too. Ibid, p.30
\end{itemize}
consists of communication satellites and territorial guidance systems which are the property of all the members, and the earth segment consists of earth stations which are built by the member countries on their own territories and thus belong to them. 102

The Board, composed of one representative from each member state with one vote each, is the main governing body of INTERSPUTNIK. The Board concerns itself with broad policies, establishing standards, operating the satellite system, distributing the available channels, setting guidance for earth stations, and approving the budget. 103

Pursuant to the provisions of the United Nations General Assembly Resolution 1721 (XVI), 104 and the Space Treaty 105 the INTERSPUTNIK was established with a view to enhancing economic, technical, cultural and other relations as well as co-operation based on sovereignty, equality and non-interference in the internal affairs of States. 106

102. Ibid, p.680

103. Agreement on the establishment of the "INTERSPUTNIK" International System and Organisation of Space Communications, Moscow, 15 November, 1971, Article, 11,12

104. Resolution 1721(XVI), n.80

105. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, of January 27, 1967, Article 1

106. See, Preamble of the INTERSPUTNIK Agreement, n.103
INTERSPUTNIK was inevitably seen as a challenge to INTELSAT. Many observers were of the opinion that the Soviet plan had contributed to make an already difficult situation even more difficult.\textsuperscript{107} Others thought that the Soviet Union initiative indirectly served the purpose of necessitating new agreements over a global system.\textsuperscript{108}

**INMARSAT**

Recognizing the importance of a maritime satellite system the International Maritime Consultative Organisation (IMCO, now a IMO: International Maritime Organisation), a specialised agency of the United Nations, in a study noted that "such a system could contribute to safety by providing reliable means for alerting vessels in case of distress and emergency, improving means for position reporting for search and rescue purposes, expanding transmission of weather information, facilitating the operation of shipping lanes and the separation of traffic at sea."\textsuperscript{109}

Pursuant to this realisation IMO established a panel of experts in 1972 to study certain aspects of a maritime satellite system and prepare a report for the proposed international conference in 1975.\textsuperscript{110} The Panel met six

\textsuperscript{107}. Ploman, n.7, p.84

\textsuperscript{108}. Ibid.

\textsuperscript{109}. Report of the Second Session of the IMCO Sub-committee on Safety of Navigation, IMCO Doc.NAV 2/14, (17 April, 1967), para.30, p.6


46
times during the period from July 1972 to September 1974 and identified various reasons for establishing a maritime satellite system.111 Meanwhile, the Assembly of IMO decided to convene an International Conference on the Establishment of an International Maritime Satellite System.112 Holding three successive sessions113, on 3 September 1976 the Conference finally adopted a convention on the International Maritime Satellite Organisation (INMARSAT) supplemented by the Operating Agreement on the International Maritime Satellite Organisation both of which entered into force on 16 July 1979.

Thus the United Nations through its special agency was successful in establishing INMARSAT on a universal basis. Jasentuliyana states that "there are other international and regional organizations in the field of space communications...but as a truly universal organisation with membership of countries from all parts of the world including the two major space powers - US and USSR - INMARSAT serves as an exemplary model..."114

111. Ibid, pp.3-5
112. IMCO Resolution A.305(VIII) of November 23, 1973
113. The three sessions were held respectively from: 23 April to 9 May 1975, from 9 to 27 February 1976 and from 1 to 3 September 1976
It is of interest to note that the United States in the discussions of the Panel of Experts had proposed that a careful analysis be made of the possible utilisation of INTELSAT for provision of a maritime satellite communications service. However, the proposal was not acceded to by other participants due to certain reasons. The major reason for rejection of the US proposal was, the Panel of Experts noted, under such arrangement where INTELSAT would be exercising policy and financial control over the maritime Satellite Service, the voting power would be determined largely on the basis of total utilisation of the space segment. Thus, important maritime countries with little or no fixed service traffic would have only minor control over the maritime service facilities. Since maritime communications must be fully international, particularly with respect to the safety to life at sea, the absence of any major maritime country was regarded as a serious disadvantage. While other major maritime powers wanted

