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A FUNCTIONAL APPROACH TO THE PROBLEMS OF SPACE LAW

By FRANZ B. SCHICK *

There is general agreement that Lord Coke, in *Bury v. Pope*,¹ established by dictum the common-law concept that private real property rights extend into the air above. As stated by that famous English jurist, "[T]he earth hath in law a great extent upwards, not only of water, as hath been said, but of ayre and all other things, even up to heaven, for *cujus est solum ejus est usque ad coelum*. . . ,"² the Latin being translated or interpreted to mean, "He who owns the land owns up into the sky." The maxim was invoked for centuries to follow in the determination of private property rights extending into the air.³ The English precedents found ready acceptance in early American practice.⁴ In fact, the power of the *cujus est solum* doctrine continues to be felt in current legislation and learned discussions dealing with problems of the air space and the outer space in spite of the adverse opinion rendered by the United States Supreme Court in 1946, declaring that "this doctrine has no place in the modern world."⁵

In other legal systems, for instance in the municipal laws of France in the Code Napoléon, and in such countries as the Austro-Hungarian monarchy, Germany, Belgium, Italy, Japan, Holland, Portugal, Switzerland and Spain variants of the concept developed, although in some cases the private rights of the landowner into the "periphery of the universe," were restricted in altitude to the air space which he could use in the exercise of his rights in the particular, subjacent property.

With legal status given extensively to the exercise of private property rights in the air, it was only consistent for governments to claim supreme jurisdiction in the superjacent space as an attribute of state sovereignty. It was argued that, otherwise, states could not have conferred these rights on the owners of private land.⁶ In view of these precedents and interpretations it is not difficult to see why it became a general practice of modern states to exercise jurisdiction over their national air space.

The purpose of this article is to analyze briefly the meaning, scope and limitations of this important Latin rule, *cujus est solum*, to trace the most signifi-

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¹ Cro. Eliz. 118, 78 Eng. Rep. 375 (1653); see also 74 Eng. Rep. 155 (1586).

² For a survey of the various formulations under which this Latin doctrine appeared see Sweeney, *Adjusting the Conflicting Interests of Landowner and Aviator in Anglo-American Law*, 3 JOURNAL OF AIR LAW AND COMMERCE 327, 355-373 (1932).

³ See, e.g., *Penruddock's Case*, 5 Co. Rep. 100b, 77 Eng. Rep. 210 (1957); *Baren's Case*, 9 Co. Rep. 536, 77 Eng. Rep. 810 (1610); *Pickering v. Rudd*, 4 Camp. 219, 171 Eng. Rep. 70; 1 Stark. 56, 171 Eng. Rep. 400 (1815) (Lord Ellenborough raising some doubt as to the extensions of the principle). For a summary of the development see Klein, *Cujus Est Solum Ejus Est . . . Quousque Tandem?*, 26 JOURNAL OF AIR LAW AND COMMERCE 246 (1959).

⁴ See U.S. AVIATION REPORTS, 53 (1928).

⁵ *United States v. Causby*, 328 U.S. 256, 260-61 (1946). The passage stating the Court's opinion reads as follows: "It is ancient doctrine that, at common law, ownership of the land is extended to the periphery of the universe—*Cujus est solum ejus est usque ad coelum*. But that doctrine has no place in the modern world."

⁶ See, e.g., RICHARDS, *SOVEREIGNTY OVER THE AIR* 12 (1912), where it is stated: "[O]f course, the recognition of the rights of individual proprietors '*usque ad coelum*' involves the assertion of State Sovereignty to the same extent." See also NIJEHOLT, *AIR SOVEREIGNTY* 34 (1910), pointing out that "The State cannot give the landowner a right of property or of use over the airspace above his land, if that airspace is not submitted to its sovereignty. Consequently, by giving such a right to the landowner, the State says that it considers itself sovereign over the airspace."

cant stages in the development of air law based on the doctrine,⁷ and to suggest some initial steps toward the creation of a modern space law.

Concern for rights in air space may be traced in the Roman law and other legal systems of ancient times. These systems provided for certain, limited rights in the air above private as well as public lands. However, these rights were never conceived as reaching "up into heaven," but were asserted only for the purpose of protecting the legitimate use of the land against unauthorized interference from the air. The Roman jurist Ulpian, for example, referred to private property rights extending upwards, which, as he stated, were already contained in the *Twelve Tables*, written about 450 B.C., and which provided for protection of the crop in cultivated land if an overhanging tree from the adjacent neighbor's field obstructed the growth of the crop. In such a case, the damaged landowner could trim the tree branches "up to fifteen feet of the ground";⁸ if a tree obstructed a building thus preventing the latter's rightful use, then, an interdict, similar to what today amounts to an injunction, could be granted by the *praetor* restricting the owner of the overhanging tree from preventing by force the cutting of the entire tree by the claimant.⁹ These and similar stipulations found in early sources have been referred to as evidence that a territorial concept of air space existed early in Roman law.¹⁰

A careful analysis of the *Corpus Juris Civilis* does not permit the conclusion that the sovereignty of Rome was intended to extend beyond the area wherein it could serve a *useful* purpose. Quite to the contrary, the jurisdiction of the state in the air space over private property as well as over highways, religious lands, or tombs, was conceived to reach "into the sky" — *ad coelum* — only so far as was necessary to protect such private or public lands from unauthorized interference from above. This interpretation is not only supported by Paul's famous rule,¹¹ but also by numerous other passages in the *Digest*.¹² Finally the limitation of state sovereignty in the air space is also demonstrated by the well-known passages of other famous jurists, such as Marcian,¹³ Celsus,¹⁴ and Ul-

⁷ For a more detailed historical account see SCHICK, WHO RULES THE SKIES: SOME POLITICAL AND LEGAL PROBLEMS OF THE SPACE AGE (Institute of International Studies, International Study Paper No. 4, 1961).

⁸ DIGEST 43.1.8-9.

⁹ DIGEST 43.27.1.

¹⁰ For an excellent summary of passages from the *Digest* and an erudite analysis of the *cujus est solum* doctrine see Cooper, *Roman Law and the Maxim Cujus Est Solum in International Air Law*, 1 MCGILL L. J. 23 (1952).

¹¹ DIGEST 8.2.1, stating:

"Paulus libro vicensimo primo ad edictum. Si intercedat solum publicum vel via publica, neque itineris actusve neque altius tollendi servitutes impedit: se immittendi protegendique prohibendi, item fluminum et stillicidiorum servitutem impedit, quia caelum, quod supra id solum intercedit, liberum esse debet."

Clearly, "the sky over the ground" as stated by Julius Paulus, was not to be obscured by the flow or drip of rainwater or by an overhanging roof, or some other overhanging structure projecting over the public ground or public road. However, as long as the use of the ground referred to was protected, no legal objection existed to a right of way (a *via*), or the right "to raise the height of a building."

¹² See Cooper, note 10 *supra* at 32-36.

¹³ DIGEST 1.8.2, where Marcian states:

"Some things are by natural law common to all, some belong to a community (universitas), some to nobody, most things belong to individuals; and they are acquired by various titles in the respective cases. 1. To begin with, by natural law, the following are common to all: air, flowing water, the sea, and consequently the seashore."

¹⁴ DIGEST 43.8.3 where Celsus writes that "the use of the sea is common to all men like the air."

pian,¹⁵ who declared that the air, just as the sea, was "common to mankind," i.e., beyond the exclusive authority of any state.

