Since the beginning of the space-age, when the Soviet Union launched Sputnik-I on October 4, 1957, as the first artificial satellite into the earth’s orbit, intensive exploration of the outer space has thrown up a variety of legal problems and issues before the aerospace law. The problem of delimitation of the air space and the outer space, without any doubt, belongs to the oldest and the most discussed yet unsettled questions of aerospace law.

As early as 1932, Vladimir Mandl of the University of Prague emphasized in the first monographical study on the Space Law that the prospect of penetrating into the outer space by means of rockets would pose new problem, not settled by air law which regulated only the legal regime of the air space. Rockets, in their capacity as means of transport going beyond dense layers of atmosphere, would be based on quite different principles than those, upon which the aircrafts are based upon. Mandl held the view that scope of the principle of state territorial supremacy in the air space went far beyond the limits of aeronautics. This principle rather acknowledged the right of each state to retain sovereign power over any use of its superajacent airzone, whether such use is performed by aeronautics or in any other manner,

1. The flight of an aircraft depends on the ‘aerodynamic lift’ provided by the air. Whereas, the rocket flies into the space due to the reaction of the exhausted gases and is independent of the ‘aerodynamic lift’.
including flights into outer space. As soon as a spacecraft enters a state's air space, it will be subject to its jurisdiction.¹

In outer space, as in adjacent air space and sea areas, questions of delimitation and territorial sovereignty are inter-related. Both the questions are related to the desire of national decision-makers to fix state boundaries. The late Adlai E. Stevenson argued that "men are conditioned to think in terms of states... defined by finite areas expressed in finite measurements... And especially... (men) are conditioned to think in terms of national sovereignties."²

Before the space-age, in case of air space, Article 1 of the Chicago Convention of 1944 and the other Civil Aviation Conventions³ which it supersedes refer to the area over which governments may exercise their authority. Apparently the future importance of defining the air space or upper boundary did not occur to the framers of these Conventions, the presumption being that a state's area of complete and


3. The other Conventions are; The Paris Convention (1919); The Madrid Convention (1926); and The Habana Convention (1928).
exclusive authority was adequately defined by the term 'air space' itself. However, with the dawn of the space-age, the question of upward extent of sovereignty and jurisdiction of the sub-adjacent state has come to the forefront and the views expressed by Mandl in 1932 have been proved remarkably true.

The fact needs no clarification, that in the interaction between the states, decision-makers attach paramount importance to the security and economic interests though there may be other interests (like ideological, cultural, religious etc.) as well. In air law, both the claims to control access to and activities within the territorial air space are functional to economic and security interests of the states. For example, by exercising these controls a state can ensure that it will benefit from the commercial air-traffic within its air space. It can ensure that damages are paid for injuries to citizens' person and property. And it can use its domestic controls as a bargaining lever when attempting to obtain or retain its share of international civil air-traffic. By retaining complete and exclusive jurisdiction over its air space, a state is able to deny entry to aircrafts which are perceived to be a threat to state security. And the aircrafts which are admitted may be required to follow prescribed routes, land at designated airports and transport only specified kinds of cargoes.

Similarly, in case of the outer space too, claim concer-
ning rights and activities involve economic and security interests of the states and are closely related to the claims and activities in territorial air space. This should not be surprising since, as McDougal, Laswell, and Vlasic point out:

air space and outer space are physical continuum. To effectively use outer space also involves the use of air space. Moreover... the conduct of activities in space may have important consequences for the internal value processes of the territorial communities on earth.1

If spacecrafts are to be used as a means of commercial transportation, rules concerning access to territorial air space will have to be adopted and location of the air space and the outer space boundary then becomes a practical problem. Primarily, the economic and the security interests of the states make it difficult to have a common ground in the regimes of the air space and the outer space and the point of departure begins with Article 1 of the Chicago Convention which sets forth that the contracting States recognise that every State has complete sovereignty over the air space above its territory. The Convention, obviously, does not define the term 'air space'.