115. The United States was of the view that establishment of a new international organisation was likely to pose problems and result in lengthy negotiations leading to serious delays in providing a maritime satellite capability. It further held that sufficient analysis of all possible alternative institutional arrangements as well as of the closely related economic and technical factors, have not been made. See n.110, preface at pp.2-3, See also pp.94-95

INMARSAT to be a public service organisation, the United States insisted that it must be operated on a profit making basis.\textsuperscript{117} However, a consensus reached with adoption of a provision under which INMARSAT shall operate on a sound economic and financial basis having regard to accepted commercial principles.\textsuperscript{118}

Based on two instruments, "a Convention between participating states" and "an Operating Agreement between states or public or private entities, designated by a state",\textsuperscript{119} the INMARSAT organisation has a legal personality distinct from its member states and IMO and is responsible for its acts and obligations.\textsuperscript{120} It is entitled to acquire, own, lease, hold and dispose off property, both movable and immovable, and to conclude agreements with states and other international organizations. It can sue and be sued.\textsuperscript{121}

The purpose of INMARSAT is to provide the space segment\textsuperscript{122} necessary for improving maritime communications thereby assisting in providing communications for distress and safety of life at seas, efficiency and management of ships, maritime public correspondence services and radio

\begin{thebibliography}{1}
\item\textsuperscript{117} N. Jasentuliya, "The Establishment of An International Maritime Satellite system", AASL, Vol.11, (1977), p.323
\item\textsuperscript{118} The INMARSAT Convention, Article 5(3)
\item\textsuperscript{119} Ibid, Article 1 & 2(3)
\item\textsuperscript{120} Ibid, Article 25
\item\textsuperscript{121} Ibid.
\item\textsuperscript{122} INMARSAT is entitled to own or lease the space segment. See. Article 6 of the INMARSAT Convention
\end{thebibliography}
determination capabilities. INMARSAT seeks to serve all areas where there is need for maritime communications and shall act exclusively for peaceful purposes.

INMARSAT comprises three organs, namely The Assembly, The Council and The Directorate. The Assembly is composed of representatives of all member states having one vote each. The decision making powers of the Assembly are limited to some administrative and institutional matters. Yet it considers the general policy and objectives of the organisation and makes recommendations to the Council. Thus the functions of the Assembly remain basically of an advisory nature. It meets once every two years.

The Council, consisting of representatives of the 18 signatories with the largest investment shares and four others elected by the Assembly in accordance with the principle of just geographical representation, is authorized to take decisions on financial, operational,

123. Ibid, Article 3(1)
124. Ibid, Article 3(2)
125. Ibid, Article 3(3)
126. Ibid, Article 9
127. Ibid, Article 10(1), 11(1)
128. Ibid, Article 12
129. The 18 signatories with the largest investment shares are: USA, USSR, UK, Norway, Japan, Italy, Greece, The Netherlands, Canada, Spain, Sweden, Kuwait, Denmark, Australia, India, Brazil, Poland and Belgium
See, IMCO Circular Letter 665 (24 August, 1979)
130. The INMARSAT Convention. Article. 13(1)
technical and administrative matters. However, the main function of the Council is to make provision for the space segment necessary for serving the purposes of the organisation.\textsuperscript{131} The Council meets at least three times a year and each representative has a voting power equivalent to the investment share he represents.\textsuperscript{132}

The Directorate as the executive body of INMARSAT, carries out day-to-day tasks of the organisation. It is headed by a Director General.\textsuperscript{133}

INMARSAT started operating from February 1982. Since then it has been highly successful in its mission. INMARSAT maritime satellite system has three main components: 1. the satellite capacity leased by INMARSAT, 2. the coast earth stations, and 3. the ship earth stations. The INMARSAT geostationary satellites over the Atlantic, Indian and Pacific oceans provide near global coverage. Moreover, communication services are largely automatic and remain unaffected by weather and ionospheric disturbances.\textsuperscript{134} Also it has proved its universal character by serving its members and non-members on a non-discriminatory basis. Yet it is subject to controversies

\begin{itemize}
  \item \textsuperscript{131} Ibid, Article 15
  \item \textsuperscript{132} Ibid, Article 14(3)
  \item \textsuperscript{133} Ibid, Article 16
  \item \textsuperscript{134} See, Jean-Louis Magdelenat, "INMARSAT and Satellite for Navigation Services", \textit{Air Law}, Vol.XII, No.6 (1987), pp.269-70
\end{itemize}
that are strong enough to imperil its independence and functioning.