It is true that a difference exists between the Latin term "*coelum*" meaning air space, and the original Greek word "*aer*" denoting frequently, though not always, the air which we "breathe." This distinction, which has been used by some leading scholars¹⁶ to show that *unlimited* state sovereignty existed even in Roman times over the air space, albeit not over the air (*aer*) we breathe, does not seem plausible since the above-cited Roman writers, and subsequently many interpreters of Roman law, have frequently likened the "*aer*" to the sea and declared both common to all men.¹⁷ It seems safe to assert, therefore, that the predominantly practical Roman mind never conceived of air sovereignty into the limitless sky but only so far as it needed to be applied for the protection of private or public land against interference with its rightful uses from the air. Apart from these restrictions the air space was not within the exclusive jurisdiction of the particular state. Furthermore, if full consideration is given to the *utilitarian* character of Roman law, it would seem well to emphasize the functional aspects of the *cujus est solum* doctrine as confining the jurisdiction of the state. By translating and interpreting the Latin term "*ad coelum*" as meaning a stationary, vertical column pointing upward *towards* the sky, though not reaching limitlessly *into* the sky, jurisdiction of the state would be extended only so far as is necessary to protect the use of private and public land.

Until the beginning of this century, questions concerning jurisdictional rights in the air were primarily dealt with by private property law. However, with the coming of propeller-driven aircraft and of dirigibles, the problem of air sovereignty gained added significance. On the one hand, freedom of air traffic was usually considered in the public and commercial interest of all nations; on the other hand, it was perfectly clear that the concept of the air space as a *res communis* could develop serious risks to a country's military and economic security, in view of the advances in aircraft design, as they were made with ever increasing speed. The discussions at the beginning of what might be called the age of the propeller-driven airplane are of particular interest in this respect since they offer some similarities with certain controversial juridico-political questions which, now, are being raised at the beginning of what has been called the space age.¹⁸ For instance, the first draft proposal, in modern times, for the creation of an international air law, which was accepted in 1911

¹⁵ DIGEST 47.10.13.7 where Ulpian states:

"If however I prohibit anyone from fishing in front of my buildings or mansion, what should be said? Am I liable for damages or not? For indeed the sea is common to all as well as the shores, just as the air (*aer*), and it has often been ruled that one cannot be prevented from fishing: nor from bird catching, except that one may be prevented from entering another's field."

¹⁶ See Cooper, note 10 *supra* at 38, where the learned author, although admitting some exceptions, states that the "*coelum*" (air space) was subject to private and exclusive rights while "*aer*" (air) was common to all men, deducing from this construction that state sovereignty over the air space was an already established doctrine in Roman law.

¹⁷ See, e.g., DIGEST 18.10.11.7; DIGEST 1.8.2; DIGEST 43.8.3; GROTIUS, *DE JURE BELLI AC PACIS*, ii, c.2, § 3, suggesting that the air should be likened to the open sea and be incapable of appropriation. See also 1 OPPENHEIM, *INTERNATIONAL LAW* § 197a n.2 (7th ed. 1948).

¹⁸ For an excellent summary of the early meetings convened by learned societies leading to, and including the 1919 Paris conference, see Latchford, *Freedom of the Air*, 1 DOCUMENTS AND STATE PAPERS 303-22 (1948).

by the Institute of International Law at Madrid, still incorporated — though not without legal qualifications — the principle of the air space as a *res communis*. This was done by stipulating that "International aerial circulation is free, saving the right of subjacent States to take certain measures, to be determined, to ensure their own security and that of the persons and property of their inhabitants."¹⁹ There are two main features of legal significance which characterize the Madrid formula as well as subsequent, early proposals for an air law. All of them affirm the principle that the air is free and, therefore, not subject to the exclusive jurisdiction of any state; and all of them, at the same time, acknowledge in fact that traffic in the air cannot feasibly be made entirely free of political controls. The split personality of these drafts is justified from the very beginning by the intimate connection between any type of air traffic and a nation's security requirements. Accordingly, it is not surprising that the rapid scientific and technological advances, which were made even before the era of the space age, prompted continuous revisions of proposals favoring an ever-increasing extension "into the sky" of domestic jurisdiction. The result of this development was a relegation of the functional theories underlying the freedom-of-the-air doctrines, as expressed in the private air law of the past, to the place of inconsistent, political generalities.²⁰ The culmination of this trend may be seen in 1922, when the Paris convention of 1919, on aerial navigation, came into force. This convention has not only the merit of being the first in a series of international agreements signed and ratified by a large number of governments — it has been christened the "constitution of the air"²¹ — but it may also be considered the politico-legal model for later international air-space agreements and, finally, for the Chicago convention of 1944.²²

The events during World War II showed the urgent need for an agreement on international air traffic if serious conflicts among the victorious and neutral powers were to be avoided. Like the Paris convention, its Chicago counterpart was primarily designed to establish rules for commercial air navigation. The

¹⁹ 24 ANNUAIRE DE L'INSTITUT DE DROIT INTERNATIONAL 346 (1911), complete text of the draft at 105; see also SCOTT, RESOLUTIONS OF THE INSTITUTE OF INTERNATIONAL LAW 171, 243-56 (1916).

In view of the numerous proposals made at present to establish either on the basis of some allegedly geophysical criteria, or arbitrarily, by international convention or practice, an upper boundary of national jurisdiction in the air, it is interesting to note that Fauchille, who presented his draft to the Institute of International Law, originally established 330 metres as the upper limit of the national airspace but saw himself compelled to extend this altitude considerably on several occasions and within short periods of time because of the rapid innovations in aircraft design and technology.

²⁰ For a bibliography of space literature see Senate Comm. on Aeronautical and Space Exploration, *Survey of Space Law*, H. R. Doc. No. 89, 86th Cong., 1st Sess. 38-60 (1959) [hereinafter cited as SPACE LAW]; NASA, REPORT TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ON THE LAW OF OUTER SPACE (1960) [hereinafter cited as REPORT], and literature contained therein; 2 SCHWARZENBERGER, A MANUAL OF INTERNATIONAL LAW 512-14, 520-21 (4th ed. 1960); JESSUP & TAUBENFELD, CONTROLS FOR OUTER SPACE (1959) (excellent bibliography at the end of each chapter); Senate Comm. on Aeronautical and Space Exploration, *Legal Problems of Space Exploration*, S. Doc. No. 26, 87th Cong., 4th Sess. (1961) [hereinafter cited as SPACE EXPLORATION] (the most comprehensive recent compilation of space literature).

²¹ SHAWCROSS & BEAUMONT, AIR LAW 13 (1945).

²² For the text of the Chicago Convention on International Civil Aviation see 61 Stat. 1180 (1944), 15 *United Nations Treaty Series* 102. See also, *Proceedings of the International Civil Aviation Conference* (U.S. Dept. of State, Publication No. 2820, 1948). Documents available at present indicate that the convention has been ratified by sixty-seven states, including the United States, The United Kingdom, Canada, and France. The Soviet Union and Communist China are not parties to the convention.

Chicago convention together with subsequent annexes attached to it, may be considered as the latest official approach to basic concepts of international air law in spite of the fact that two major powers, the Soviet Union and the People's Republic of China, are not parties to the convention.

Article 1 of the Chicago convention reiterates that "every state has complete and exclusive jurisdiction over the airspace above its territory." Similar to the Paris convention of 1919, the term "airspace" is not defined. On the other hand, subsequent technical additions to the convention, such as annexes six, seven, and eight, retain the description of aircraft given at Paris as "any machine which can derive support in the atmosphere from reactions of the air." Some commentators, therefore, have asserted that the Chicago convention is not applicable to space vehicles operated by states or public agencies since, according to their interpretation, the convention "was never intended to regulate anything but conventional civil aviation, and its definition of 'aircraft' cannot reasonably be stretched to fit new and then unforeseen devices and situations."²³

Although customary international law pertaining to exclusive jurisdictional rights of a state over its territorial air space could be construed as applying only to propeller-driven vehicles deriving their support in the atmosphere from "reactions of the air," a terminology which defies accurate scientific and legal determination, the American government has never officially agreed to this restrictive definition of aircraft since the above-cited annexes to the Chicago convention have not been signed or ratified by the United States. This view is also evidenced by the language of the Civil Aeronautics Act of 1938,²⁴ which defines "aircraft" as "any contrivance now known or hereafter invented, used, or designed for navigation or flight in the air," as well as by the Federal Aviation Act of 1958,²⁵ which retains the same definition of "aircraft." Moreover, the latter does not permit an interpretation which would limit specifically the asserted right of exclusive control over the national air space beyond a certain altitude.

