

Outer Space Treaty and proceeding to our National Space Policy, and Title 49 the policy/legal framework necessary to guide this new exciting endeavor begins to emerge. Policy is implemented by legislation, which means that either existing statutes will have to be modified and expanded or new statutes passed. Regulations deriving from the legislation will be what determines the specific actions of providers of Space Tourism trips. In all four cases, current treaties, policies, statutes and regulations were never intended to address the new activity of Space Tourism. But, they themselves in their current form were made out of whole cloth when space travel went from a dream to reality. Now the dream is moving onto another dimension, and the policy/legal framework will have to be expanded to insure that the dream of Space Tourism in the 21st century has a chance to be realized.

DELIMITATION OF OUTER SPACE AND THE AEROSPACE OBJECT
- WHERE IS THE LAW?

*Katherine M. Gorove**

There is no natural division defining the border between the atmosphere and outer space. For doctors, space begins at a low altitude within dozens of kilometers where the lymph glands of a human being begin to swell without special protection. Physicists and chemists, in contrast, find elements of the atmosphere at altitudes well above several hundred kilometers. These two regions, the atmosphere and outer space, have completely different legal regimes in terms of sovereignty, property rights, transit rights, and liability consequences. The dividing line, however, has no precise physical characteristics.¹ The result is a lack of agreement on whether there is or should be a fixed boundary between air and outer space and if there is a boundary, what should be the criteria.

The question of delimitation has been discussed and examined extensively for some years in legal and scientific literature and in international fora. Of particular prominence is delimitation's placement, since 1967, on the agenda of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space in the United Nations and its Legal Subcommittee.² In many ways the international community has taken an approach which could be characterized as "we'll know it when we see it." What appears to have emerged as international customary law is that the lowest perigee orbit of artificial earth satellites (currently, that would be

* Paper submitted while Visiting Associate Professor of Law, The American University, Washington College of Law (1998-2000). This written piece stems from an oral presentation at the International Studies Association, February 18, 1999.

¹ A number of definitions exist, *i.e.*, defining the demarcation point in terms of atmospheric characteristics or in terms of earth's gravitational effects. See summary of the various theories in a Background Paper prepared by U.N. Committee on Peaceful Uses of Outer Space (hereinafter "COPUOS"), U.N. Doc. A/AC.105/C.2/7, at 4 *et seq.* (May 7, 1970), and its Addendum, U.N. Doc. A/AC.105/C.2/7, at 2 *et seq.*, Add. 1 (Jan. 21, 1977), *reprinted in* I THE FUTURE OF INTERNATIONAL TELECOMMUNICATIONS 12-50 (Umberto Leanza ed. 1993). See also ROBERT F.A. GOEDHART, THE NEVER ENDING DISPUTE: DELIMITATION OF AIR SPACE AND OUTER SPACE, chs. 3-13 (1996) (describing for the greater part of the book a number of theories: atmosphere as a boundary; the biological theory; the rotation theory; the lowest perigee of orbiting satellites; the aerodynamic theory; the three zone atmosphere theory; limitless airspace theory; functional approach; and theory of a uniform legal regime).

² This topic is currently dealt with in the Legal Subcommittee's Agenda under Item 4. It is entitled "matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit." See, *e.g.*, Report of the Legal Subcommittee on the Work of Its Thirty-Eighth Session to the Committee on Peaceful Uses of Outer Space, U.N. Doc. A/AC.105/721 (Mar. 30, 1999) [hereinafter "1999 Report"].

approximately 100-110 km above sea level) lies at a point in outer space,³ although a number of equatorial countries still take issue with this statement, claiming the portions of the geostationary orbit above their territory.⁴

Even if all artificial earth satellites lie in outer space, there is no agreement that airspace lies below their paths. To date, high altitude planes currently reach ceilings at around 21 km.⁵ But currently there are no aircraft and/or spacecraft operating in the 25 km to 96 km range, other than in ascent or descent from outer space.

The Relevance of Delimitation

Airspace is subject to national sovereignty and hence the laws of the nation lying below. Outer space is open for freedom of movement. Practically speaking, the primary question is whether there is a right of free passage at all stages of ascent and descent: (1) for objects such as the U.S. Space Shuttle, the former U.S.S.R. Space Shuttle Buran (used once), and similar vehicles that take-off on a rocket to outer space and descend to earth somewhat like an aircraft; or (2) for future objects,⁶ such as the

³ A satellite has orbited the earth at about 96 km above sea level. See BIN CHENG, *STUDIES IN INTERNATIONAL SPACE LAW* (1997). See also, Bin Cheng, "Space Objects", "Astronauts" and Related Expressions, 34 *PROC. COLLOQ. L. OUTER SPACE* 17-27 (1991) who has stated that "outer space can be said to begin arguably at an altitude of 96 kilometres above the earth, clearly so at 110 kilometres and definitely so at 130 kilometres." *Id.* at 26. As early as 1960, Soviet and American experts had agreed at the International Aeronautical Federal Congress of October 4, 1960, that a "spacecraft" was any craft that exceeded 62 miles or about 100 km above the earth's surface. Nicholas Mateesco Matte, *AEROSPACE LAW* (1969).

