CHAPTER V
DELIMITATION OF THE AIR SPACE AND THE OUTER SPACE

Two different legal regimes operate in the air space and the outer space, though, space as a total medium, appears continuous and inseparable. It does not lend itself to artificial physical divisions or separation into distinct demarcable zones. This difficulty in the precise delimitation of the air space vis-a-vis the outer space has generated a considerable speculation and controversy among the space law scholars and the states represented before the COPUOS at the United Nations.

A number of theories with regard to the delimitation of the air space and the outer space have been advanced. These theories may broadly be divided into two categories, namely, the spatial theories and the functional theory. The theories categorized as spatial propound the need for some sort of geographical or territorial delimitation of the air space and the outer space whereas the functional theory spurns the need of such a delimitation on the basis of the adequacy of the international law to regulate and deal with space flights simply by referring to and determining the nature of the activity or the nature of the vehicle or a combination of both.

The Spatial Theories

The delimitation theories on spatial basis can be grouped into eight separate categories and each having an infinite number of variations with the denominator that the air
space and the outer space should have a spatial definition of a boundary between the said areas. These theories are discussed as under:

The air space theory is based upon the premise that the basis of demarcation between vertical space under the state sovereignty and the outer space should be the atmosphere of the earth (in the geophysical sense), or certain properties of the later. The rationale of this theory is one of the basic principles of interpretation of legal rules that the natural concepts should be interpreted according to their natural meaning in the first place. On this basis, when two major multilateral treaties on air law, the Paris Convention of 1919 and the Chicago Convention of 1944, as well as the bilateral treaties, refer to the air space, implies that the international law recognises the vertical extension of state sovereignty upto the extreme limit of the air space in its geophysical meaning. However, the view-point whether this space includes the whole atmosphere or just the layer in which the human life is possible, leads the supporters of

1. The Permanent Court of International Justice held the opinion in the Eastern Greenland Case (1933) that "the natural meaning of the term Greenland was its geographical meaning". For background and details of the case see L. Preuss, "The Dispute between Denmark and Norway over the Sovereignty of Eastern Greenland", The American Journal of International Law, Vol. 26, 1932, 469-475.

this theory to three approaches namely: The atmospheric approach, the aerodynamical approach and the biological approach.

According to the atmospheric approach outer space begins at the outer limit of the terrestrial atmosphere. The term 'espace atmosphérique' of the Paris Convention of 1919, has been translated in English as air space. In the legal sense thus the air space is synonymous with the entire atmosphere. Many scholars have shared these views. Meyer is of the opinion that from the legal point of view one must adhere to the opinion that the outer space begins where the air space ends. Cheng affirms that the correct international law interpretation of the air space is its original geophysical meaning. While referring to the state sovereignty, Goedhuis also upholds the same definition of the air space and declares it as the whole atmosphere above its surface territory,


3. "Air space is the entire space where air is to be found under any form. This is identical with the atmosphere in its broadest meaning, including all its layers, irrespective of whether it is sufficiently dense to carry the aircraft". See B.Cheng, "Recent Development in Air law", Current Legal Problems, Vol. 9, 1956, 210-213.
though it is for the geophysicists to delimit it.¹ Cooper holds that international law had accepted the concept of sovereignty over the atmosphere without linking it with the aircraft using the latter.² Ambrosini, speaking on behalf of Italy, also urged the United Nations to limit the sovereignty of states to 'atmospheric space'. According to him, on the basis of logic supported by physical as well as juridical considerations, the space or atmospheric space should be considered by the jurists, as at present, as an integral part of the territory of a state and therefore, subject to its sovereignty.³ Similar views are expressed by Bohme, Mankiewics, Horsford, Potter, Zadorozhny and many others.⁴

So far as the present day international positive law goes, 'the atmospheric approach' can rely on weightiest legal arguments, but a closer examination of this approach makes it clear that this natural boundary between state sovereignty and the outer space is far from being natural

⁴ For the views of these writers, see Gyula, Gal, Space Law (Leiden: A.W. Shijthoff, 1969), pp. 75-76.
and measurable, and that it can be refuted both on scientific as well as legal grounds.

Scientifically, the structure and the extent of the atmosphere present such a difficult problem even for the natural sciences that the demarcation of its boundary, if any, is impossible according to geophysicists. The atmosphere consists of various layers having different characteristics. There is no sharp dividing line between various layers of the atmosphere and there is no accurate boundary between the exosphere and the outer space. This is the reason that demarcation line proposed by various scholars on the basis of atmosphere led to extremely divergent conclusions. For example, Fasan arrived at the conclusion that the upper limit of the atmosphere can be in between 80 to 20,000 kms., whereas, according to Aaronson, the upper boundary of thus conceived 'air space' could extend as high up as 60,000 miles (96,000 kms), which, according to him is the scientifically agreed 'outside limit' of the earth's atmosphere.

On legal grounds too, this theory has been refuted. The

2. Quoted in Gal, op. cit., p. 28.
Treaties on which this theory is based, that is, the Paris Convention and the Chicago Convention, never defined the 'air space'. At the time of their drafting, the idea had never arisen that the uppermost layers of the atmosphere (in geophysical meaning) would ever come within the scope of human activity. Thus, such an interpretation is based only on speculation, what the legislator would have done, had he intended to delimit the outer space, when dealing with air law.¹

According to the aerodynamical approach, the lower layers of the atmosphere supply the aerodynamic lift necessary for the flight of aircraft and airships and for the action of the internal combustion engine. This property of the atmosphere has afforded a practical criterion for the delimitation of the air space and the outer space. Many space law scholars have shared this rule for the demarcation of upper boundary of the atmosphere. Schachter states that the most reasonable rule seems to be the one defining air space by the elements of the atmosphere that are necessary for the

¹. This argument is proved after examining the perigees and apogees of satellites. For example, the perigee of the Soviet proton-3 is at no more than 120 kms, that of the American EGSR-6 Satellite is at 172 kms, which remain within the layer considered to belong to the atmosphere. Even the orbits of the Soviet Molniya-type Satellites (apogee 39,000 kms) may be regarded as lying within the atmosphere. So depending upon this approach certain layers can be considered as being part of outer space, whereas in the geophysical meaning, they belong to the atmosphere. See Gal, op. cit., p. 78.
flight of the aircraft. Quincy Wright supports this rule from the point of view of security, in as much as the state can be exposed to danger by bombs or other objects dropped from balloons or airplanes. Woetzel expresses the view that the outer space begins where the air vehicles no longer get any support from the air. Kovalev and Cheprov explain that the unconditional conclusion that can be drawn today from the analysis of the rules and practice of international law seems to be that sovereignty does extend to that layer of atmosphere where the density of air makes flights possible. Smirnoff and Zadorozhny also hold the above opinion.


It is also argued that the concept of the air sovereignty and the concept of the entire air law is attached to the vehicles using the air.¹

The aerodynamical approach for delimiting the air space and the outer space is refuted on the ground that the Paris Convention and Chicago Convention have nothing to do with the determination of upper limit of a state's sovereignty.² Moreover, the various air codes mostly give a restatement of the co-relation between the aircraft and the air, though some of them merely give a functional definition under which rockets can easily be included. For example, according to Brazilian Air Code of June 8, 1939, any device which is suitable for flight and navigation (above the state territory) is aircraft; so, satellites are easily covered by this definition.³ The U.S.Federal Republic Aviation Act of 1958,⁴ and the German Federal Republic Aviation Act of 1964, also contain similar definitions.⁵ It is also impor-

1. This argument is shared, among others, by Cooper, Schachter, and Goedhuis. See for further details Chapter II of this study, pp. 28-29.

2. For further details see Ibid., pp. 31-32.


5. It lists, among devices designed for the use of the air space particularly space vehicles, rockets and similar flying objects. See Gal, op. cit., p. 82.
tant that aerodynamical factors play an important role in the re-entry of satellites at altitudes not yet reached by conventional aircraft. Moreover, in case of aerospace vehicles like American space shuttle which has the characteristics of both a spacecraft and an aircraft, the aerodynamical approach loses its significance. Thus, the multilateral air law treaties which are considered the basis of this theory have nothing to do with the legal status of the outer space or with the demarcation of boundaries between the air space and the outer space.

According to the biological approach, the boundary between the air space and the outer space should be fixed at an altitudinal limit of man’s possibility of life. Strughold, the main supporter of this approach who is not a lawyer but

1. Ibid., p.84. The American Test plane X-15 achieves an altitude of 106,680 metres on July 19, 1963. At this range approaching the lowest satellite orbits the plane moved as a rocket, regardless of aerodynamical effect. The X-20 plane (Dyno-Soar) is also included in this category.


a natural scientist, declares:

We face complete biological anoxia at about 16 kms despite free molecular oxygen in the atmosphere upto 90 kms... the alveolar air in lungs, however, and the ambient air are decisive from the biological point of view... It is in this narrow zone that the stage for drama of life on our planet is normally set. 1

Only this layer deserves the name atmosphere, which from the Greek word 'atmos' means 'breath'. 2 Goff defines the air space as the layer of the atmosphere where human life is possible. 3 It is also known as an idea of biological jurisdictional line.

This biological jurisdictional line for delimitation cannot be accepted, because at the usual flight altitudes life is impossible without pressurised cabins and even the conventional airplanes have these devices.

Thus, the air space theory hardly provides a sound basis for the delimitation of the air space and the outer space because it lacks not only consensus among its supporters having different approaches, but also mutually acceptable inference.


2. Ibid. Strughold mentions three types of zero line: The physiological, the technical and the mechanical zero line. He sets the limit of outer space from the latter (200 kms).

3. M. Lee Goff., quoted in Gal, op. cit., p. 84.
The gravitation theory identifies the limit of state sovereignty in the air space with the outer limit of earth's gravitational attraction. Kroell and Rink are the main advocates of this theory. According to Rink the gravity of the earth ceases at the distance of 1.5 million kms. Though he admits that at this altitude no definite limit can be drawn, still this proposal is the most reasonable one, when the state’s right to security is kept in mind.\(^1\) Kroell holds that the state sovereignty extends upto the point where gravitational attraction of the earth is balanced by that of another celestial body.\(^2\) At one time, Cooper also supported this view and pointed out that tentatively "the upper boundary of the state territory lies at a point between the upper limit of the state’s air space and the upper limit of the earth’s attraction."\(^3\) Verplaetse, Ambrosini, Jastrow and Dahm also expressed similar views.\(^4\)

The rationale nucleus of the gravitational theory is the

1. According to Rink since all satellites orbit in the gravitational sphere of the earth, so it follows that these satellites are moving above the territory of the states. Quoted in Gal, op. cit.,p.71.


hypothesis that the security of states can only be endangered from an altitude whence something can be dropped, or return of an object can be imagined.