It should be noted that Article 8 of the Chicago convention, similar to the Paris agreement of 1919, requires previous permission of a state for flights across its territorial air space by "aircraft capable of being flown without a pilot over the territory of a contracting State. . . ." The attempts of some commentators to justify internationally unauthorized flights of ballistic rockets "passing over" far distant foreign areas by declaring that the provisions of Article 8 do not apply to the orbiting of artificial satellites in high altitude and space areas "across" foreign states cannot detract from the fact that such interpretations are often contradicted by the official spokesmen of the major powers leading in space exploration. Referring to the Chicago convention, the legal adviser of

²³ SPACE LAW, note 20 *supra* at 10. For an opposing opinion see Bin Cheng, *From Air Law to Space Law*, 13 CURRENT LEGAL PROBLEMS 228, 230 (1960), where the author, referring to the Chicago convention establishing "exclusive sovereignty over the airspace," declares that "this principle of airspace sovereignty, well established in air law, is equally applicable to space law." The author's main theme is that a definition of the "exact upper limits of national sovereignty . . . while hitherto unimportant in air law, is one of the first and most important problems that have to be tackled in space law."

²⁴ 52 Stat. 973 (1938), 49 U.S.C. § 401 (1958).

²⁵ 72 Stat. 737 (1958), 49 U.S.C. § 1301 (1958).

the U.S. Department of State, for example, declared that "the United States Government has not recognized any top or upper limit to its sovereignty," nor is the American government prepared to take officially any "definite position" as to how the term "airspace," as used in the Chicago convention, should be defined.²⁶ The same position has been maintained by the Soviet Union, America's most advanced competitor in the space race, which claims not only complete and exclusive jurisdiction over its territorial air space but which has never recognized an upper limit to the latter. As cogently stated by a group of American space experts, "the most recent expressions on the subject indicate that the Soviets are prepared to assert their national rights into the heavens just about as far as is necessary to further whatever interests they feel are important."²⁷ This view is substantiated in a rather recent paper by Mr. F. N. Kovalev, a Soviet judge, which was read before the Soviet Association of International Law. In the opinion of this Soviet expert, the overriding principle of space law must be based on an acknowledgement of the fact that "the right of safeguarding its security is one of the basic rights of a state inherent in sovereignty. And the principle of respect of sovereignty is the most important and universally recognized principle of international law."²⁸ Professor A. Galina, another Soviet scholar, expresses even more explicitly his government's attitude by concluding in an article on interplanetary law that "the result at which we arrive thus reduces to the fact that the outer altitude limit of state sovereignty must

²⁶ The official position of the United States has been stated before various Congressional committees by Mr. Loftus E. Becker, Legal Adviser of the Department of State. Mr. Becker testified before the Select Committee on Astronautics and Space Exploration that we should not be:

"in a hurry to delimit or restrict the sovereignty of the United States unless we know that we are on the right road. . . . It is only after we have a great deal more knowledge that I feel we want to make a final decision that the boundary of the United States goes this far and no farther." H.R., 85th Cong., 2nd Sess. 1229 (1958) (concerning H.R. 11881).

See also Mr. Becker's prepared statement before the United States Senate, declaring that quite apart from the "plainly asserted" right of the United States to exercise "complete and exclusive sovereignty over the airspace above its territory," it has never been conceded that the American Government "has no rights in the higher regions of space," in *Hearings on National Aeronautics and Space Act (S. 3609)*, 72 Stat. 426 (1958), 42 U.S.C. §§ 2451-59 (Supp. 1960), reprinted in part in 38 DEP'T STATE BULL. (1958).

For a similar position of the British Government see 216 H.L. Deb. 5s., col. 975 (June 11, 1959) where Lord Hailsham states:

"Her majesty's Government considers that sovereignty over space above national territory cannot extend indefinitely upwards. It cannot, however, be said that international law has yet determined the exact limit to be placed on the extension of sovereignty upwards or what legal regime should apply in realms of outer space to which sovereignty does not extend. There are still too many unsolved problems in this field to justify the adoption at present of any sweeping legal propositions, in whatever direction they tend."

²⁷ SPACE LAW, note 20 *supra* at 32.

²⁸ *Id.*, at 18-21. See also Stucki, *Security of Nations and Cosmic Space*, 7-9 POLISH INSTITUTE OF INTERNATIONAL AFFAIRS (1959).

Alleged superiority of the Soviet Union in the exploration of outer space has caused a hardening of attitude, expressed by Professor E. Korovin of the U.S.S.R. Academy of Sciences in *On the Neutralization and Demilitarization of Outer Space*, INT'L AFF. 82-83 (December 1959) as follows:

"It is all too obvious that such proposals [on prohibiting the military use of outer space] cannot win support of the Soviet Union and other peaceful countries . . . For it is not the space rocket as such that endangers the security of mankind, but the nuclear warhead which may be delivered by a space rocket, a rocket of any possible range, a military aircraft, etc. Clearly, the disarmament of outer space cannot be divorced from disarmament on Earth."

be established in such a manner as to protect the state against encroachments on its territorial sovereignty, or its independence.”²⁹

As may have been appropriate before the introduction of the use of ballistic missiles, the concept of sovereignty over the national air space was closely linked with two supporting assumptions: (1) That a legal boundary for the national air space could be established by means of a geometrical reference to an inverted cone with its vertex in the assumed center of the earth where the imaginary conic spaces of all national territories converge, reaching upward into the sky, through the physical boundary of a state's territory and territorial waters. This theory was accompanied by a practice of states which considered it unnecessary to reach an international agreement as to the upper limit in altitude of such inverted national space cones; (2) That, based primarily on the experience of states with propeller-driven aircraft, the effectivity rule, when applied to the legally and geophysically undefined air space, would not, or could not be challenged in the future. The second assumption permitted each state to extend its claims over the national air space in terms of altitude as fast and as far as its effective control could be exercised.

Man's penetration into space, rendered possible by a vastly enhanced geophysical and astronomical knowledge, has made it clear that meaningful international space agreements cannot be achieved by relying on the concept of a quasi-stationary, allegedly verifiable boundary between the “national” air space, possibly a “contiguous” air space, then a “free” air space, and, beyond, an “outer space,” if such agreements are to be based on scientific criteria;³⁰

²⁹ Galina, *On the Question of Interplanetary Law*, 7 SOVIET STATE AND LAW 52-58 (1958).

³⁰ See, e.g., Jenks, *International Law and Activities in Space*, 5 INT'L & COMP. L.Q. 99, 103-04 (1956) stating:

“The revolution of the earth on its own axis, its rotation around the sun, and the motions of the sun and the planets through the galaxy all require that the relationship of particular sovereignties on the surface of the earth to space beyond the atmosphere is never constant for the smallest conceivable fraction of time. Such a projection into space of sovereignties based on particular areas of the earth's surface would give us a series of adjacent irregularly shaped cones with a constantly changing content. Celestial bodies would move in and out of these cones all the time. In these circumstances, the concept of a space cone of sovereignty is a meaningless and dangerous abstraction.”