EUTELSAT

The INTELSAT Agreement which originally appeared to be justified, was held to be no longer valid when this originally agreed upon monopoly was seen as a barrier to the growth of space activity in Europe or anywhere else in the world.\textsuperscript{135} It was felt that the United States wrongly exploited its monopoly in satellite technology and almost forced other states to enter interim INTELSAT agreements on its own terms.\textsuperscript{136} Kildov observes that "the United States was generous in wanting to share the ability to communicate on a global scale. But it did not offer the technological benefits to be gained from developing and building the system."\textsuperscript{137} This situation made the members of the European Conference of Postal and Telecommunication Administrations (CEPT) to create an alternative organisation. The other reasons for the


\textsuperscript{136} The United Kingdom was opposed to INTELSAT providing specialised telecommunications services since it would strengthen further the already strong position of the United States in this field and in respect of the supply of a space segment and related facilities required to provide satellite telecommunications services. However, the US view prevailed and the INTELSAT Agreement entitled the organisation to provide specialised services. H.H.M Sondaal, "The Current Situation in the Field of Maritime Communication Satellites: INMARSAT", \textit{Journal of Space Law}, Vol.8, No.1 (1980), p.37

establishment of the European Telecommunications Satellite Organisation (EUTELSAT) were: the demand for better telecommunications, the European broadcasters requirement of improved system of interconnection available at all times, the expanding cable television networks needed facilities for the distribution of European-originated programmes, and the business services demands.138

The EUTELSAT was established with the adoption of a Convention in 1982. This Convention along with an operating agreement was open for signature on July 15, 1982 and entered into force in January 1983.

EUTELSAT was made responsible for establishing, operating, and maintaining communications satellites to serve Western Europe. As per an agreement between EUTELSAT and the European Space Agency (ESA), it was decided that ESA would take the responsibility of providing satellites, their launching and maintenance in the orbit.139 These satellites provide numerous business services.140


139. Powell, n.135, p.24

140. The business services provided by the EUTELSAT satellites include: high speed data transmission and transfer of stored data, interconnection of computers, remote word processing, remote printing of newspapers, control of unmanned equipments, telephony, teleconferencing, faximile telephotography, telediagnosis, electronic mail system and distribution of data on request. See, "Business Communications: The EUTELSAT Satellite Multiservice System", Information release issued by the EUTELSAT, Paris, Year N.D. pp.1-2.
ARABSAT

The professed purpose of INTELSAT was to provide a single global commercial system for communications services on a non-discriminatory basis. However, the INTELSAT Agreement did contain necessary provisions relating to the establishment of other systems by any country individually or jointly. The emergence of the regional satellite systems find relevance to the INTELSAT Agreement.

The Arab Corporation for Space Communications (ARABSAT) was established by an agreement among 22 countries.

141. Where a member or signatory of INTELSAT is to establish satellite communications systems, it is required to consult INTELSAT. Article XIV(d) reads: "To the extent that any party or signatory or person within the jurisdiction of a party intends individually or jointly to establish, acquire or utilise space segment facilities separate from the INTELSAT space segment facilities to meet its international public telecommunications requirements such party or signatory prior to establishment, acquisition or utilisation of such facilities shall furnish all relevant information to and shall consult with the Assembly of parties, through the Board of Governors, to ensure technical compatibility of such facilities and in their operation with the use of radio frequency spectrum and orbital space by the existing or planned INTELSAT space segment and to avoid significant economic harm to the global system of INTELSAT." See, INTELSAT Agreement, n.77 Article XIV(d)

142. The ARABSAT members include: Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, North Yemen, Oman, Palestine, Qatar, Saudi Arabia, Somalia, South Yemen, Sudan, Syria, Tunisia and United Arab Emirates.
On having decided to establish ARABSAT the members submitted their proposal to the Board of Governors of INTELSAT. The proposal was approved by the Board of Governors on 4 April 1980.  