The pull of the gravity varies greatly as the earth is not round like a ball and is affected by the rotation of the earth and the uneven distribution of mass and water on and within the earth. Schachter describes this theory as irrelevant and highly impracticable and says it is not only un sound scientifically but also quite useless from legal point of view. Moreover, according to the laws of the celestial mechanics the gravitational attraction of the earth extends into the infinite. The fantastic dimensions of the outer space, which this theory would include in 'territorial space' and its built-in uncertainties, condemn it as completely

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2. If the gravisphere is to be depicted we are left to picture an infinitely complex network of points of attractions, the shape of network changing according to whether the attraction of one, or another celestial body becomes overwhelming. The earth’s attraction in relation to the moon is dominant upto 327,000 kms whereas in relation to the sun, upto 1,870,000 kms. In the opposite direction, the cumulated gravitational attraction of the earth and the sun would extend to several light years distance, upto the attraction sphere of the nearest fixed star, so there is no 'gravisphere' in the sense of a closed sphere parallel with the earth's surface, as held by common belief. See Fasan, quoted in Gal, op. cit., p. 72.
inimical to overriding to community policy. This theory is generally rejected by the science of space law.

The propounder of the theory of the Karman line is Haley who named his theory after Theodor von Karman to whom the basic technical idea of the theory is to be attributed.

The boundary proposed by him is known as 'Karman primary jurisdiction line'. Haley gives a formula which effectively separates the territory of the 'air-breathing vehicles' from that of 'rockets vehicles' which, according to him, is the most appropriate dividing line between the exclusive aerial domain of the states and the common domain of the outer space. To quote, says Haley:

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\text{the Karman jurisdictional boundary falls at approximately 275,000 feet (83kms), where an object travelling at 25,000 feet (7kms) per second loses its aerodynamic lift and centrifugal force (Kepler force) takes over.} \]

This is a critical jurisdictional boundary. Haley's theory mixes up the physical, thermodynamical, aerodynamical principles.

3. Ibid., p. 96, now this Karman primary jurisdiction line is placed at a height of about 100 kms according to new scientific research, See Matte, op. cit., p. 3o.
exobiological, physiological and mechanical points of view of aviation with those of astronautics.

This theory has many supporters which include, among others, Prince Heinrick von Hannewer. Heinrick agrees with Haley that Karman line divides, the 'air space' from the 'outer space' at 100 kms.¹

Scholars like Schrader, Roberts and Fasan also accepted the Karman line with or without modifications.² In fact this theory is an improved version of the aerodynamical approach under the air space theory.

This theory, it is submitted, is full of contradictions. For example, the X-15 test planes which, during a certain stretch of their flight, avail themselves of the lifting force of the air, but beyond that, up to the perigee of various satellites, continue as rockets. So Karman line cannot

2. Schrader, combined Karman theory with another, based on satellite orbits, proposing a 10 miles wide dividing belt between 60 and 70 miles up. (96 kms and 112 kms). This belt would separate the limit where an aerodynamic lift is ceased from that of the perigee of the lowest feasible satellite orbit. See G.D. Schrader, "National Sovereignty in Space," Fifth Colloquium 1962, op. cit., p. 33; Major Roberts of the U.S. Air Force accepts the Karman line of 53 miles as reasonable not because of its scientific infallibility, but rather because all areal and balloon incidents, have taken place below this height and by contrast, all satellite activities have been conducted, without protests, above that height. Quoted in Matte, op. cit., pp. 27-28; E. Fasan also proposes an 80 kms altitude (Karman line) as the desirable boundary between the air space and the outer space. Quoted in Gal, op. cit., p. 87.
provide an effective distinction between air breathing and rocket driven vehicles. Another shortcoming in the theory is that in course of technical development, a considerable shift may result in the Karman line.

Haley himself admits that this theoretical line of the limit of the air navigation "as a result of such developments as improved technique of cooling and more heat... resistant materials... may significantly be changed." Even if the technical data remain constant, the application of formula may result in having to apply once to the jurisdiction of the air space, next time to that of the outer space for the same point in space depending on the character of the different flying objects.

Moreover, McDougal, Laswell and Vlasic do not agree that the boundaries in the 80 kms range proposed by various authors are necessarily caused by sharing Haley’s


views. As stated earlier, the theory is nothing but an improved version of the aerodynamical approach under the air space theory. Further, the problem with this approach is that verifying the point at which an object leaves the air space and enters the outer space would require every country to monitor constantly the objects entering and maintaining orbit. This theory met with the same fate as the aerodynamical approach under the air space theory.

The theory of effective control, for the purpose of limiting the exercise of sovereignty in the air, lays down that the exclusive competence of the state underneath would extend to the limit to which it effectively wields its authority. The term 'effective control' usually connotes the power of preventing unauthorised flights. It can be regarded as the revival of "the cannon shot theory" by Bynkershoek which holds that the territorial domain ends where the power of weapons terminates.

After the Second-World War, Kelson sought the solution to the problem of delimitation in conformity with the

1. Haley himself quoted the followers of the air space theory or those who had proposed analogous limits eg. Pepin, Cheng etc., in support of his theory. See McDougal, et al., op. cit., p. 334.


principle of effectiveness. Referring to the Paris Convention of 1919, he states:

It stands to reason that a state can enforce the provisions of this Convention or of its own legal order against the aircraft of another state only within that part of the air space over which it has effective control. The validity of any legal order cannot extend beyond this sphere.  

Similar views are expressed by Verdross in connection with the Chicago Convention of 1944. Scholars like Rehm, Kovalev and Cheprov, Arthen Dean, and Meyer also hold that state sovereignty is limited to the altitude at which the state can effectively control events.


2. See Gal, op. cit., p. 90; Cooper also adopted the doctrine of effectivity in 1951 by declaring that state sovereignty extended up to the limit where the scientific progress of a state permitted the state to control the space above it. However, after sometime he gave up this theory in the ideas expressed later, in which he suggested the theory of zones. See Cooper, op. cit., pp. 414, 417.

3. G. W. Rehm puts the limit of state sovereignty at about 60 kms, because this is the point up to which the subjacent state can practice effective control by ground to air-missiles, See Gal, op. cit., p. 91; Kovalov and Cheprov in 1958, supported this criterion of demarcating between air space and outer space and declared that it would have no sense in declaring sovereign right for altitude which cannot be reached for ensuring law and order there. Kovalov, et al., op. cit., p. 138; Arther Dean is of the opinion that sovereignty is limited to the altitudes at which the state can effectively control events. Quoted in Matte, op. cit., p. 33; Alex Meyer says that the vertical extent of a state's exclusive authority must be limited to "a predetermined space within which the state can effectively exercise its sovereignty." See A. Meyer, "Legal Problems of Outer Space," Legal Problems 1961, op. cit., p. 505;
After the space age, it was Jocobini, who first of all supported the principle of effective control vis-a-vis the problem of inclusive and exclusive interests of the states. According to him, in regard to the extension of the national sovereignty over territorial space, the upper limit of this jurisdiction would be determined by the upward extent to which the subject state can exert effective control.\textsuperscript{1} Alvarez, Beresford and Becker also subscribe to this theory.\textsuperscript{2}

One of the examples of the embodiment of the principle of effectivity in the positive law was provided by the Bolivian Air Code of Oct. 24th,1930. According to this Code, the state territory in the air includes:

the perpendicular column of air which covers the surface of the national territory within the limits of the frontiers, the height being determined by the range of defensive methods of the country.\textsuperscript{3}

The doctrine of effectiveness, as a basis for inclusive

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\item Jacobini, op. cit., p. 115.
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competence from community policy perspectives, is hardly acceptable. It is semantic equivalent to accept that the control and not the law determines the right and obligations of the states in the world community.\(^1\) Schachter, Belaunde, Roy and Gal also share the same opinion. \(^2\) Accepting the implication of the effective control principle that the boundaries between the air space and the outer space continually change with progress in technology would inevitably lead to the inference that the outer space would begin at varying heights for different states. Moreover, effective control, in some cases, is impossible even on the surface of the earth. For instance, Nepal has the territorial jurisdiction over the highest peak of the Himalayas without the sli-

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1. The application of such doctrine with respect to any problem of legal order... would be highly dangerous: it would certainly be disastrous in the domain of space. McDougal, et al., op. cit., p. 342.

2. Schachter has compared the principle of effective control with the principle of "might makes right." Schachter, op. cit., p. 17; Belaunde says, "You cannot measure the strength of law by the length of the arm of the law. Therefore, if someone cannot exercise his right, his right must be recognised any way," see U.N.Doc.No.A/C 1, PV.983.1958, pp. 43-45; Roy says, "The acceptance of this principle would be most unfortunate," Legal Problems 1961, op.cit., pp. 75-76; Gal says, accepting this principle would mean the acceptance of technical development of the defensive weapons as a yardstick. As far as space powers go, the sphere of effective control now covers the usual satellites orbital heights. By accepting this principle, sovereignty of small states over their air space would be put at a very low altitude, Gal, op. cit., p. 92. also see Matte, op. cit., p. 33.
ghtest possibility of effective control over it.

Another important postulate for the delimitation of the air space and the outer space is the theory of security. Osnitskaya observed in 1959:

...to take measure to safeguard its security and to protect itself against infringement by other states of its territorial supremacy is a state's sovereign right. Any attempt to draw rule which would not ensure the exercising of that right (including the delimitation of outer space) cannot be recognised as being in accordance with international law. The protection of the security of the state is the only, or at least, the fundamental criterion.1

Zhukov also expresses a similar opinion by saying, that if the problem of security was resolved, the problem of sovereignty in the air would be simplified and sovereignty could not extend beyond a very low altitude.2 Koretski maintains that the air boundary must be fixed only by taking into consideration the defence and security of the subjacent states.3 Whenever the problem of the security of the states arises, observes Cebis, full and exclusive sovereignty over the air space will prevail.4 Kovalev and

4. Quoted in Gal, op. cit., p. 94.
Cheprov, Reintanz and Korovin, too, support this idea.¹ Many more scholars have also focused their attention on the security of the states.²

The vagueness of the term 'state security' is a major argument against this theory. Moreover, delimitation alone wherever the limits be drawn, cannot satisfy a state's claim to security.³ This theory also fails to lay down a concrete basis for demarcation. However, one must agree that the security of states should be the guiding principle in elaborating the fundamentals and whole structure of the space law. This theory, at the most, can provide a juridico-political principle for a unilateral delimitation or for one based on a treaty.