For a well-documented summary of recent attempts to define the upper limit of air space see Jessup & Taubenfeld, note 20 *supra* at 193-221. In the opinion of the authors, “. . . there is a limit to the extension of terrestrial sovereignties and . . . in due course practical international necessities will lead to its definition.” *Id.*, at 209. See also, *The Boundary Between Air Space and Space*, REPORT, note 20 *supra* at 12-21, especially the conclusion reached at 16, confirming the view that even an arbitrarily arrived at upper boundary of 100 miles “may become meaningless,” and stating: “From what has been said it is clear that the difficulties of fixing a stationary boundary by reference to supposed geophysical or astronomical constants are at least formidable, perhaps insuperable.”

See further, Welf Heinrich Prince of Hanover, *Problems in Establishing a Legal Boundary Between Air Space and Space*, FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 29 (1959) [hereinafter cited as FIRST COLLOQUIUM] stating that a fixed upward “boundary of sovereignty from the earth” can be established by measuring “scientifically the altitude at which aerial devices are no longer able to support themselves by their own lifting power but by the centrifugal force of the earth—as in the case of satellites.”

For differing views see, e.g., Cheng, note 23 *supra* at 232-33, where the author states: “In fine, there is nothing inherently impossible in law or in geophysics which prevents states agreeing to an upper limit of national sovereignty beyond the atmosphere of the earth. . . . This does not imply, however, that agreement among states on the subject will be easy or that the fixing of the upper limit of national sovereignty at a height well beyond the terrestrial atmosphere is necessarily in the interests of scientific exploration or the peaceful use of outer space.”

Since Dr. Cheng suggests as the upper limit of “airspace sovereignty” a frontier belt, known as the exosphere, which is “estimated to lie generally at about 300-500 miles above the

nor is any arbitrary political agreement on the basis of the orthodox air-sovereignty concept likely to be obtainable in the near future as is demonstrated by the discussions on this sensitive subject in recent professional literature, and particularly in the lengthy debates before the Political Committee of the General Assembly.³¹ Moreover, it should be noted that the technological advances demonstrated not only by rockets but also by U-2 type aircraft and, most recently, by the X-15, which can be used as an "aircraft" as well as a "space vehicle," render the adherence to the orthodox sovereignty-in-the-air concept obsolete, if not meaningless.³² Finally, the possibility exists that "power assisted satellites" will soon be operational for continuous flights not only in "outer space," but at lower altitudes, well within the areas of the earth's gravitational

surface of the earth" (*Id.*, at 231) and since "the initial perigees and apogees of the orbits of Sputnik I, Discoverers I, II, V, VII, XI, and the Soviet Space Ship are, respectively, 142-588, 99-605, 142-220, 136-450, 100-520, 109-380, and 193-230 miles," (*Id.*, at 237) nearly all would have been within the national air space of the states over which they passed.

Most recent opposition to a relinquishment of the boundary concept has been voiced by the dean of American space lawyers, Professor Cooper, in an address at Leiden University entitled "*Fundamental Questions of Outer Space Law*," stating that: "I do not believe that the Rule of Law can be established with certainty as to outer space, a finite geographic area, unless the boundaries of that area are known and understood." *SPACE EXPLORATION*, note 20 *supra* at 765.

Serious objection to the boundary concept has been voiced by Professor Stephen Gorove, in an article entitled *On the Threshold of Space: Toward a Cosmic Law — Problems of the Upward Extent of Sovereignty*, declaring:

"The fact that permission has not been asked to place satellites in orbit . . . does not necessarily carry with it the implication that they have recognized a definite zonal limit on the upper extent of their sovereignty. . . . If military science reveals to the decision-maker that it would be national suicide to allow unchecked foreign satellites to circulate freely above a certain height over national territory, then a suggested solution to set the upper limit of national sovereignty below this height . . . is most likely to be discarded by a rational decision-maker." *FIRST COLLOQUIUM*, *supra* at 74-75.

³¹ U.N. Doc. No. (A/C.1/S.R. 982), where the fear and mistrust of Western space activities is illustrated by the following excerpts from statements made by delegates of the Communist bloc.

U.S.S.R., at 194:

"The Soviet government is prepared to sign an agreement prohibiting the use of outer space for military purposes and providing that rockets should not be launched into cosmic space except as part of an international programme. It [the U.S.S.R.] has one condition to set: that the agreement should provide for the elimination of military bases in other countries."

Roumania, at 207:

"The mastering of outer space by missiles has added a new and important dimension to the threat of all-out war and the problem for the United Nations is to eliminate the possibility that destruction might come from or through outer space. Thus the military aspect of the use of space is of paramount importance . . ."

Poland, at 223:

"It is unrealistic to attempt to avoid discussion of the political-military aspects of space activities since it is clear that rockets intended primarily for military use have been the basis of the break-through into outer space and that the military use of space is part of the complex of disarmament problems."

Apart from some rather dramatic appeals by the U.S. delegate, Mr. Lodge, calling attention to the "horrors of nuclear weapons," the Western concepts about a future space law were, perhaps, best expressed by the admonition of the British delegate that it would be necessary

"to determine the practicability of a control system adequate to ensure that outer space was used solely for peaceful purposes since 'a ban on the military use of outer space such as proposed by the Soviet Union would be valueless unless enforced by means of such effective international control.'" *Id.*, at 213.

³² Professor G. Zhukov, Executive Secretary of the Scientific Research Committee on the Legal Problems of Outer Space, U.S.S.R. Academy of Sciences, in an article entitled "*Space Espionage Plans and International Law*" in *INT'L AFF.* (Oct. 1960), rejects the boundary concept regardless of where it may be drawn in any "acts of espionage directed against its [Soviet] security, irrespective of whether air space or outer space is used for these purposes." Professor Zhukov's article is reprinted in *SPACE EXPLORATION*, note 20 *supra* at 1095-1101.

field. In view of this situation, it appears futile to seek useful international legislation for a limitation upon national jurisdiction in the air on the basis of an international agreement whose stipulations were to determine scientifically where the national air space ends and the outer space begins. Besides, the experiences encountered during the first decades of this century amply demonstrate that it would be of little use to seek arbitrary, political proposals for a temporary fixation of air boundaries. Even if such proposals should obtain international acceptance, they would require frequent resubmission to important revisions in view of the rapid advances in space science and technology and their impact on the security of states. In turn, such developments would necessitate renegotiations of vitally important treaty provisions, a task which would be frustrating and likely to end in failure.

The inconsistencies engendered by a continued reliance on the fixed-boundary concept are well shown in a recent publication of the National Aeronautics and Space Administration, which, among other proposals, advances also certain suggestions for a future space law on the basis of an analogy with the law of the open sea. The distinguished authors of this study, while searching for a legal definition of what constitutes the use of space for "peaceful" purposes, declare that

[A]ny use of space which did not itself constitute an attack upon, or threat against, the territorial integrity and independence of another state would be permissible; the high seas, for example, can be used for the maintenance of a naval force-in-being without any violation of international law, and may be employed "peacefully" for maneuvers and testing of weapons.³³

Certainly, the uses of space for "peaceful" purposes cannot rely on the criteria of distance from a given territory, even if such distance could be verified with accuracy; nor will progress toward space regulation be facilitated by a legal terminology which replaces one yet undefined term, *i.e.*, peaceful uses of space, with another undefined concept, *i.e.*, the use of space which does not "itself" constitute a "threat" against another state. If it is legally permissible to test weapons — and that would include also nuclear weapons and any type of rockets — on or below the surface of the open sea, it would be inconsistent to deny to states the testing of the same weapons shot into space from below or above the open sea. Indeed, such "tests" would be initiated outside the jurisdiction of any but the one state having authority over the ships and crew flying the flag of the state engaged in these "peacefully" conceived "maneuvers." As may be seen, the boundary concept expressed by the peace-time doctrine of the freedom of the open sea does not take into account the political and military repercussions which such activities may have, especially if such tests for "peaceful purposes" should include the launching of intercontinental missiles and other space vehicles whose design does also permit the carriage of nuclear warheads and other weapons. Moreover, if the freedom-of-the-open-sea doctrine, conceived in terms of a stationary boundary concept, were to be applied, by analogy, to the far more distant areas of space across which orbiting satellites can travel, the danger to the security and very existence of states resulting from