The problem is further complicated by Article I of The

Outer Space Treaty of 1967, which is the first international agreement devoted solely to the regulation of activities in the outer space, including the celestial bodies. It declares that exploration and use of outer space, including the celestial bodies is to be carried out in the interest of all countries. The use and free exploration of the outer space and the celestial bodies is to be available to all states on the basis of equality. Article II of the said Treaty guarantees that neither the outer space nor the celestial bodies are to be subject to national appropriation or claims of sovereignty. But, at the same time, the term 'outer space' has been defined, neither in the said Treaty, nor in other four major Treaties which superseded the Outer Space Treaty. In the absence of clear and well accepted definitions

1. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, January 27, 1967. For the text of this Treaty, see Appendix I


3. In all these Treaties the terms 'outer space', 'space objects', 'space activities' etc. are repeatedly used. Contd...*
of the air space and the outer space, the delimitation of
the air space and the outer space becomes important. In the
absence of proper meaning of the outer space, particularly
of its exact beginning, the above said Treaties cannot be
made more effective, as, the notion of the space-activities
itself can be defined only on the basis of the definition of
the outer space. Imperatively, states, both performing and
not performing space activities, cannot remain for ever with­
out the knowledge of proper meaning of the outer space in
its precise legal terms.

Moreover, the emergence of new factors linked with the
problem of delimitation of the air space and the outer spa­
ce has further necessitated the demarcation of boundaries
between the air space and the outer space. The ever-growing
number of space objects launched into orbits around the
earth and beyond them, as well as the prospects of establi­
shing large orbiting space systems of multipurpose character
establish that an international space organisation will soon
be needed for the space traffic control which can be devel­
oped only if proper and well accepted definition and delim­
itation of the outer space is reached.¹

*...It is interesting to note that in the Outer Space Tre­
aty of 1967, the term 'outer space' occurs 37 times
without any specific definition of 'outer space'.

1. According to an estimate about twenty countries and one
international organisation (the European Space Agency)
already have satellites on orbit. A half dozen countries
can launch their own satellites and these artificial bo­
Contd...*
The prospects of establishing solar power satellites collecting energy in the outer space, converting such energy to microwave beams and transmitting it from satellites to the earth,\(^1\) would require the delimitation of the air space and the outer space. Such beams will have to pass through not only the international area of the outer space but also the zone of the territorial air space over which the subjacent states possess 'complete' and 'exclusive' sovereignty.

The creation of the new generation spacecrafts like space shuttle and aerospace vehicle too has further pushed the problem of delimiting the outer space to the forefront.\(^2\)

These versatile vehicles have the essential characteristics


2. The proposed 'aerospace plane' would be a horizontal take-off and landing vehicle, which would function as an airplane in its take-off and landing stages, and as spacecraft while travelling through low earth orbit. The British have been researching a version of an 'aerospace plane' and the United States is beginning to gear up for the programme of its own. President Reagan, in his State of the Union Address, Feb. 4, 1986, stated that "we are going forward with research into a new 'Orient Express' that could take off from Dulles airport, accelerate upto 25 times the speed of sound, attaining low earth orbit or flying to Tokyo within 2 hours". See S. Neil Hosenball, et al., "Delimitation of Air Space and Outer Space: Is Boundary Needed Now?" University of Colorado Law Review, Vol. 57, 1986, 887-88.
of a spacecraft yet in some respects are similar to an aircraft. The space shuttle ascends into the outer space with the assistance of rockets just as does the conventional spacecraft and descends in a manner reminiscent of the landing of an aircraft by gliding through the atmosphere and landing on a runway. These new generation space vehicles make it imperative to define where air space ends so as to know when such a craft is in the air space subject to the sovereign rights of the state through the territory of which it is passing.

From the very beginning of the space-age, the problem of delimitation of the air space and the outer space has been the focus of attention for space law scholars and national policy framers in and outside the United Nations Organisation. There has not been any great pressure on the decision-makers to formulate rules regarding delimitation of the outer space. Even "The United Nations Committee on Peaceful Uses of Outer Space" (COPUOS) until 1967, was of the opinion that boundary problem did not deserve a priority consideration because demarcation, its enforcement and monitoring between the air space and the outer space was impossible and also it did not create any serious problem. The reason for such an attitude of the COPUOS could be explained by the fact that it did not suit the interests of both the super powers which dominated the COPUOS, to have boundaries which restrict their freedom to get into space (whether-
er for peaceful or military purposes) without let or hindrance. During the first twenty years of the space-age, there was no protest over flight by orbitting satellites primarily for the reason that most of the space activities were not perceived as threats to either economic or security interests of the subjacent states. In other words, decision-makers during the first twenty years of space-age adopted a 'go-slow' approach in accepting rules establishing boundary or regulating space activities close to the earth. The nature of activities being performed in the outer space has undergone a sea change especially during the last decade. Such activities as militarisation of the outer space, reconnaissance satellites, remote sensing, pollution and damage caused by space objects, pose a threat to the economic and security interests of the states, which necessitates an urgent need to demarcate the areas of the two different regimes of the air space and the outer space.