The theory of the perigee of satellites is somewhat similar to the atmosphere and the gravitation theories. According to this theory, boundary of the state sovereignty should be drawn at the lowest level at which a satellite can be put into orbit. It is based on the fact that though it is theoretically possible to put a satellite in orbit quite

2. Among others are Gal, Kiss, H.Boker-Szego, Csabafi etc., See Gal, op. cit., p. 94.
3. Now military preparations are conducted at a greater altitude. So, the height to which sovereignty extends is not the decisive factor for state security. Zhukov, op. cit., p. 1082.
near the surface of the air, if it has enough speed, the particles of matter present in the near vacuum will check considerably the speed of the satellite. It will loose height, consequently, reducing the eccentricity of its orbit and will burn in the denser layers of the air. That is why this theory believes in setting the boundary at the lowest 'effective' perigee of a satellite.

It was Cooper who first suggested this approach. He defines the outer space as an area whose upper or outer boundary is the outer limit of the solar system, and whose lower or inner boundary is the lowest altitude above the earth’s surface at which an artificial satellite may be put into orbit around the earth.\(^1\) Zadorozhny likewise put 140 kms as the lower boundary of the outer space, unless technical development results in a lower perigee.\(^2\) According to Jastrow outer space must be defined as the region traversed.

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1. This boundary according to Cooper would appear to be in the area 80 to 100 miles above the surface of the earth. (later on he revised the lower boundary of the outer space to 70 miles above the surface of the earth keeping in mind the then scientific opinion as the effective lowest perigee of a satellite) See J.C.Cooper, "Legal Problems of Upper Space", *Legal Problems* 1961, op. cit., pp. 71-72; Ibid; " International Control of Outer Space-Some Preliminary Problems", *Third Colloquium 1960*, op. cit., pp. 21-22.

2. The lowest point crossed by a satellite orbit was 140 kms (Mercury, Friendship-7) at the time of this proposal. See G.P.Zadorzhny, "Man Made Satellites and International Law.," *Legal Problems 1961*, pp. 1048-49.
by vehicles which have been placed into the orbit round the earth or which have escaped from the gravitational attraction of the earth.¹

Fenwick argues that satellites do not violate international law as long as they stay in the orbit and keep their altitude.² Bauza considers the point of nullity of the field of gravity, where a satellite enters into orbit, as boundary, for the application either of air law or astronautical law.³ Costadoat fixes the limit of the air and the national jurisdiction at the point where a projectile can begin to move around without the help of the air, by its own force of inertia, that is where a satellite could orbit closest to the earth.⁴ The criterion of the lowest perigee is considered as a natural boundary which should serve as the basis on which an agreement establishing a conventional boundary could be reached.⁵

Keeping in mind the uncertainties arising from the changes of technical possibilities, Rivoiri, another supporter of this theory, proposed the satellite orbit at 300 kms. For

1. Jastrow, op. cit, p. 82.
3. Quoted in Matte, op. cit., p. 32.
4. Ibid.
satellites having a lower perigee than that, the rules of space law would still be applicable (satellized aircraft). For this reason, he would modify the definition of aircraft given in Annex VII of the Chicago Convention.\(^1\) Perek, Zhu­kov, Kolosov, Cheng and many others have supported this theory.\(^2\)

The theory of the perigee of satellites is mainly crit­icised on the ground that it is not sufficiently precise, since the limit varies from one point of the earth to another due to the fact that globe is not perfectly round and that it is affected by its own rotation and by unequal dist­ribution of the masses of water and land at its surface.\(^3\)

The use of this height as a sovereignty limit would be an unnatural restriction since it would curb the whole area of low altitude satellite technology which some venture in the

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1. "An aircraft will be any machine capable of keeping itself afloat in airspace. Such a machine however will automatically cease to be considered an aircraft when it rises above the 300 km limit or when it begins to move in a continuous orbit." See J. Rivoiri, "Design for a Law of Space," *First Colloquium 1958*, op. cit., p. 98.


future might find desirable. Also the extension of absolute sovereignty up to that height places unnecessary constraints on trajectories of space mission launchings or landings.\footnote{Mishra, et al, "On the Lack of Physical Basis for Defining a Boundary between Air Space and Outer Space", \textit{Annals of Air and Space Law}, Vol. 7. 1982, 403.}

It is also believed that such a delimitation can have only a subsidiary character; the application of the space law cannot depend on the province where a legally relevant set of facts takes place.\footnote{Gal, op. cit, p. 86.}

However, majority of the scholars believe that delimiting at the lowest perigee is a customary law rule since no country has made any protest against the passage of satellites over its territory.\footnote{A detailed analysis of this point has been made in the succeeding pages of this Chapter see pp. 231-237.} If the scientists agree that below a certain altitude satellites can not orbit, this theory can be taken as a basis for an international agreement on the issue of delimitation of the air space and the outer space.\footnote{See \textit{Chapter II} of this Study, p. 41.}

In order to reconcile different trends in the spatial theories, as in early air law, some scholars have proposed another theory known as the \textit{zone theory}. This theory divides the space into three zones: the zone immediately over the national territory, within which the states could exercise...
their complete and exclusive sovereignty, the intermediary (contiguous) zone in which free passage should be granted for peaceful purposes and the unlimited zone of free space.¹

The theory is based on two important considerations. The limit of national sovereignty, complete and exclusive, should be reasonably low in order to facilitate the exploration of the outer space and the subjacent states should have a legitimate interest in exercising certain control and powers in the contiguous zone for reasons of conservation.

The first zone would constitute the territorial air space (navigable and efficient) similar to the territorial sea in maritime law. This territorial air space would not include the right of innocent passage of any foreign plane or space vehicle.

The second zone would constitute the contiguous air space (non-navigable and deficient) similar to the contiguous zone in maritime law.

Above these zones, there would be an unlimited free upper space not subjected to any regulatory power of the subjacent states analogous to the high sea.²


2. The concept of vertical contiguous air zone with the right of innocent passage for all states is not new. In the early air law the right of national sovereignty was acknowledged provided it took into consideration certain privileges of transit or even of transport. For Contd...*
The concept of a vertical contiguous air zone may resolve the problem of delimitation and space exploration if the 'air space' is interpreted as meaning 'navigable air space'. Possibly, the states could enter into a new international convention to establish such a contiguous zone. Cooper, the main propounder of this theory, believes that one might include the following principles in such a convention:

a) reaffirm Article 1 of the Chicago Convention, giving the subjacent state, full sovereignty in the areas of atmospheric space above it, up to the height, where 'aircraft' as now defined may be operated, such area to be designated 'territorial space'.

b) extend the sovereignty of the subjacent state upward to 300 miles above the earth's surface, designating this second area as 'contiguous space', and provide for a right of transit through this zone for all non-military flight instrumentalities when ascending or descending.

c) accept the principle that all space, above the contiguous space, is free for the passage of all instrumentalities.1

However, in 1957, he raised the upper limit of the contiguous space to 600 miles (960 kms)2

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2. Ibid. It was after the announcement of the Soviet ICBM Contd...
While maintaining his zone theory, Cooper reformulated it in 1962, in which he wanted to extend the absolute national sovereignty to the narrow belt next to the earth used by 'normal airplanes'. As to the outer space, he suggested that its limit be drawn where satellites could be put into the lowest orbit. In the zones between these two 'peaceful foreign spacecrafts' should be granted free passage. In 1963, he put these two zones at 20-25 miles and 70-75 miles respectively.¹

Schofield proposed a similar trichotomous theory consisting of a national air space (0-50 miles); an international space (50-2000 miles) and an outer space (above 2000 miles).² Likewise Hyman made a detailed proposal and suggested the establishment of 'Neutralia'--a neutral zone--between the air space and the outer space, where innocent space and the outer space, where innocent passage of all instrumentalities

¹...tests which was expected to reach an altitude of 600 miles (960 kms), Cooper mentioned in 1957 that it was necessary in the interest of the neutral states to prevent such missiles to cause destruction to third countries from passing above their territories.

would be allowed.¹

Scholars like Wright, Haanappel, Kopal and Reignen have also proposed similar divisions.² McDougal first opposed the fixing of such boundaries but later revived the proposition of a contiguous zone.³

The zone theory is also not free from defects. Even the proponents of the theory are far from agreeing among themselves, on details. For example, Costadoat and Ambrosini suggest a division into four zones, the fourth zone to be subjected to a co-imperium of all states.⁴ Verschoor and Gal have opposed the establishment of a contiguous zone as is done in maritime law, considering that the analogy is not justified.⁵


4. Quoted in Matte, op. cit., p. 40.

5. The contiguous zone of the sea serves a definite purpose, it enables the territorial state to exercise certain functions (customs, sanitary control, fishing, Contd...*
The majority of the scholars choose a division into two zones discarding the contiguous zone proposed by Cooper. For example, Pepin declares that legally there are only two zones: one, the air or atmosphere which has a legal status defined in the Chicago Convention of 1944 and the other, the outer space of a still undefined status.\(^1\) Zyliez recognises national sovereignty solely in the air space overlying the states and would give a free status to the zone beyond.\(^2\) Similarly Lachs, Berezowski, Makowsky, Roskowski, Winiarski and Jenks also subscribe to the same view.\(^3\)

Gal is of the opinion that apart from the difficulties of location, this contiguous zone (in contra-distinction to the similar maritime zone) could be just as important as the zone of 'absolute sovereignty'. He further says that it is unlikely that in the age of satellites and ballistic missile weapons speeding at 25000 kms an hour, any state


\(^2\) Quoted in Matte, op. cit., p. 41.

would make its security measures dependent on the special legal order of a contiguous zone or neutral zone. Similar views are expressed by Meyer, Hannover, and Zourek.