³³ REPORT, note 20 *supra* at 29 (summary section).

such orbiting satellites, admittedly, might be much greater than that from presently permitted weapons tests on the less distant areas of the open sea.³⁴

It would seem that a more realistic alternative for a conceptual basis of an emerging space law would be to consider as politically and legally decisive the ascertainable intent and possible effects of space activities rather than the distance from the solid surface of the earth where these activities may take place. As has been pointed out, "the irrelevance of vertical distance to most of the pressing problems would keep alive the concern of affected states over many of the activities that would be taking place."³⁵ This analysis has lately been given strong support by a prominent space lawyer who emphasized that

The most promising alternative to the extension of sovereignty into outer space is the classification by international agreement of proscribed activities in space according to their purpose and effect, leading in time, through limited particular agreements, to a self-enforcing system of international control. It would be premature to anticipate the manner in which control will be accomplished. Timing and the method of negotiation are essential elements of an agreement. Nevertheless, it seems reasonable to suppose that solutions will be facilitated if particular space activities are considered one by one. . . . By a series of such steps it will be possible to build a legal order in outer space.³⁶

An adaptation of the protective-functional rules of ancient Roman law to the needs of the unfolding space age could provide rules of law governing certain uses of space regardless of the areas where such uses are prepared or are actually taking place. The term "uses of space," as here defined, refers not only to orbiting vehicles but also to all technological-scientific ground-and-low-altitude activities preparatory to the launching of missiles or to the orbiting of space vehicles, regardless of whether or not these activities are performed within or outside of the territorial sphere of exclusive domestic jurisdiction of a state. The major shortcoming of the functional approach is, of course, that it is difficult to separate peaceful from military uses of outer space. Admittedly no satisfactory answer has been given to the questions asked so eloquently by a leading jurist at the last meeting of the International Astronautical Federation:

How can we, despite the potential military implications and applications of most if not all activities in space, evolve, in the absence of an agreed international control and inspection of armaments which still eludes us, arrangements for peaceful cooperation in space which will reduce the danger that space will be so militarised before general arrangements for the international control of armaments have been agreed as to make it still more difficult to reach agreement upon such arrangements? How can we . . .

³⁴ Professor D. Goedhuis, Rapporteur of the International Law Association, Section on Air Sovereignty and the Legal Status of Outer Space, advocates the idea of functionalism as opposed to the concept of sovereignty when he states in *International Astronautical Federation, 10th Congress, SECOND COLLOQUIUM ON THE LAW OF OUTER SPACE* 43 (1959) [hereinafter cited as *SECOND COLLOQUIUM*]:

"If the principle that outer space is to be considered as *res communis omnium* is accepted, then as a necessary corollary, freedom of innocent passage through the space which is not considered to be outer space [*i.e.*, air space], should be recognized."

³⁵ REPORT, note 20 *supra* at 28.

³⁶ Beresford, *The Future of National Sovereignty*, *SECOND COLLOQUIUM*, note 34 *supra* at 9.

create a partnership of policy, law, science and technology in bringing activities in space within the rule of law?³⁷

Nonetheless, it is here contended that the concept of functionalism would permit the gradual development of a space law in progressive stages.

The first stage it is suggested, would encompass the vast bulk of space activities which, in the mutual interest of all states, are in urgent need of international regulation. Agreement in this respect exists and was given clear expression more than two years ago by the legal experts of the United Nations *Ad Hoc* Committee on the Peaceful Uses of Outer Space in a report to the General Assembly. This report enumerates as "legal problems susceptible of priority treatment" the following:

(a) question of freedom of outer space for exploration and use; (b) liability for injury or damage caused by space vehicles; (c) allocation of radio frequencies; (d) avoidance of interference between space vehicles and aircraft; (e) identification and registration of space vehicles and co-ordination of launchings; (f) re-entry and landing of space vehicles.³⁸

This enumeration does not claim to be exhaustive. The report of the *ad hoc* committee, for example, indicates that other space problems may lead themselves to legal regulation at some later time, such as questions relating to exploration of celestial bodies; avoidance of interference among space vehicles; the protection of public health and safety; and the question of determining where outer space begins.³⁹ Further evidence that space regulations within this enumerated range are generally desired has been given by the General Assembly which established a new space committee, on a much broader basis, concerned with the peaceful uses of outer space, in which Soviet Russia is also represented.⁴⁰ This committee has been charged with the task of studying further the nature of the problems which may arise from the exploitation of outer space. Indications of a political atmosphere propitious to the creation of *particular* space norms are also given by the fact that agreement has been reached in the United Nations on the convocation, in the near future, of an international space conference to discuss problems and exchange experiences pertaining to the peaceful uses of outer space.⁴¹

³⁷ Address by C. Wilfred Jenks, "The International Control of Outer Space." XIth Cong., International Astronautical Federation (1960), printed in *SPACE EXPLORATION*, note 20 *supra* at 738.

³⁸ U.N. Doc., *Report of the Ad Hoc Committee on the Peaceful Uses of Outer Space* (A/4141) 1-76 (1959), at 4 [hereinafter cited as U.N. COMMITTEE REPORT].

³⁹ *Id.*, at 67-70.

⁴⁰ U.N., General Assembly, Res. A, No. 1472 (XIV) (1959), *International Cooperation in the Peaceful Uses of Outer Space* (1959):

"The General Assembly . . . establishes a Committee on the Peaceful Uses of Outer Space consisting of Albania, Argentina, Australia, Austria, Belgium, Brazil, Italy, Japan, Lebanon, Mexico, Poland, Romania, Sweden, the Union of Soviet Socialist Republics, the United Arab Republic, the United Kingdom of Great Britain and Northern Ireland, and the United States of America, whose members will serve for the years 1960 and 1961. . . ."

⁴¹ *Ibid.*, (Res. B): "The General Assembly . . . Decides to convene in 1960 or 1961, under the auspices of the United Nations, an international scientific conference . . . for the exchange of experience in the peaceful uses of outer space."

In the following, a few examples are given to illustrate the types of activities which hold promise of incorporation into the first stage of legal regulations. These arbitrarily selected examples are also intended to show the compelling reasons for the earliest possible enactment of such regulations.

Recent advances in rocket technology have permitted the orbiting of increasing numbers of satellites. It is reasonable to expect that this trend will be accelerated in the very near future. Large amounts of data will continue to be stored in various types of satellites for transmission to Earth, other space vehicles, and possibly other planets. These satellites will also receive a mass of signals from the Earth and other emitting sources. It will be mandatory to reach early agreements on the allocation and co-ordination of radio frequencies if unimpeded tracking, telemetry and other research activities are to be continued and serious interference with existing radio-television communications on Earth is to be avoided. The American missile shots on August 1 and 12, 1958, over Johnston Island in the Pacific, for instance, interrupted within a radius of several hundred miles, most commercial communication systems operating on about 5 to 25 megacycles "for as long as several hours, [and] at various times over a period of about a day."⁴² It has been stated by the same American source that different American space vehicles are known to have interfered with each other "in regard to broadcasting and in some cases have caused garbled reception of valuable data." It is also known that the Soviet Sputniks have interfered with instrument calibration, aircraft navigational aids, and time signals of the U.S. Bureau of Standards.⁴³ The problem of communication regulation assumes even greater peace-time urgency in view of the recently announced American plans to link together, on a commercial basis and by means of permanently orbiting satellites, the communication systems of the United States with the United Kingdom, France, Western Germany and other states. It has been stated authoritatively that this system will be in operation within about one year and will handle, on a highly competitive basis, "several hundred trans-Atlantic telephone calls at one time or broadcast transoceanic television programs" efficiently and at low cost.⁴⁴ It may be assumed that other states will object to such commercial competition transplanted into space. Apart from undivulged Soviet plans, the British government seems to be alarmed about the extension of economic rivalries into space.⁴⁵

⁴² *Space Handbook: Astronautics and its Applications*, H.R. Doc. No. 86, 86th Cong., 1st Sess. 1-252 (1959) [hereinafter cited as *SPACE HANDBOOK*].