As stated earlier, while the debate continued both in and outside the United Nations, as to whether delimitation is possible or necessary, the problem assumed a new dimension when some equatorial states on December 3, 1976, in "the Declaration of Bogota", 1 declared that the geostationary

1. It was signed by Brazil, Colombia, Congo, Equador, Indonesia, Kenya, Uganda and Zaire. For the text of the Bogota Declaration of 1976, see Appendix II
orbit\(^1\) to be a part of the sovereign territory of the states whose territory is underneath it. The scientific basis for such a declaration was that "the geostationary orbit is a physical fact linked with the reality of our planet because its existence depends exclusively on its relation to the gravitational phenomenon generated by the earth".\(^2\) And the legal basis of such a claim is that "the Outer Space Treaty of 1967 does not define outer space."\(^3\) Further, "the geostationary orbit is not specifically included in outer space, and therefore, there is nothing in the Outer Space Treaty to prevent the geostationary orbit from being private property."\(^4\)

The Bogota Declaration has thrown up two fundamental issues which have a direct bearing on the problem of delimitation of the air space and the outer space. First, is geostationary orbit a part of the outer space or not? Second, what is its legal status? These issues have assumed special significance in regard to the problem of delimitation of the

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1. The geostationary orbit lies at an altitude of approximately 35,871 kms above the earth’s equator. A satellite placed in this orbit lies in the plane of the equator and turns about the polar axis of the earth in the same direction and within same period as the earth itself. Thus, a satellite placed in this orbit appears stationary in relation to the underlying point. For details see Chapter VI of this study. See pp. 241-274.


3. Section 4, Ibid.

4. Ibid.
air space and the outer space. As claimed in the Bogota Declaration, in case the segments of the geostationary orbit are a part of the territorial air space of the states below, the legal boundary between the air space and the outer space cannot be fixed lower than 35,871 Kilometres which is the altitude of the geostationary orbit. On the other hand, though for many years the legal aspects of the geostationary orbit have been the subject of scientific study and political discussion, no one has ever questioned the geostationary orbit being a part of the outer space and that its legal status is accordingly covered by the provisions of the Outer Space Treaty, including Article II of the Treaty which prohibits its national appropriation.

As a result of this generally well-disposed attitude of the states towards space flights, there seems to have developed a rule of general international law that all orbits of artificial earth satellites are considered to be in the outer space. In other words, it means that whatever may be or might have been the precise upper limit of national air space, it is now deemed not to exceed the lowest perigee height of the artificial satellites which, according to the scientists with good precision is the height of 90 kms above the surface of the earth.¹

As a result of the above mentioned issue the problem of

delimitation of the air space and the outer space has assumed added significance. A precise definition of the outer space, (especially its inner limit) is urgently required to avoid conflicts regarding the infringement of national sovereignty over the air space through space activities and for the applicability of the space law instruments.

It is in this background that the present study has been undertaken. The main focus of the study is on the detailed critical analysis of the problem of delimitation of the air space and the outer space and of the issue of the legal status of the geostationary orbit with its impact on the problem of delimitation of the said areas.

As warranted by the complex nature of the problem under research, historico-analytical method has been adopted. The data for the present project was garnered and sifted from the primary as well as secondary sources. The primary sources include the United Nations Documents, the texts of the various International Conventions like the United Nations sponsored Treaties on the outer space, air law, Antarctica, sea law, various declarations etc. The facts and information researched therefrom were supplemented by those from secondary sources which comprise published books, articles, research papers, reports and proceedings of various international conferences, seminars, symposia, colloquia, studies etc.