The defects pointed out in the afore-going discussion in the spatial theories based on physical and scientific bases are symptomatic of the fact that it is almost impossible to solve the problem of delimitation of the air space and the outer space by application of any such theory. In the one and the same theory different interpretations of one criterion further complicate the problem. Consequently, some authors thought it fit to recommend boundaries in terms of arbitrary altitudes unrelated to any conventional astronomical, geophysical or engineering factors.

3. A recent study on the physical basis for defining a boundary between air space and outer space also concludes that there are in fact, no physical basis which might be used as a sound and absolute reason for defining a boundary between air space and outer space. The notion of 'boundary' is simply a humanly conceived constraint, possibly a matter of convenience or means of controlling conflicting human objectives. The definition must, therefore, be sought in human terms... in terms of human experience, this means that such definition is an act of wilful desire, an arbitrary decision, and the answer must be achieved through well-known processes of human decision making in such cases. Such decisions may be achieved on social, cultural, economic, historical...
For example, Cheng as early as 1960 wrote:

The most urgent task in space law... to secure a general agreement among states fixing precise upper limit of national boundary... the parties to such an agreement are at liberty to choose any arbitrary distance as the extreme height of national space, which need not necessarily coincide with the limits of terrestrial atmosphere.¹

However, the extreme variations of the numerical proposals for the definition of a boundary, ranging from ten to one million kms became evident from the balance sheet prepared on the bases of numerical proposals.² It speaks of the difficulty of reaching at an international agreement entirely based on a numerical proposal.

The discussion of the spatial theories to the problem of delimitation establishes that no single theory is fully capable of providing rational accommodation between 'inclusive' and 'exclusive' interests of the states. The extension of national sovereignty to very high altitudes would grievously interfere with all uses of space without providing

*...and political grounds as an act of collective will through negotiated agreements. See Mishra et al., op. cit., p. 413.

1. Cheng, op. cit., p. 231. Similarly Meyer declares that boundary can only be drawn numerically, by an international agreement, regardless whether such boundary to be established between air space and outer space will correspond to the prevailing geographical or topographical data, quoted in Gal, op. cit., p. 98.

2. For the Balance Sheet see Appendix VI
any real protection to the genuine exclusive interests of the subjacent states. And limiting the comprehensive, exclusive competence of the states to a very low height might, on the other hand, seriously interfere with their unique interests. Since the spatial theories leading to varied conclusions failed to solve the problem of delimitation of the air space and the outer space, the functional theory came to the foreground.

The Functional Theory

According to this theory it would be more appropriate for international law to regulate space flights simply by reference to the nature of activity (function) or nature of vehicle or a combination of both. It acknowledges the unity of the status of the air and the space, and lays down different rules according to the functions of the flying machines (planes or rockets).  

The idea of the functional regulation in the field of space can be traced to the times preceding the advent of the

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space-age. As early as 1947, Lemoine wrote that the air law is the field of law which determines and studies the laws and legal norms that regulate the traffic and use of an aircraft as well as the relations which they brought about and that cosmic law was oriented towards navigation in space.\(^1\) Kroell observed in 1953, that astrocraft and cosmocraft should be subject to different legal status according to their destination which could be terrestrial or spatial. The cosmocraft would be subjected to cosmic law, and it would be applicable to it as soon as it left the earth. Otherwise, it would be too complicated to determine when the machines passed from one legal status to another. The 'unity of status' is preferable, if not more rational solution.\(^2\) Jenks expressed the view in 1956, that the atmosphere should be continued to be governed by the states, but the jurisdiction over space should be exercised by the United Nations. According to him, there is no necessity of establishing a unity of status, but at the same time space activities must not be subjected to national sovereignties.\(^3\)

Hombourg, one of the pioneers who introduced the

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2. Ibid.

3. Jenks, op. cit., pp. 109-110. As the states' approach to the problem of demarcation differs, the idea which must be retained above all others from Jenks 'statement' is the functional division he makes between the two activities.
functional approach to air law, expressed the opinion that the boundaries established between the air and the space would be illusory and without practical value. Quadri, developing the functional theory, wrote that all area aspects of the definition of space law are illogical because it is not the area which characterizes the phenomenon of cosmic activity. The proper legal category of this activity will be determined by its nature.

For Chaumont, it is most important to ‘exclude the geographic and territorial theory’ and to introduce a functional system which is the only one which can be considered capable of guaranteeing the protection of all interests involved and promoting at one and the same time, the progress of science. It is much easier to define, according to this opinion, the space activities, rather than the limits

1. R. Hombourg defined air law as "the totality of legal rules applying to air navigation between different points of the surface of the earth." This definition should be revised so as to take into account the fact that a mixed (or hybrid) plane can navigate both in the air and in space. According to Hombourg, cosmic law is that which is applicable to space navigation, between the earth and another point of universe. See Matte, op. cit., p. 66. Also see U.N. Doc.A/AC.105/C 207, 1970, p. 59.

2. Ibid. Quadri also expressed the opinion that states with respect to spacecraft which fly over them, do not have any authority over such vehicles. All jurisdiction in such a craft is vested solely in the state which launches it.
in the space. Likewise, McDougal and Lipson have said that "... with growing awareness of the difficulties entailed by fixed lines... the problem will transform itself from one of boundaries to one of activities." Focusing the attention on the functional nature of activities in the space, Beresford observed that the most promising alternative to the extension of sovereignty into outer space is the classification by international agreement of prescribed activities in space according to their purpose and effect. Kuhfeld also supported the functional theory and declared that states are concerned not so much with distances at which certain spatial activities occur as with the nature of such activities. Gal, Szutucki and Kopal share the same viewpoint. The Soviet authors rejected the extension of a


a comprehensive, exclusive competence of states to cosmic reaches because it would mean, "that the entire programme of scientific space exploration could be thwarted by protests of just a single country over which the earth satellite might fly."\(^1\) The Soviet scholars insist, like other advocates of the functional approach, that what matters is not so much the location of a particular activity as the effect of that activity upon the security of the subjacent state.\(^2\)

The functional theory got recognition in the report of the United Nations Ad Hoc Committee on the Peaceful Uses of Outer Space, which indicated a possibility of basing the legal regime governing outer space activities primarily on the nature and type of particular space activities.\(^3\) In fact the foundations of the space law has been laid down with the principles declared in the United Nations General

\*...Space Control: The Delimitation of Outer Space and the Legal Ground for Outer Space Flights", Third Colloquium 1960, op. cit., p. 111

1. Korovin, op. cit., p. 54.
2. Zhukov said, "it seems to me that from the standpoint of the security of states the height to which sovereignty extends above land is not of decisive importance. A state will not feel above more secure because military preparations are being conducted at a greater altitude." See Zhukov, op. cit., p. 1082.
Assembly Res. Nos. 1721/XVI and 1962/XVIII\(^1\) without a previous agreement on the demarcation of the boundaries of the air space and the outer space. Accordingly, some authors have been prompted by the reasons of positive law to recognise the validity (or at least the priority) of a legal construction based on the nature of the activity.\(^2\)

Even from the Outer Space Treaty 1967, it can be inferred that the Treaty deals with the principles governing the activities of the states in the exploration and use of the outer space and, within this scope, regulates without determining the limits of their sovereignty towards the outer space the rights and obligations of the states, parties to the Treaty. This regulation, found in the Treaty, bears fundamentally and necessarily a functional character.\(^3\)


2. For example, state activity in space has been capable of regulation; namely, by drawing up functional rules of conduct concerning space, D.P. O’Connell, quoted in Gal, op. cit., p. 110; The formulation of such rules, even though the definition of boundaries might become necessary some day, must precede the question of demarcation. I. Herczeg, Ibid. By a functional delimitation, more exact distinction is assured than by spatial interpretation of space flights, D.M. Sontag, Ibid, p. 111.

3. For example, Article III of the Treaty, obligates the Contd...*
The reason invoked in favour of the functional theory, both from the juridico-political aspects and that of positive law, is that the problem of vertical delimitation cannot be solved overnight. For example, referring to maritime law analogy, it is said that the customary rules regarding the legal position of the territorial sea, firmly established during centuries, were codified by the Geneva Conference on the Law of Sea in 1958. Nevertheless, at that time the Convention was forced to leave open the problem of the width of the territorial sea. The problem of vertical delimitation, which is only three decades old, being much more complex and infinitely more delicate from the aspect of security of states, cannot be resolved from one day to the next.

The space law should be based on new foundations. It is argued that the solution to the problem of regulation of...


2. Moreover, to set down premature legal rules, too strict and rigid, could contribute to retarding the very evolution of science of aeronautics, astronautics and several other connected sciences (telecommunications, chemistry etc.) See Matte, op. cit., p. 44.
international questions of astronautics should be found not in a variety of the demarcation theories but in laying new foundations for the space law.¹

Moreover, an attacking I.C.B.M.² or a stationary spy-satellite endangers the security of the states even if the subjacent state’s sovereignty is extended to this altitude. The ballistic missile will endanger the security of the state under attack not upon crossing the vertical boundaries of the later, but many thousands of kilometers away by relying entirely on its automatic guiding mechanism. Even by the anti-missile missiles, it is quite probable that the missile cannot be annihilated in any other way than by meeting it at such a point of the trajectory which may lie outside the vertical boundaries of the state territory. As such there is no weight in the argument that boundaries of the state territorial sovereignty must be drawn at the top of altitude of

1. The synthesis of territorial air space and free outer space can only be assured by an international agreement which can break away the conventional forms, and encompass the activity element of rockets, artificial satellites and planets launched by the states. Gal, op. cit., p. 106; Matte is also of the opinion that air law and space law differ from maritime law, so it is indispensable to reject easy analogies, such as that between the status of the sea or even of the Antarctica etc. Thus, a new and autonomous status for air and space must be considered. See Matte, op. cit., p. 44.

2. Inter-continental Ballistic Missiles.
the missiles in the interests of protection of neutrality. Further, the safety of the state can be endangered from outside the state territory also. A stationary satellite orbiting at a proper height may carry out successful intelligence activity from space while remaining outside the vertical territory of the state.

It is, therefore, difficult to reconcile the freedom of space with sovereignty in the air. The idea of state sovereignty over the space, even if it should relate only to a part of space, is squarely opposed to the theory of freedom of space, which acquires favour from almost all theorists.