⁴³ *SPACE LAW*, note 20 *supra* at 28.

⁴⁴ As reported by the New York Times, Oct. 18, 1960, p. 10, the American Telephone and Telegraph Company eventually expects to establish "... a space communications system of about fifty satellites circling the earth at 3,000 miles altitude. With this network, costing about \$170,000,000, it is believed possible to provide communications between the United States and all areas of the world."

⁴⁵ The New York Times, Dec. 29, 1960, p. 10, reported:

"The British Government will ask France, West Germany, Italy and Belgium to attend a conference on space research early next year . . . The Ministry of Aviation will propose to the conference that Britain's Blue Streak missile be used as a heavy satellite launcher in a joint program . . . backed by the Continental government. . . . While time is being wasted, both the Soviet Union and the United States are moving toward establishment of world communication systems using satellites. . . . The Government believes that the *Blue Streak* would be capable of putting a satellite into orbit 5,000 to 6,000 miles from earth. . . ."

The flight of the first man into space brings in range the need for agreements on measures to prevent, or minimize, the damaging effects which chemical, biological, or radiological contamination of and from space may involve. Unless such regulations become enforceable soon, disaster may engulf mankind and possibly other celestial areas. Furthermore, as satellite traffic increases, it will be necessary to arrive at juridico-technical agreements for the creation of a central registration agency. This will permit the establishment of the orbital elements which will assist in identifying individual satellites. Without precise legal stipulations providing in advance of launching for full information about such items as the nationality of all space vehicles, their expected launching dates and orbital paths, their radio codes for transmission and reception of data, their agreed equipment and instrumentation and certain markings permitting identification of space vehicles in orbit and after re-entry, the risk of miscalculation and ensuing human disaster will be real.

Another set of agreements will soon be needed for rules governing the termination of all transmissions from and to satellites whose useful life has expired as well as for their return or destruction. Unless such agreements are effectuated, ground tracking stations will soon be unable to handle the "traffic" problems with a resulting collapse of effective space activities.

Closely connected with these traffic regulations is the urgent need for rules concerning the re-entry and recovery of space vehicles, the return of equipment and, possibly, of all passengers to the launching country.

Since there exists worldwide agreement that many space activities, similar to those in the fields of atomic and nuclear science, can benefit all mankind, we may now have a last opportunity to conclude agreements providing that this type of operational activity be organized as public utilities of the international community.⁴⁶

In addition to a wide array of space agreements intended primarily to regulate technical space activities, an opportunity still exists to include in the first stage of space legislation certain political treaties of a general nature. It is conceivable, for example, that agreement could be obtained, now, on a declaratory space law stipulating that no state will make unilateral claims to exclusive jurisdiction over any extraterrestrial area or resources. In a few years it may be too late for such an agreement! Another frame for which agreement appears promising could be formulated in a general declaration, delegating to the United Nations, or another international organ the direction, coordination, and eventual supervision of all sharable space activities.

Similar to existing provisions applicable to international sea and air traffic, agreement will also be needed with regard to damages that may be caused by space vehicles or their equipment. Although certain legal technicalities may

The House of Commons was recently told that

"astronomical profits would accrue to the American Telephone and Telegraph Company under a communications system using satellites. . . . Behind both the Government program and the criticism of it by Tory back-benchers lies a desire to compete with the United States in world-wide communications systems based on satellites."

⁴⁶ See, e.g., Jenks, note 40 *supra* at 744, warning that "the opportunity to organize operational activities in space as world public services will be a fleeting one. . . . Success in this respect would be a major contribution to the establishment of an effective international control of space."

render it difficult to formulate generally acceptable rules pertaining to such items as the type of interest to be protected, the type of conduct which may give rise to liability, or the machinery to be used in determining liability and providing for effective execution of any such decision, it seems that these questions will not seriously obstruct the conclusion of an international convention on liability for damages or injury caused by space activities.⁴⁷

Many of the aforementioned agenda which lend themselves to international agreement will benefit from, or require joint projects, such as the creation of internationalized launching sites, tracking stations, data processing stations, and centers for their interpretation. The secrecy presently surrounding certain facets of the space race, which makes many leading scientists the intellectual prisoners of their respective countries, will have to give way gradually to agreements based on a much broader international exchange of scientific and technological information.

It must remain the task of international negotiations to determine the framework and the specific provisions of the predominantly technical and organizational agreements designed to regulate this first category of space activities which hold political promise for early regulation. Obviously, a conclusion of such agreements will denote that they are considered in the mutual interest of all contracting parties. In turn, the articles of these space conventions will constitute legal rights and legal obligations, expressive of the first stage in the development of a positive, international space law. It is suggested that a positive distinction between peaceful uses of space and those which may serve military, aggressive purposes can be established within this first category since any space activity permitted by such conventional space laws will have to be defined as *peaceful* even if such an activity could potentially serve non-peaceful purposes. Conversely, any violation of provisions incorporated in existing space agreements will serve as *prima facie* evidence that a given activity has served non-peaceful or military purposes. It is submitted that this approach differs from many other proposals for space regulations by withdrawing from the judgment of governments the now strictly political, subjective term "peaceful purposes," and by creating a legally more objective basis with reference to the performance, or non-performance, of specific treaty law. Moreover, this concept would enable governments to decide on the basis of ascertainable legal criteria whether or not a contemplated space activity could be considered as peaceful under the terms of a given space treaty. Instead of the vagueness inherent in the undefined term "peaceful purposes," a legally determinable relationship, similar to that existing under the Covenant of the League of Nations, could be established. Article 16 of the Covenant sought to define the term "resort to war" by stipulating that any act "in disregard" of the obligations undertaken by any Member of the League "under Articles 12, 13 or 15," shall *ipso facto* be deemed an act of war "committed against all other Members of the League. . . ." Instead of leaving the definition of as vague a concept as is

⁴⁷ Machowski, *The Legal Status of Unmanned Space Vehicles*, SECOND COLLOQUIUM, note 34 *supra* at 116-17, where the author discusses "the problem of liability for injury or damage from unmanned space vehicles," and where he concludes that liability rests with the launching state.

the term "resort to war" to the individual or collective interpretation of states,⁴⁸ the framers of the Covenant established a far more objective legal basis by international agreement, restricting the definition of the term to violations of three *specific* articles of the Covenant. Although it is true that even these three articles, like all human language, permit of differing interpretations, it would be difficult to reject the proposition that a legally ascertainable and, therefore, far more positive basis is created by reference to specific provisions of a treaty than by reference to a subjective term.

It would be highly unrealistic to expect that the first stage of legal space development will produce accord on all conceivable space activities. It is well known, for example, that the drafting of legal stipulations often poses serious differences in spite of agreement on fundamental principles. Overriding security considerations may tempt certain powers to prefer none to any technical-organizational agreement at the present time. Specific types of space uses may raise the question as to what is to be drafted as the minimum or the maximum of theoretically agreed space regulations. In spite of stated solemn agreement that space must solely be used for peaceful purposes, it may be impossible to obtain consensus in all cases about the range of technical-scientific information to be made internationally available; or the extent and type of pre-launching inspection may evade legal formulation. In all such instances the creation of written space norms may have to be postponed. However, as long as agreement on certain principles of space conduct exists, it is likely that states will conform to these overriding principles. Indeed, international custom offers innumerable precedents of this kind. Eventually, the practice of states with regards to certain space activities, not regulated by written agreement, may become so firmly established as to be regarded evidence of an existing customary rule of international law — and, therefore, binding upon all states. In time, governments may consider it mutually convenient to codify these customary rules for which, originally, written agreement seemed unobtainable.