ARABSAT has the following objectives:

1. The Corporation aims to provide and set up an Arab Space Sector for general and specialised services in the field of telecommunications for all member states of the Arab League in accordance with the technical and economic criteria accepted in the Arab and international quarters.

2. Besides these objectives the Corporation may undertake the following activities:
   - Assisting Arab countries financially or technically in designing and constructing the ground stations.
   - Undertaking research and other studies concerning space science technology.
   - Encouraging the establishment of industries necessary to supply installations to space sector and ground stations in Arab states.
   - Undertaking radio and television transmission and telecasting among departments and organizations concerned in the Arab states, via the Arab satellite network and laying down regulations organizing the use of television and radio channels in such a manner as to satisfy the local and collective needs of the Arab states.

3. Any other activities that serve the objectives of the Corporation besides those already stated, provided that they are approved by the General Meeting of the organisation on the recommendation of one member state of the corporation or more of the Board of Directors.\textsuperscript{144}

The ARABSAT communications system operates with three types of earth stations using different capacity antennae for different regional and local services.\textsuperscript{145}

The system is planned to foster existing inter-regional and domestic services including telephone, telex, data transmission as well as television.

ARABSAT has three main organs: The General Assembly, The Board of Directors, and the Executive body. The General Assembly is composed of representatives of all members and the Board has nine directors of which five are from the permanent member nations and the other four are elected by the General Assembly. The Executive body is responsible for day-to-day task.\textsuperscript{146}

\textsuperscript{144} The Agreement of the Arab Corporation for Space Communications, Article 3.


\textsuperscript{146} See, n.74, pp.44-45
PALPA

Apart from EUTELSAT and ARABSAT as has been discussed above, PALPA is another regional communications system presently operating in the South-East Asia. The PALPA system began as a national system by Indonesia but now it is being used extensively by other members of the ASEAN Organizations as well as by Australia.

Interestingly, PALPA can be said to be of dual nature. While by origin it is a domestic system, its operational aspect makes it a regional one. And there has been arguments on the nature of PALPA.147

Indonesia had launched PALPA-I, in 1976 for its own domestic telephone and television services. However, having launched PALPA-2 in 1977 it leased out channels to the Philippines, Thailand, and Malaysia. Thus PALPA started operating on a regional level.148

The PALPA system was established basically for domestic services. Hence the purposes set forth for the system were as follows:

- To enhance capacity for telephone, telegraph and telex services all over the country, particularly in the


outer islands\textsuperscript{149} and as a back-up to the terrestrial microwave network in Java and Sumatra,

- To extend television services to all of the provinces, and
- To introduce educational television on national basis.\textsuperscript{150} The wide scope of the PALPA system and its application may well prove to be a highly important development in the field of telecommunications for the developing countries.

The foregoing discussion includes only the major global and regional communications satellite systems. Apart from these systems there exist a sizeable number of regional and domestic satellite systems. Furthermore, a host of countries including many members of INTELSAT are proceeding ahead to develop their own systems.

Domestic systems may be grouped in two categories:

The first group comprises those countries that have established or are planning to establish domestic systems of their own.

The second group includes those countries where a domestic service is provided through the lease of facilities on an existing system, primarily the INTELSAT system.\textsuperscript{151}

\textsuperscript{149} The entire Indonesian territory, comprising 13,677 islands, is about 5,193,250 square km. Of all the islands only 6000 have names and are inhabited. Republic of Indonesia: in a nutshell, Pamphlet published by the Department of Information, Republic of Indonesia, year n.d.

\textsuperscript{150} n.148, p.16

\textsuperscript{151} For details. see. Ploman. n.7. pp.164-72.
Obviously, the activities of these systems required to be regulated at some organizational level. The next chapter would endeavour to discuss the structure, scope and relevance of the organizations concerned with the regulatory aspects of the communications satellite systems.