1. A missile which has a range of 10,000 kms will have a speed of 25000 kms/hour at the point where the rocket propulsion unit burns out. During the following so-called free trajectory it will attain an altitude of 1320 kms, while its velocity is decreasing; subsequently, continuously speeding up it will regain its top velocity and finally hit the target after a flight of 32' 14''. In this way it can be seen that even if the sovereignty of the state is set at 1320 kms above its territory the ballistic missile will endanger the security of the state under attack not upon crossing the vertical boundaries of the state, but many thousands of kilometres earlier when relying entirely on its automatic guiding mechanism. See Rothmeyer, Rocket, Sputnik, Spaceship, quoted in Gal, op. cit., 107. Zhukov also shares the same views.

2. To speak of equal freedom to explore space cannot reconcile with national sovereignty as some states may object to foreign rockets flying over their territory, because it is difficult, at least for small states, to send a rocket into space without passing through the atmosphere of another country. For example, Switzerland cannot send such a rocket which may reach space without passing through the atmosphere of Germany, Austria or some other countries.
The space law regulates the entity and unity of space activities. The law, as such, cannot divide the trajectory of a spacecraft into sections of different legal status.\(^1\) Space law in its wider meaning also includes national legal norms relating to the entirety of activities in space.\(^2\) Accordingly, the only way to preserve the logical unity of legal regulations is by dispensing with demarcation in space and adopting the functional basis as legally relevant facts cannot be localised in the outer space.

Further, in the space over the high seas only functional theory can defend the security of the states. For example, 71 percent of the surface of the earth is covered by the sea. In the space above the high seas only a regulation based on the nature of space activity will afford a restriction capable of protecting the security of the states.\(^3\)

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1. The space rockets and the trajectory of space ship form an operational entity which cannot be sliced into several layers of different legal positions like a loaf of bread or an apple.

2. For example, in Article IV of the Outer Space Treaty of 1967, the contracting States bind themselves not to place in orbit nuclear weapons or any other kinds of weapons of mass destruction, then this will automatically involve the duty for the states not to permit any such activity right from the moment of launching, or even before, at the stage of preparation.

3. On the contrary, no matter how high the limit of sovereignty should be drawn above the continental territories totalling only 29 percent of the earth’s surface, it would not protect the states from harmful interference through activities carried out above the sea.
And vertical delimitation is not possible on scientific and physical bases.¹

Matte, one of the propounders of the functional theory, explains certain factors which may serve as the bases for the functional solution to the problem of delimitation which are discussed as under:

The starting point of the functional theory is the obliteration of all divisions between air and space, because nobody knows the limits of one or the other, and these concepts have accessory value only in this theory. The concepts of freedom of space and state sovereignty must be understood as indicating a 'functional freedom' and a functional sovereignty, and the application of these concepts must be reasonable. And the functional theory does not reject the rights recognised as belonging to the states, such as their functional sovereignty over the air traffic, over their territory or over the activities of their citizens. The functional sovereignty, thus understood, will take into account all interests of the states in military security. On the other hand, for the purpose of navigation air should be as free as

¹ Any attempt to make use of physical arguments to define a boundary will be contrived, artificial, illusory and therefore, intellectually unsound. For details see Mishra, op. cit., pp.399-413. Also see Matte, op. cit., pp. 44-52, 61; E.N. Georgakarkos, "The Necessity to Set Boundaries Between Air Space and Outer Space", Thesaurus Acroasium, Vol. 14, 1985, 663-687.
The functional freedom of space does not grant the right to do anything one wishes in it without paying attention to the consequences, nor does it imply the absence of legal rules. The functional freedom should be understood as liberty given only in view of certain such functions as humanitarian, scientific, exploratory etc.¹

The right of self defence (or right to security), which seems to be inherent in the very human nature and the right to access or right of mobility between two points of the universe, should be recognised. These two rights must be considered as bases for the formulation of functional regulation of the space activities.²

By virtue of the functional theory, the air law (aeronautical law) is that field of law which applies to the activities of aircraft, planes, balloons and any device requiring air support.³

The arguments given in favour of the functional theory are not free from defects and are refuted on different grounds. The reference to the 1958 Convention on the Law of the

2. Ibid.
3. Ibid.
4. Ibid.
Sea has no relevance to the argument in favour of the functional theory. The customary standard of twelve miles limit of the territorial sea has already been reaffirmed in Article 3 of the 1982 UN Convention on the Law of the Sea.¹

No body will deny that space law should be based on 'new foundations'. Even the supporters of the theory regard it as a necessary means for want of the solution to delimitation. How can an interim solution, like functional theory, be accepted as a solid 'new foundation' which is expected to function as a lasting cornerstone of this new branch of law.²

It is common knowledge that the trajectory of a spacecraft, which is travelling at very high speed traversing the air space in a matter of minutes or less, cannot be divided into different sections. The flight of spacecraft takes only seconds or minutes in the space having a different legal status than that the outer space has. It is questionable whether the nature of the activity has any legal signi-

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¹. "Every State has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles, measured from baselines determined in accordance with this Convention". Article 3, The UN Convention on the Law of the Sea, December 10, 1982.

ficance outside the outer space. To bring down the legal consequences of the functional theory right to the threshold of sovereign states, does not appear to be a welcome idea at the present time.¹

The next argument eroding the functional base of the theory challenges the very assumption upon which it is propounded. It is argued that only the functional theory can protect the states from the endangering activities carried out over the high seas. It leads to the assumption that freedom of the outer space is an unqualified one, and from international spaces any activity may be carried out, which, otherwise, is prohibited within national territories. This tacit assumption creates, of course, further contradictions within the theory itself. Though this kind of speculation cannot be accepted, nevertheless, it is a matter of fact that the states need not have to take the ‘advantage’ of the high seas, if they want to embark upon an activity, which according to the assumption of the functional theory, would be ‘more possible’ outside a national territory from legal point of view.²

Further, the argument that the legally relevant facts cannot be localised in the outer space, also implies that

¹. Ibid., pp. 332-333.
². Ibid., p. 333.
legally relevant facts cannot be localised in any of the spaces. We do not know, for instance, where is the limit between the air space and the outer space. We may not know either in what vertical space a definite action takes place. Thus legally relevant facts can be localised in the outer space, though sometimes in a negative manner. An activity which is not localised as having taken place in the air space automatically comes to be regarded as having been carried out in the outer space.

The premise that vertical delimitation on scientific grounds is not possible, has been refuted by Perek who believes that science can well provide such a criterion for delimitation. He declares that determination of function being performed by a space object could be considerably more difficult than a simple measurement of distance.¹

Even the legal principles declared vide the United Nations General Assembly Res, No. 1962/XVIII of December

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¹ Perek does not agree with Matte that delimitation on scientific basis is not possible. According to him, had it been so, how was it ever possible to place satellites very accurately into predetermined orbits? He believes that science is in a position to indicate e.g. the region of lowest perigees of artificial satellites... on the basis of standard navigation methods. Space vehicles themselves can determine whether they are inside or outside the adopted limit... distance of any space object can be measured quickly with equipment which is not exceedingly expensive. See Peek, op. cit., pp. 114-116.
13,1963 contain elements of spatial character. Moreover, the United Nations General Assembly Res, No. 2222/XXI of December 19, 1966, while approving the Space Treaty, called on the COPUOS to study the question relative to the definition of the outer space, thus putting the question of the demarcation of boundaries on its agenda. These arguments undermine the applicability of the functional theory.

Another possible defect of the functional theory is that it lacks viable grounds for the application of certain subordinate policies, especially those of procedural character. This theory does not sufficiently take into account either the need for preventing or minimising the occurrence of disputes or the requirements of economy in the disposition of particular disputes once they have occurred.

Further, the argument that if an activity is lawful, it may be conducted anywhere, cannot be accepted. Cheng says that even if an activity is lawful, this, by no means implies that it may be conducted, no matter where.

If there is a great divergence among the spatialists on the exact method of delimiting the air space and the outer

1. For example see the United Nations General Assembly. Resolution, No. 1961/XVIII, Para 5, "national activities in outer space; and control over such object... while in outer space"; Para 9, "envoys of mankind in outer space".


space, the functionalists, too, are divided in a similar way. According to Cheng, the supporters of the functional theory can be divided into two categories having further sub-categories in the following way:

a) Spatial delimitation not required at all.
   i) Astronautics can be regulated by reference solely to the nature of these activities.
   ii) Astronautics can be regulated by reference solely to the nature of the activities and the nature of the space objects.

b) Spatial delimitation not required at present and astronautics can be adequately regulated at present by either (a) i or (a) ii above.1

Furthermore, it is difficult to make an objective assessment as to what constitutes purely aeronautical versus astronomical function and that each particular mission of increasing number of space vehicles could or would be revealed for the purposes of differentiating air space from outer space.2

Notwithstanding the above criticism, the scholars who otherwise build up space law on spatial basis also recognise the advantages of the functional theory.3 It also goes to

3. According to McMohan "The best solution would seem to be one drawing the line below 100 miles together with an agreement on what activities above that point are to be permitted or prohibited." See J.F. McMohan, "Legal Aspects of Outer Space", British Yearbook of International Law, 1962, pp. 356-357.
the credit of the functional theory that it does, in particular controversies, permit a relatively precise accommodation of both inclusive and exclusive interests, thus, conforming to highest possible measure to overriding community policies. While assessing the usefulness of the functional theory, it may be kept in mind that this theory came to the foreground to provide some solution to the consequences which arose from the situation linked with the failure to solve the problem of delimitation. The functional theory is only a "stop gap arrangement" but not a satisfactory legal solution to the problem. Sharing the same opinion Rosenfield, Kopal, and Zhukov also subscribe to the view that acceptance to date of this functional approach does not prevent a different approach in future. It does suggest that this approach is currently being successfully used and should be continued so long as it is of value.