It would be impractical to deny that some, though not all, space activities normally carried on for peaceful uses can also serve immediate or potential military objectives. These cases, comprising the second category of space activities, will require different regulatory approaches. This will apply to aircraft, rockets and missiles traversing high altitudes but not orbiting the Earth.⁴⁹ Clearly, this second category of space activities, falling within what might be called a twilight area, presents far more difficult political and legal problems. A few examples will illustrate this point.

In a relatively few years two-way communications over distances "as great as 50 million miles" will be possible.⁵⁰ This technological development will

⁴⁸ See, e.g., U.N. CHARTER, art. 4, "peace-loving states," art. 39, "the existence of any threat to the peace, breach of the peace, or act of aggression," or art. 51, "the inherent right of individual or collective self-defense if an armed attack occurs." The definition of these political terms can be given with final authenticity by the competent political organs of the United Nations *without reference to any legal criterion* whenever their respective voting procedures permit them to render this decision.

⁴⁹ It would seem that attempts to distinguish in general between activities that are peaceful and others that are not peaceful, and to attach legal consequences to such a distinction, are bound to fail also in other spheres of human endeavor unless a precise relationship between such activities and specific stipulations regulating them can clearly be established.

⁵⁰ SPACE HANDBOOK, note 45 *supra* at 75.

permit the accumulation of a mass of data which could assume great strategic significance in case of a conflagration. Infrared detection systems have been installed in satellites for strictly scientific purposes. However, it has been openly admitted that they "may have some utility for military reconnaissance and surveillance of the Earth."⁵¹ Optical information transmitted from geodetic and mapping satellites could also help a country to place its nuclear warheads more accurately at a desired target by pinpointing either military installations, or vital industrial establishments of a foreign power. A technical team of the United Nations has reported that optical observation of this kind "has the potentiality of yielding the observer's location to less than 30 metres. . . ."⁵² The fact that even such small targets as ocean liners can be detected by navigation satellites was emphasized by a Soviet scientist, Professor Tumanov, as early as 1957.⁵³ Since then, methods of detection have been further improved. As stated by a Congressional committee more than two years ago, "an ordinary automobile headlight located on the dark half of the half-full moon could be detected by the 200-inch telescope."⁵⁴ The dual nature of normally peaceful space activities is also evidenced by the net of already existing tracking stations whose general purpose it is to establish the position-time history of a vehicle, for guidance, navigation, observation, or *attack*.⁵⁵

The military potential of air-and-space uses is further demonstrated by the recent reports that an orbiting satellite launched by the U.S. Air Force, christened the Discoverer XVII, is "the first of a series of new military spy satellites capable of changing course if threatened," and the type of future space vehicles "designed to carry TV cameras and send surveillance films back to American territory."⁵⁶ The meaning of the term "surveillance" has been defined in a report from a missile base of the U.S. Navy, namely Point Aruello in California, which acknowledges that:

the supersecret Samos opens a new era in the ancient art of spying, an era in which the cloak and dagger man takes a back seat to space electronics. . . . Packed in Samos I's nose capsule were instruments of a type expected ultimately to outdo the U-2 at scanning Russia's heartland. And, because

⁵¹ *Id.*, at 79.

⁵² U.N. COMMITTEE REPORT, note 41 *supra* at 37.

⁵³ Tumanov, *Determining the Position of a Ship by Means of an Earth Satellite*, SOVETSKY FLOT 3 (December 21, 1957) as translated in 9 CURRENT DIGEST OF THE SOVIET PRESS 23 (No. 52, 1958).

⁵⁴ SPACE HANDBOOK, note 45 *supra* at 78.

⁵⁵ *Id.*, at 80. (Emphasis added.)

⁵⁶ Report by the Associated Press as published in the Salt Lake Tribune, Nov. 13, 1960, p. 1. Proof of the intimate connection between space activities for scientific and military purposes has also been given by the recent launching from Cape Canaveral, of Blue Scout I. This space rocket is reported to have given American scientists new data on "neutrons, electrons, protons" in the lower edge of the Van Allen radiation belt some 1,000 miles above the earth's surface, and to have added to our knowledge by measuring "micrometeorite punctures and electric signals above and below the ionosphere. . . ." Finally:

"Blue Scout I is one of a family of rockets the Air Force is developing as low cost, all purpose vehicles for launching *scientific probes and satellites to gather vital information for military space missions*." (Emphasis added.) Associated Press Report of the successful launching of Blue Scout I, on Jan. 7, 1961.

This report, it must be assumed, has been made with the knowledge and approval of the U.S. government.

of bitter Russian protests over the U-2 spy plane, shot down in Soviet territory last May, Samos is loaded with political implications.⁵⁷

It cannot be doubted that Soviet Russia, and possibly other space powers, have, or soon will have, similar types of space facilities. It is submitted that four alternatives could conceivably be employed with some promise for regulation in the twilight area: (a) agreements stipulating that all facilities of this type shall be used only in cooperative, international space projects and that the entire results obtained from such exploration shall be made available to all states through the United Nations or another international agency; (b) agreements stipulating that each state shall be permitted to conduct space activities of a type technically similar to that performed by any other state even though such peaceful activities might, potentially, be employable for strategic purposes; (c) agreement prohibiting certain uses of space in spite of the fact that they can also serve peaceful purposes; (d) agreement to submit controversies concerning activities within this category to the United Nations for advice in accordance with the Charter of the United Nations.

By its very nature, a third general category of space activities is likely to defy specific international regulation. Here it will be necessary, for quite some time, to rely on skillful diplomacy and the effectivity of general international law, the Charter of the United Nations, as well as the operational clauses of existing regional treaties. A few examples may serve as an illustration. A realistic appraisal of the present international situation leads to the conclusion that governments will hardly agree within the near future, to the abandonment of, or to crippling limitations on, the possible uses of a limited range of operational missiles or of space vehicles for purposes of national defense. Although it is conceivable that a ban on the production and uses of all atomic and thermonuclear weapons could be negotiated after the effectivity of a previously concluded test ban has been established, it is doubtful that early agreement will be obtainable for an effective, international control of all these weapons. Short of an international treaty providing for, and actually effectuating, universal disarmament, it would be farfetched to expect that governments within the foreseeable future, will desist from continuing such military air-and-space activities as they may consider necessary for the defense and survival of their respective countries.⁵⁸ Nor is it likely that vital air-and-space defense installations can be opened to effective international regulation and controls under the prevailing international situation. In fact, one may expect that governments will not be prepared to consider the removal of launching pads from military installations on land, or as they are installed on men-of-war at this time; nor can they be expected to accept readily legal limitations on the construction and

⁵⁷ William Ryan, Associated Press report, Oct. 11, 1960, as published in the Salt Lake Tribune, Oct. 12, 1960, p. 1.

⁵⁸ See, e.g., Rear Admiral Chester Ward, Judge Advocate General of the Navy, *Space Law as a Way to World Peace*, JAG J. (Feb. 1959), stating that

"there is not one single man-made object now in outer space . . . which was not put there by rocket thrust developed primarily for military or missile purposes . . . It is exactly because of this incredibly momentous importance of space activities to the survival of the United States that I submit that it would be premature and dangerous to commit ourselves to a code of laws which would control our activities in space."

experimental uses of missile-carrying, high-altitude "aircraft" whose designs may permit their employment also as space vehicles, be they manned or pilotless.