Some scholars have modified the functional theory by

1. It is achieved through its insistence upon taking in account, in particular instances, all the factors that may be relevant to national decision with respect to an appropriate accommodation of conflicting interests. See McDougal, et al., op. cit., p. 355.


reconciling the functional elements with spatial elements. In the words of Kish, functional factors determine the concrete delimitation of the air space and the outer space. On the basis of this consideration, he wrote:

The upper flight of aircraft may be accepted as the functional limit of airspace. Accordingly, thirty miles may be considered as the upper limit of airflight, and thus airspace. This limit would secure the sovereignty of the subjacent state over its entire airspace and preclude the legality of aerial reconnaissance above national territory. On the other hand, the functional limit of outer space constitutes an alternative boundary. On the basis of this consideration, the lower orbit of spacecraft may be accepted as the functional limit of outer space. Accordingly, ninety miles may be considered as the lower limit of space orbit, and thus outer space.

In addition to the above-discussed spatial and functional theories, there are scholars who have viewed the problem of delimitation of the air space and the outer space through another approach, namely, the wait and see approach.

It stems from the wait and see attitude adopted on the premise that time for delimitation is not yet ripe. The determination of a boundary line between the air space and the outer space raises policy problems regarding state security, diplomatic instruments, military capabilities, ideological instruments, economic instruments, technology, scientific knowledge and know-how etc., that have not yet been resolved. As such, determination of line dividing the air space and the outer space is not feasible in terms of current international policy. And if at all such arbitrary line is drawn it would be indefinite.

Moreover, lack of boundary, as yet, has caused a few or no inter-country conflicts in the regulation of the air and the outer space activities. At the same time, finding solution to the problems raised so far in this context seems feasible, even without a definite line between the air space and the outer space.

The delimitation should be postponed until the nature of these problems is well understood.

1. For details see H.H. Almond Jr., "Legal Definition of Outer Space", in M.D. Schwartz, The Proceedings of Twenty-First Colloquium on the Law of Outer Space, Dubrovnik, October 1-8, 1978 (Davis: University of California School of Law, 1979), pp. 87-88
2. Rosenfield, op. cit., p. 147
4. Rosenfield, op. cit., p. 147
of future astronautical activities is better understood. Once a demarcation line is agreed upon, it will be as difficult to change such a line as it is to agree to it.¹ Hosenball and Hofgard maintain that any delimitation of the air space and the outer space would almost certainly lead to competing and perhaps even hostile charges of invasion of the air space. It is significant that no country or writer has identified any problem that would be resolved only through the establishment of a boundary between the air space and the outer space.² It is argued that there is neither a clearly defined scientific point upon which the states of the world can agree, nor a specific problem that needs a solution and which cannot be solved except through delimitation. And it cannot be predicted when either of the situations may arise.³ In short, there is no need for such delimitation, until a serious problem, which defies resolution without it, arises.


The wait and see approach is also not free from defects. It is no longer justified to hold the view that lack of a boundary between the air space and the outer space creates no problems. The sovereignty claim over that part of the geostationary orbit which lies over their territory, by some equatorial countries in 1976, illustrates the urgency of the situation. The customary law no longer provides a practical or equitable solution to the demarcation problem. A precise limit, defined by an international agreement, is necessary to avoid future conflicts. Further, the legitimacy of the exercise of sovereign authority over the geostationary orbit could easily be determined if there existed a boundary.

Moreover, the new generation spacecrafts like space shuttle, which is launched as a spacecraft but returns to the earth and lands as an aircraft, and the proposed horizontal take-off and landing vehicle or 'aerospace plane', have underscored an urgent need for delimitation. The overriding question is: when does space shuttle leave the outer space and enter the air space? This question apparently cannot be answered without first determining the boundary between the two.

1. For a detailed discussion on this issue see Chapter VI of this study, pp. 241-274.

2. The British scientists have been researching a version of aerospace plane and the United States is beginning to contd...
The countries that have not established space programmes fear that space-powers will exploit the principle of the freedom of use and non-appropriation to their own advantage and disregard the interests of lesser developed countries. Hence these countries insist on an early delimitation of the air space and the outer space. The argument that the time is not ripe for delimitation has also been criticised by Cheng, who maintains:

when it is recognised that one will have to do in due course, it would be more prudent to try and slip while all the issues are still dormant than to wait till the divergent interests of all nations have hardened.

He further says that if one were to wait for all opinions to agree, one could easily wait till Greek Calends.

From the preceding discussion on various theories and

*...gear up for a programme of its own. An aerospace plane would function as airplane in its take-off and landing stages, and as a spacecraft while through low earth orbit. See Hosenball, et al., op. cit., pp. 887-88.


approaches, the complexity of the problem of delimitation of the air space and the outer space becomes evident. If there is divergence of opinion among the spatialists on the exact method of delimitation, the functionalists, as discussed earlier, also belong to different categories united only by their common belief that spatial delimitation is either not required at all, or not required for the present.

There is a lack of consensus among the scholars on space law on any of the theories and approaches discussed above. Nevertheless, it appears that the necessity to solve the problem of delimitation on spatial basis is gradually acknowledged by the publicists. Though there is no agreement, it seems that the lowest effective perigee of satellites is emerging as a natural boundary between the air space and the outer space. And to a great extent state practice also lends credence to it.¹

The United Nations and the Problem of Delimitation

The problems of delimitation has been the focus of attention not only among the space law scholars but also in the United Nations in the COPUOS from the very advent of the space-age.

¹ State practice is discussed in the succeeding pages. See pp. 231-237.
As early as 1959, the problem of delimitation of the outer space was raised in the United Nations Ad Hoc Committee on the Peaceful Uses of Outer Space. In its report, however, this Committee expressed the view that it was generally believed that the determination of precise limits for the air space and the outer space did not present a serious problem calling priority consideration at the moment.¹ In 1962, the Legal Sub-Committee established by the COPUOS, put this issue on its agenda, but the discussion was repeatedly postponed until 1967. At that time, the Legal Sub-Committee, in compliance with the United Nations General Assembly Resolution 2222 (XXI) of December 19, 1966,² requesting the COPUOS to begin the study of the issue relative to the definition of outer space, discussed this question in greater detail at its following session in 1967. As a result of its deliberations, Committee addressed a questionnaire to the Scientific and Technical Sub-Committee, inviting this body to draw up a list of scientific criteria that could be helpful to the Legal Sub-Committee in its study relative to a definition of outer space. Furthermore, the Scientific and Technical Sub-Committee was called upon to give its views on the selection of scientific and technical criteria that

that might be adopted by the Legal Sub-Committee.\textsuperscript{1}

After an exchange of views on this topic, the Scientific and Technical Sub-Committee agreed to a position that, "it is not possible at the present time to identify scientific or technical criteria which would permit a precise and lasting definition of the outer space."\textsuperscript{2} All the same, the Sub-Committee felt it appropriate to continue its considerations on this issue at its future sessions.

For several subsequent years the item remained on the agenda of the Legal Sub-Committee. A number of statements were made by delegations in which they stressed the renewed importance of the subject and expressed the wish that it should receive more detailed examination at future meetings.\textsuperscript{3} But, a thorough consideration of all aspects involved was repeatedly postponed, owing to the lack of time, till 1977.\textsuperscript{4}

However, in the years between 1977 and 1989, the problem of the delimitation of the air space and the outer space has been most extensively debated in the COPUOS and its

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Legal Sub-Committee. The matter still remains on the agenda of the COPUOS and its Legal Sub-Committee, awaiting an internationally acceptable solution.

On the basis of the analysis of the views expressed by the delegations of various states on the problem of delimitation in the Legal Sub-Committee of the COPUOS, it is possible to identify three groups of views (same as in the case of publicists): the spatialists, the functionalists and the wait and seers.

In the initial years i.e. starting from 1959 till 1967, when the question of definition and/or delimitation was formally put on the agenda of the Legal Sub-Committee, the functionalists, backed by major space powers, received substantial support in the said Committee.

1. The 23rd Session of the Legal Sub-Committee held in March-April 1984 in keeping with the U.N. General Assembly's resolution 38/80 of December 15, 1983, set up a working group to consider urgently this item on agenda. The General Assembly specially recommended that the working group to take into account the different legal regimes regulating the air space and the outer space.

2. The 1959 Report of the Ad Hoc Committee on Peaceful Uses of Outer Space did not consider that the topic called for priority consideration. See U.N. Doc.A/4141, 1959, pp. 93-94, also see B. Cheng, "The United Nations and Outer Space", *Current Legal Problems*, Vol. 14, 1961, 259-262. The reason for such an attitude of the COPUOS was that both space-powers the USSR and the USA were dominant in the COPUOS and it was not in their interests to have boundaries which might restrict their freedom to get into space (whether for peaceful or military purposes) without let or hindrance. See Cheng, op. cit., p. 324, Contd...
But over the years, though there is no agreement or consensus on the issue of delimitation in the COPUOS, it seems that the functionalists are losing ground and a trend for adopting the 'spatial approach' or the 'wait and see approach' is emerging.¹

Some of the states which previously favoured the functional theory have changed their position and now prefer to delimit the outer space. For example, Belgium, which had been in favour of the functional theory, changed its stand and in a working paper in 1976 suggested a 100 kms boundary.² Similarly, though the U.S.S.R. opposed the Belgium proposal as arbitrarily passed, it produced a working paper in 1979 which provided:

1) The region above 100(110) kilometres altitude from the sea level of the earth is outer space.
2) The boundary between the air space and the outer space shall be subject to agre-

¹...see for supporters of the functional theory, U.N. Doc.A/AC.105/C.2/7, 1970, p. 18 (Japan); p. 20, (France); p. 21, (Japan).

¹. Especially, after the sovereignty claims over the segments of geostationary orbit by some equatorial states in the Bogota Declaration of 1976. It is appropriate to mention here that ILA in 1978 in its report stated that states are more concerned with the delimitation problem in the air space and the outer space. There is a tendency towards the preference of the states of the spatial theory above the functional. See ILA Report, 58th Conference, 1978 (London: ILA, 1979), p. 176.

². U.N. Doc.A/AC.105/C.76. 1976,
ement among States and shall subsequently be established by a treaty at an altitude not exceeding 100(110) kilometres above see level.

3) Space objects of States shall retain the right to fly over the territory of other states at altitudes lower than 100(110) kilometres above sea level for the purpose of reaching orbit or returning to the earth in the territory of the launching State.1

In 1983, in another working paper submitted to the Legal Sub-Committee, the U.S.S.R. urged the member states to opt in favour of a boundary at an altitude not exceeding 110 kilometres above the sea level.2 Further, in 1987 the U.S.S.R. again in another working paper submitted a compromise proposal which stated:

While not resolving in advance the question of the need to establish a boundary between the air space and the outer space and without prejudice to the final position concerning the upper limit of state sovereignty general agreement might be reached to the effect that:-

1) Any object launched into outer space shall be considered as being in outer space at all stages of its flight after launch at which its altitude above sea level is 110 kilometres or more.