The expectation is justified that governments will insist upon retaining exclusive jurisdiction over strategically important categories of space research and space activities designed for the protection of vital national interests as long as in the opinion of these governments this protection cannot be provided satisfactorily by general or particular international agreements. In this sensitive sector of national space activities, the regulatory possibilities offered by means of international agreement may have to remain limited in scope until such time as governments will be prepared to admit that the gradual submission to international law of a country's space activities, although of vital concern to national security, can offer more effective protection and will be less costly than an armaments race extended into space. The faithful observation of agreements or practices, over a sufficiently long period of time, whose characteristics lie primarily in the non-contested first and second areas of activities, however, may lead to a further strengthening of those political theories which proclaim that a military stalemate has been reached and that, eventually, those states prominently engaged in the armaments race, might gradually abandon the latter since international cooperation in the uses of space, as it is likely to be practiced in all but the third area of activities, will demonstrate the benefits which all states can derive from a general reduction of armaments.

So far, all space literature seems to agree that, in addition to the reservation of space for peaceful uses only, a vital part of any future space law must be the creation of an international "control-and-inspection system" for all "sharable" uses of space. An authoritative and very comprehensive study of the law of outer space quite poignantly reproduces current legal thinking on this matter when stating:

The main response in the first part of the century was to establish the exclusive sovereignty of the underlying state; the main response today is to focus attention on international control or regulation. . . . Until and unless all space activities can be brought under unified international control, we can safely assume that space programs will continue to be carried on by nation-states individually and perhaps (as with atomic energy) collectively as well; that these programs will increase in scope, intensity and frequency; and that they will develop basic scientific knowledge of great though now unpredictable significance to mankind, and technology which may be employed to a variety of non-military as well as military ends.⁵⁹

The political, psychological, or military risks involved in the conduct of certain space activities may also prompt governments to accept "self-imposed" restrictions.

As suggested in this article, international legal regulations of many technical and organizational space activities for peaceful purposes are not only feasible but urgently needed and, therefore, likely to be obtained. If the term "space controls" refers to the restrictive and permissive regulations to be established by space agreements, it would seem meaningful to support the idea of space controls. If, on the other hand, the term space controls denotes that the

⁵⁹ U.N. COMMITTEE REPORT, note 41 *supra* at 30-31.

pre-condition for the creation of specific space regulations must be the establishment of unfailing international inspection systems for all space activities wherever they may occur, nothing short of a general disarmament treaty will do. This is exactly the position of the Soviet Union and other Communist states. The frustrating experiences so far encountered during the Geneva disarmament negotiations do not justify the hope for early success of such a scheme. The result of further delays may well be space chaos.

One might even go one step further. The question may be raised about the usefulness of any territorial inspection system attached to "sharable" space activities if, because of "limits imposed by considerations of national security," it is admitted that no effective control-or-inspection system can at present be established by international agreement for exactly those areas of activities where it would be most urgently needed, namely the non-sharable space activities. The experiences during the long-drawn negotiations for a legally acceptable draft treaty on the ban of nuclear weapons tests, the collapse of these negotiations because of the inability to agree on a control-and-inspection system, and the voluntary continuation of the testing moratorium by the nuclear powers without any control-and-inspection system whatsoever, illustrate, it would seem, the lack of realism of such all-inclusive proposals for an international inspection system for sharable as well as non-sharable space activities.

A realistic appraisal of the function of international law in the loosely organized international community is most likely to accept the proposition that governments, for quite some time to come, will continue to be the initial interpreters of international law and, accordingly, to base their initial actions on their subjective claims and counterclaims. Even the proposed creation of a *United Nations Outer Space Agency*⁶⁰ could not abrogate the inherent right of any state to exist and, therefore, to take such initial steps as a government may consider necessary for the immediate protection of this right. It should also be noted that space activities, whether or not they will be covered by future space agreements and practices, will not relieve states from their obligations under general international law or the provisions of the United Nations Charter, particularly those to settle or adjust all differences by peaceful means as stipulated in the Charter. Hence, claims and counterclaims concerning the interpretation of customary or conventional space law will be subject to a sort of appellate review, at least through the medium of debate as provided for in the Charter of the United Nations. Whether the final decision pertaining to the interpretation of space agreements or space practices should be entrusted to an organ

⁶⁰ CLARK & SOHN, *WORLD PEACE THROUGH WORLD LAW* 296-302 (2d ed. 1960), especially section 1, providing that the agency shall "possess and operate its own rockets, satellites and spacecraft and license, through the Inspector-General, the possession and operation of rockets, satellites and spacecraft by nations, organizations and individuals." And section 6 gives the agency the right to "take all measures necessary to prevent the use of outer space for military purposes by any nation and to keep other organs of the United Nations informed of any violation of the prohibition against the use of outer space for military purposes."

Apart from the fact that this draft fails to define objectively the term "military uses of space," attention should be called to the statement of two prominent American space lawyers, Jessup & Taubenfeld, *Outer Space, Antarctica, and the United Nations*, 13 *INTERNATIONAL ORGANIZATION* 363 (1959) that

"some of the current writing about outer space is so highly imaginative as to discourage serious students of international organization and law from pursuing detailed studies of very real problems which now confront the United Nations."

of the United Nations, be it the Security Council, the General Assembly, the International Court of Justice, or a newly created Space Agency, is a matter of governmental policy rather than of legal cognition or interpretation. In this connection it is necessary, however, to point out the need for universality of any space agreements or informal space understandings and, equally, of universal membership in the United Nations, especially if the latter is to be used effectively as an appellate organ.

It would seem that the appropriate, and initially most effective, coercive measure attached to an internationally established violation of space agreements or space custom would be to deprive the violator of the benefits offered by the space agreement or the customary rule, which he has not carried out in good faith. No persuasive reason exists, therefore, why a future Universal Space Union, loosely organized (similar to the existing Universal Postal Union) by the existence of a number of primarily technical space conventions and space practices, could not make an effective start *without* the specific establishment of other space sanctions. To go beyond, and to expect fruitful results from the use of orthodox enforcement measures in space conflicts seems to be a bit unrealistic in the nuclear age.

It has been asserted in some quarters particularly familiar with municipal-law practice that a sanction consisting of the deprivation of advantages offered by treaty or customary rule, as suggested in this article, cannot be considered a legal sanction. Hence, the critical conclusion has been advanced that the lack of a coercive nature of the proposed space laws would deprive them of their legal character, the establishment of which should be the essential task of the international jurist. However, the suggestion of this study that deprivation of the benefits derived from the specific space agreements would constitute an effective and most appropriate "sanction" — using this term in its broadest technical meaning — furnishes no reason why states, individually, collectively, or on behalf of an international organ, would not be legally permitted, in the case of internationally established space violations, to apply the wide range of sanctions provided by general or particular international law *if such action should be politically feasible*. Moreover, there is excellent precedent for agreements which, although lacking specific stipulations for sanctions, have, nevertheless, been considered by all nations as legally valid instruments. An outstanding illustration can be found in the unique pattern of the *General Treaty for the Renunciation of War* whose sole "sanction," expressed in the Preamble to the treaty, stipulates that "any signatory Power which shall hereafter seek to promote its national interests by resort to war should be denied the benefits furnished by this treaty."⁶¹

In short, it is the conclusion of this paper that gradually increasing areas of space regulations are feasible; that such regulations must refer to certain space functions and their effects on the political, military, and economic security of states; that much more reliance can thus be placed on the moral suasion of the universally recognized maxim *pacta sunt servanda* (given promises must be kept); and finally, that the insertion into such agreements of all-inclusive control-and-inspection systems is neither necessary nor likely to be obtained.

⁶¹ 94 *League of Nations Treaty Series* 57.