2) Space objects of the states shall retain the right to fly over the territory of other states at altitudes lower than 110 kilometres above sea level for the purpose of reaching orbit around the Earth or proceeding on a flight trajectory beyond the confines of that orbit and for the purpose of returning to the Earth.3

Only three countries i.e. Japan, Argentina, and Sweden seem to advocate openly the functional approach to the problem of delimitation, though France is also of the opinion that an understanding should first be reached on the concept of "space activities" as criterion for the scope of space law.¹

The attitude of the United States, followed closely among others by the United Kingdom, the Federal Republic of Germany and Australia, which previously supported the functional theory, has also undergone a change. However, in their case the change towards the wait and see approach is more pronounced. The principle reasons against the immediate need for delimitation of the air space and the outer space advanced by the United States delegate were:

a) The inability of most countries to monitor such an altitude frontier.
b) The lack of adequate examination of the relevant scientific, legal and political factors.
c) The possible inhibiting and even stifling effect of such a boundary on future efforts to explore and use outer space.²


As stated earlier agreement regarding various theories and approaches to the problem of delimitation has eluded the states debating the issue. But in the subsequent discussions in the Legal Sub-Committee, great majority of the states favoured 'a spatial approach' towards solving the problem of delimitation. A number of states have explicitly declared preference for 100 or 110 kilometres for upward extent of sovereign air space as proposed by the U.S.S.R. For example, among others India, Mongolia, Czechoslovakia, Bulgaria, Vietnam, Ecuador, Romania, China, Poland, the G.D.R., Cuba, and Hungary preferring spatial approach, supported the Soviet proposal of 100/110 kilometres. Moreover, a growing number of states are in favour of trying to arrive rapidly at

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1. U.N. Doc.A/AC.105/C.2/SR.369, 1982, p. 3. (India);
U.N. Doc.A/AC.105/C.2/SR.419, 1984, p. 6. (India);
U.N. Doc.A/AC.105/C.2/SR.408, 1984, p. 2. (India);
U.N. Doc.A/AC.105/C.2/SR.379, 1982, p. 3. (Czechoslovakia);
U.N. Doc.A/AC.105/C.2/SR.410, 1984, p. 2. (Czechoslovakia);
U.N. Doc.A/AC.105/C.2/SR.493, 1988, p. 6. (Czechoslovakia);

Contd...
solution to the problem of delimitation of the air space and the outer space. States like, Argentina, Austria, Belgium, Brazil, Chile, Egypt, France, Iran, Italy, Mexico, Poland, Romania, Kenya, Bulgaria, Colombia, Vietnam, Hungary, India, Czechoslovakia, Venezuela, China, Iraq, Mongolia, Pakistan, Nigeria, and many others feel that the problem of delimitation should be solved at the earliest.\(^1\) A great majority of the above mentioned countries have also advocated the lower

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\begin{itemize}
  \item U.N. Doc.A/AC.105/C.2/SR.368, 1982, p. 3. (Bulgaria);
  \item U.N. Doc.A/AC.105/C.2/SR.413, 1984, p. 6. (Bulgaria);
  \item U.N. Doc.A/AC.105/C.2/SR.430, 1985, pp. 3-4. (Bulgaria);
  \item U.N. Doc.A/AC.105/C.2/SR.518, 1989, p. 7. (Bulgaria);
  \item U.N. Doc.A/AC.105/C.2/SR.368, 1982, p. 6. (Vietnam);
  \item U.N. Doc.A/AC.105/C.2/SR.433, 1985, p. 3. (Vietnam);
  \item U.N. Doc.A/AC.105/C.2/SR.372, 1982, p. 6. (Ecuador);
  \item U.N. Doc.A/AC.105/C.2/SR.373, 1982, p. 7. (Romania);
  \item U.N. Doc.A/AC.105/C.2/SR.464, 1987, p. 4. (China);
  \item U.N. Doc.A/AC.105/C.2/SR.491, 1988, p. 3. (China);
  \item U.N. Doc.A/AC.105/C.2/SR.355, 1981, p. 5. (Poland);
  \item U.N. Doc.A/AC.105/C.2/SR.412, 1984, p. 4. (Poland);
  \item U.N. Doc.A/AC.105/C.2/SR.429, 1985, p. 2. (Poland);
  \item U.N. Doc.A/AC.105/C.2/SR.446, 1986, pp. 4-5. (Poland);
  \item U.N. Doc.A/AC.105/C.2/SR.491, 1988, p. 3. (Poland);
  \item U.N. Doc.A/AC.105/C.2/SR.373, 1982, p. 4. (GDR);
  \item U.N. Doc.A/AC.105/C.2/SR.516, 1989, p. 3. (GDR);
  \item U.N. Doc.A/AC.105/C.2/SR.445, 1986, p. 3. (Cuba);
  \item Ibid., p. 10. (Hungary).
\end{itemize}

  \item U.N. Doc.A/AC.105/C.2/SR.430, 1985, p. 5. (Argentina);
  \item U.N. Doc.A/AC.105/C.2/SR.445, 1986, p. 2. (Argentina);
  \item U.N. Doc.A/AC.105/C.2/SR.446m 1986, p. 5. (Argentina);
  \item U.N. Doc.A/AC.105/C.e/7. Add.1, 1977, p. 9 (Austria);
  \item U.N. Doc.A/AC.105/C.2/SR.268, 1977, p. 5. (Belgium);
  \item U.N. Doc.A/AC.105/C.2/7. Add.1, 1977, p. 9 (Brazil);
  \item U.N. Doc.A/AC.105/C.2/SR.433, 1985, p. 2. (Brazil);
  \item U.N. Doc.A/AC.105/C.2/SR.446, 1986, p. 11. (Brazil);
  \item U.N. Doc.A/AC.105/C.2/SR.269, 1977, p. 3. (Chile);
  \item U.N. Doc.A/AC.105/C.2/SR.430, 1985, p. 5. (Chile);
  \item Contd...*
boundary of outer space at a height of 100 kilometres directly or by supporting the Soviet proposal of 100/110 kilometres. Some states like China, Poland, Mongolia, the G.D.R., Czechoslovakia and Romania supported the compromise proposal submitted by the Soviet Union in 1987 of 110 kilometres boundary, since it can help in reaching a compromise deci-

ion and expressed their preparedness to consider any interim measures aimed at the eventual settlement of the question of delimitation. These states also referred to the proposal to consider the lowest perigee of an orbiting satellite as a lower boundary of the outer space.¹

The wait and see approach continues to get support in the Legal Sub-Committee of the COPUOS from the states like the U.S.A., the U.K. and Canada, the F.R.G., Japan, Sweden and the Netherlands. They feel that time is not yet ripe for spatial delimitation.²

The delegate of the United Kingdom gave three reasons during the twenty-fifth session of the Legal Sub-Committee

1. U.N. Doc.A/AC.105/C.2/L.175/Add. 6, 1989, p. 3.(China);
U.N. Doc.A/AC.105/C.2/SR.466, 1987, p. 3.(Poland);
U.N. Doc.A/AC.105/C.2/SR.489, 1988, p. 3.(Mongolia);
U.N. Doc.A/AC.105/C.2/SR.491, 1988, p. 3.(Poland and China);
U.N. Doc.A/AC.105/C.2/SR.493, 1988, pp. 6-7.(Czechoslovakia);
U.N. Doc.A/AC.105/C.2/SR.516, 1989, p. 3.(GDR);

2. U.N. Doc.A/AC.105/C.2/SR.316, 1979, p. 2.(USA);
U.N. Doc.A/AC.105/C.2/SR.377, 1982, pp. 2, 6, 8.(USA);
U.N. Doc.A/AC.105/C.2/SR.413, 1984, p. 5.(UK);
U.N. Doc.A/AC.105/C.2/SR.413, 1984, p. 3.(Canada);
U.N. Doc.A/AC.105/C.2/SR.411, 1984, p. 5.(FRG);
U.N. Doc.A/AC.105/C.2/SR.493, 1988, p. 10.(Japan);
U.N. Doc.A/AC.105/C.2/SR.411, 1984, p. 2.(Sweden);
of the COPUOS in 1986, for not supporting any proposal which sought to draw a boundary between the air space and the outer space. First, there was no satisfactory scientific basis for drawing such a boundary which would, therefore, be essentially arbitrary. The second reason advanced was that no need for delimitation had been demonstrated and there were no practical problems which require a definition of the outer space at the present time. And the third reason was that it would be premature for the Sub-Committee to embark on a purely theoretical exercise, and even dangerous for it to adopt a definition before actual problems had arisen.\(^1\)

Almost similar arguments were given by the delegates of the U.S.A., the F.R.G., Sweden, Japan and France for not favouring a spatial definition of a boundary between the air space and the outer space at the present time.\(^2\)

Since there is no likelihood of a consensus on the definition and delimitation of the outer space, the

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   U.N. Doc.A/AC.105/C.2/SR.446, 1986, p. 7.(USA);
   U.N. Doc.A/AC.105/C.2/SR.506, 1989, pp. 4-5.(USA);
   U.N. Doc.A/AC.105/C.2/SR.463, 1987, p. 4.(FRG);
   U.N. Doc.A/AC.105/C.2/SR.495, 1988, p. 3.(FRG);
   U.N. Doc.A/AC.105/C.2/SR.518, 1989, p. 3.(FRG);
   U.N. Doc.A/AC.105/C.2/SR.446, 1986, p. 8.(Sweden);
   U.N. Doc.A/AC.105/C.2/SR.493, 1988, p. 5.(Sweden);
   U.N. Doc.A/AC.105/C.2/SR.518, 1989, p. 5.(Sweden);
   U.N. Doc.A/AC.105/C.2/SR.493, 1988, p. 10.(Japan);
   U.N. Doc.A/AC.105/C.2/SR.464, 1987, pp. 3-4.(France);
delegation of the United States, in the twenty-eighth session of the Legal Sub-Committee in March 1989, expressed the view that the retention of the item on the agenda of the Committee was unproductive, and that the Committee should recommend to the COPUOS the postponement of, or a significant reduction in the time allotted to the consideration of the item, until problems arose which required attention.¹

However, the above viewpoint did not get support, and as desired by other delegations, the Legal Sub-Committee re-established its working group on March 20, 1989, so that the problem of definition and delimitation of the outer space may get due consideration at its next session in a constructive manner, with all the delegations demonstrating a will to reach compromise.²

The question of defining and delimiting the outer space thus, remains present to-date on the agenda of the COPUOS and its Legal Sub-Committee. Furthermore, it is evident from the attitude of the states that a great majority of states agree that this issue must be duly solved at the earliest in order to define the scope of the legal regime of the outer space. By supporting the 100/110 kms boundary, it seems that a growing number of spatialists have tended to accept the

lowest perigee rule to delimit the air space and the outer space. It is significant to note that even those states which favour the 'wait and see' approach are indirectly supporting the lower perigee rule to delimit the outer space.¹

In addition to the above discussion and analysis of various theories and attitude of the states in the United Nations' deliberations, there is a strong section among the space law scholars which, on the basis of state practice during the past thirty years, believes that delimiting of the air space and the outer space at the lowest effective perigee of satellites has become a customary rule of international law.

It is pertinent to mention that the first satellites were launched in connexion with the International Geophysical Year. On April 15, 1955, the U.S.S.R. Academy of Sciences announced that it had established a commission to prepare the launching of a laboratory to the orbit around the earth. On July 29, 1955, the United States made a similar announcement. After launching of the first Sputnik on October 4, 1957, and of Explorer -- I on January 31, 1958,

¹. The U.K., the F.R.G., Canada and Sweden recognize the importance of continuing study on this issue, and consider that it is still premature to try and formulate a definition of outer space 'at this stage'. It should be noted, however, that they all declared themselves in favour of fixing -- when time is ripe -- a low limit so as not to impede progress in space exploration and utilisation.
scores of rockets and satellites launched later have crossed the air space of many states.¹ This afforded a like number of opportunities to the affected states to lodge their protests, but surprisingly none of the states, thus affected, lodged the protest. The launching states have also never considered it necessary to seek permission from those states over whose territory their satellites were scheduled to pass. Further, no state has so far declared that it reserved its position concerning the passing over its territory by a space object of another state.

It is assumed that a consensus has emerged whereby the launching states do not hold that their activities infringe the sovereign rights of the states, while the states flown over seem to acquiesce that their rights were not so affected. In other words, the states have recognised that their sovereignty did not reach up to the lowest perigee of the satellites. This practice continued for about twenty years till 1975,² which may be held insufficient for accepting

1. On the basis of an estimate during the last 30 years various states have launched over 10,000 satellites, space-ships and space stations. And the world community is always informed about the launching of such space objects. V. Vereshchetin, et al., Outer Space Politics and Law (Moscow: Progress Publishers, 1987), p. 63.

2. On October 6, 1975 at the United Nations, the President of the delegation of Colombia, for the first time, questioned the legality of the presence of satellites located in a permanent way in the territorial sky of the equatorial countries. Later, on Dec. 3, 1976 in the Bogota Contd...*
the above said consensus. However, it may be argued that it should be considered in the light of the number of opportu-
nities afforded to the states to assert their rights or protest against such violations. The afore-going facts warr­
ant the conclusion that a customary rule of law has gradu­
ally come into being that territorial air space does not go beyond the lowest effective perigee of an artificial satell­
ite placed in the orbit around the earth and the boundary line between the air space and the outer space does not lie above that line.

The above view-point has been supported by a great majority of the space law scholars. Denilenko on the basis of state practice observes:

Although the examination of the current international practice cannot lead to a legal definition of the precise line of the boundary between sovereign air space and outer space, it indicates that there exists a general consensus among states in relation to the following two points:

1) The region at and above the line determined by the lowest perigee of satellites so far placed in orbit (100/110) kms above sea level is not subject to the sovereignty of underlying states and therefore, is outer space. 2) The boundary between air space and outer space does not lie above that line. 1

--- Declaration, some equatorial states made sovereignty claims over the segments of the geostationary orbit lying above their territories. See for a detailed discussion on this issue, Chapter VI of this study, pp. 241-274.

1. See for details, Gennady M. Danilenco, "The Boundary Contd..."
Scholars like Goedhuis, Bockst-Williams, Lissitzyn, Woetzel, Mankewicz, and others have repeatedly spoken in favour of the above said customary law rule, noting that the chief task now was to reach agreement regarding the establishment of an exact height in kilometres.¹

Similarly, focusing their attention on the state practice, Vereshchetin, Vasilevskay and Kamenetskaya wrote:

We believe that the long-term practice of launching objects into outer space, including the altitude of the minimal perigee of the artificial satellite, the absence of any protests and the tacit agreement with such practice to the fact that a customary legal rule has already evolved. It would now be advisable to confirm this rule, to concretise it and formalise it in a treaty.²

Many more scholars subscribe to the above viewpoint. Among others are Cheng, Lay and Taubenfeld, Busak, Gorove, Perek, McDougal, Herezeg, Kopal, Lachs and Lipson and Katzenbach.³

The existence of the above mentioned customary law rule is also recognized by the ILA vide its resolutions adopted


Contd...*
in 1966 and 1968. In the draft resolution, proposed to a joint session on Air Law and Space Law of the ILA at the 1966 Helsinki Conference, it is provided:

"The International Law Association considers that the practice of states is consistent with the view that air sovereignty does not extend as far as the lowest perigee of any satellite so far placed in orbit.1

Again in a resolution adopted by the ILA in 1968, it is provided:

The term outer space should be interpreted to include all space at and above the lowest perigee achieved by January 1967, when the Outer Space Treaty was opened for signature.2

Contrary to the above viewpoint, however, some scholars do not agree that a customary rule has evolved on the basis


of the state practice. Gal is of the opinion that there has not been a single official statement to motivate such tacit consent by the argument that state sovereignty ended vertically somewhere below satellites orbits. Arguing, that absence of protests may give rise to other kinds of conclusions, he observes:

a) the states in question have tacitly acknowledged the flights of the satellites launched in the framework of the I.G.Y. above their territories.

b) as regards these satellites (and the ones launched since then), the states seem to have recognised that these are not to be put in the same category as the conventional aircraft (airplanes, balloons). Thus, for instance, they cannot be regarded as unmanned aircrafts, the flight of which through, alien air space, would require the consent of the state in question, under Article 8 of the Chicago Convention.

c) nevertheless, this tacit consent cannot be interpreted as a recognition by the states that the upper limit of sovereignty lies at the lowest perigee of the satellite orbit.1

Scholars like Sloup and Almond also subscribe to the same view.2

The above noted apprehension concerning the existence of the said customary law rule, however, loses significance


after the almost unanimous rejection of the sovereignty claims over the segments of the geostationary orbit in the Bogota Declaration of 1976 (both by the developed as well as the developing countries) and by the assertion that artificial satellites in the geostationary orbit, irrespective of their lowest perigee, are "in" outer space. Nevertheless, the above said customary law rule on the basis of acquiescence has been subject to certain qualifications. It does not imply consent to every type of activity or a recognition of the freedom of exploration and use of the outer space at a specific altitude and that the states retain their right to protect their vital interests. In fact, no state has openly consented to limit its sovereign rights over the air space to a certain height and thus, unilaterally proclaim the upper limit of its air space. Rather, the states assert their exclusive control over their territorial air space below the altitude of the lowest perigees of the space objects.

From the preceding discussion on the problem of delimitation of the air space and the outer space, following conclusions may be drawn:

It is generally recognized that the air space and the outer space are two different concepts and distinction

1. For a detailed discussion on this point see Chapter VI of this study, pp. 256-259.
should be drawn between them.

There is no generally accepted agreement determining a boundary line between the air space and the outer space.

The majority of the states as well as the publicists recognize that this important issue of delimitation must be duly solved at the earliest in order to define the scope of legal regime of the outer space.

It is possible to identify three groups of views on the problem of delimitation: a) those favouring the "spatial approach" that is, the air space and the outer space have to be distinguished by establishing a spatial demarcation; b) those preferring the "functional approach", that is, the legal regimes in space can only be associated with character of activities under regulation, the entire space is an inalienable whole, and it is undesirable to delimit the air space and the outer space; and c) the view that time is still not ripe to define the outer space and determine its boundary and the question needs further study along with the development of space technology.

In the initial years of the space-age, when the question of delimitation of the outer space came under discussion in the United Nations, the functional approach backed by space-powers, received support without let or hindrance. But after 1967, this support appears to have dwindled. Though the supporters of functionalism continue to make their presence
felt in the Legal Sub-Committee of the COPUOS, there is a clear evidence of growing support for the spatial approach to the problem of delimitation. So much so, some of the states which previously favoured the functional theory have changed their stance and now prefer the spatial one.

The developments in recent years indicate that a growing number of spatialists have tended to accept the lowest height of the artificial satellite orbit flight as the lower boundary of the outer space. This is subject to a considerable support on the basis that the states accept artificial satellites orbiting round around the earth as being in outer space, and to accept a higher limit would require, excluding from the outer space a significant portion of activity currently taking place. After the equatorial states claimed sovereign rights over the segments of the geostationary orbit above their respective territories, this trend has become even stronger. That is why various proposals for delimitation, (including the Soviet Proposal) in recent years, ranging between 90 to 110 kms, seem to have received support from majority of the states.

Though there is no international agreement on the issue of delimitation on the basis of the state practice it may be assumed that there exists a broad customary recognition of the boundary between the air space and the outer space on the basis of the criterion of the lowest effective perigees of the earth-orbiting space objects.
The controversy over the issue of delimitation has considerably reduced the chances of arriving at the consensus on just and acceptable solution through an international convention. The major powers like the United States, Japan, Sweden, the United Kingdom and the F.R.G. do not agree on the lowest perigee rule and are opposed to spatial delimitation for the present time.

It may be inferred that by establishing a boundary line through an international agreement, congruent with the basic principles of international law, a potential source of dangerous conflicts in the field of space activities would be removed. To stress that the entire space constitutes inalienable whole, without making distinction between the air space and the outer space, would lead to the denial of the principle of state sovereignty over the air space.