⁴ Colombia states "it should be borne in mind that Colombia has repeatedly ... asserted its claim to the segment of geostationary orbit to which it is entitled by virtue of its geographical location, this being included in article 101 of its Political Constitution as part of its territory. However, the provision of international law whereby outer space is deemed common property because of its universal interest came into force after obtaining the required number of ratifications." See Reply of Colombia to Question 2 in the Questionnaire on Possible Legal Issues with Regard to Aerospace Objects: Replies from Member States, Noted by the Secretariat, U.N. COPUOS, U.N. Doc. A/AC.105/635/Add.5 (Feb. 5, 1998) [hereinafter "Questionnaire Replies 1998"].

⁵ The U.S. Air Force's U-2R/U-2S high altitude, reconnaissance aircraft can fly at over 21 km. See Fact Sheet (visited Sept. 21, 1999) <http://www.af.mil/news/factsheets/U_2R_U_2S.html>. Similarly, SkyStation, Inc., an FCC-licensed U.S. company, is constructing telecommunications blimps that will hover some 21 km over major metropolitan areas.

⁶ The Air Force is headed towards development of the main component of the space plane system, the Space Maneuver Vehicle. See Kristen Roundtree, *The Space Maneuver Vehicle*, *LAUNCH SPACE*, March/April 1999, at 40-1. NASA is testing the X-38, which could become the first spacecraft built in the past two decades that will travel to and from orbit. See <<http://www.dfrc.nasa.gov/EAO/PAIS/HTML/FS-O38-DFRC.html>> visited Sept. 23, 1999. For a list of NASA

planned U.S. National Aerospace Plane, the European Space Agency's HERMES, the United Kingdom's HOTOL, the German S/NGER, and Japan's HOPE, all of which take-off to outer space and descend to earth somewhat like an aircraft.

Delimitation is also important to the extent it determines the type of object and the applicable liability regime. For example, if an aerospace object is considered as a space object for its entire ascent and descent, the strict liability standard set forth in the Liability Convention would apply if damage is caused by a space object "on the surface of the earth or to aircraft flight."⁷ In contrast, if an aerospace object is considered as an air object while in air space, then normally a negligence standard would apply if damage is caused on the surface of the earth or to aircraft flight. Delimitation also has implications for the registration of the craft, with registration of aircraft provided for in the 1944 Chicago Convention and the registration of space objects in the 1975 Registration Convention. Both instruments establish different ways of, and requirements for, registration.

To date, the question of delimitation has not been of critical consequence. The U.S. Space Shuttle normally takes off from and returns to U.S. territory, either overflying U.S. territory or the high seas, but not third States. Similarly, space vehicles of the former USSR and now the Russian Federation have taken advantage of the vast area of Soviet/Russian Eurasia and normally have not impinged on the airspace of foreign States during their ascent to or descent from outer space. Thus it should come as no surprise that there have been only a few reported instances when a space vehicle overflow another state. State practice in these cases is noteworthy. The former U.S.S.R.'s Buran during its one flight in 1988 overflow countries without providing any notice.⁸ The U.S. Space Shuttle Atlantis in 1990 overflow the former U.S.S.R. with some notice provided. Specifically, the United States communicated to the former U.S.S.R. a few hours prior to the overflight information regarding the final flight stage of

future aircraft projects, *see* <<http://www.dfrn.nasa.gov/EAO/PAIS>> visited Sept. 23, 1999. A number of other projects are underway as well, such as the Proteus reusable launch vehicle, which plans to bring humans to 100 km twice within a two week period; Cosmos Mariner, which is a single stage, piloted launcher, that will take-off and land horizontally, using jet engines at conventional airports; the Ascender, which is a sub-orbital space plane. *See The Reusable Playing Field, LAUNCH SPACE*, Sept. 1, 1999, at 26-7.

⁷ Convention on International Liability for Damage Caused by Space Objects, Art. II.

⁸ According to the Reply of Germany to Question 3 in the Questionnaire on Possible Legal Issues with Regard to Aerospace Objects, Buran "de-orbited over the southern part of South American and flew over North Africa and re-entered Baikonur possibly over Turkey" (citing to presentation of E.N. Dudar, from NPO Molnia Ballistics and Dynamics of Flight Department, Moscow). Questionnaire on Possible Legal Issues with Regard to Aerospace Objects: Replies from Member States, Note by the Secretariat, U.N. COPUOS, U.N. Doc. A/AC.105/635 (Feb. 15, 1996) [hereinafter "Questionnaire Replies I"].

the Shuttle, including its flight trajectory, its period of overflight, its minimum planned altitude and technical details of the craft. The United States and former U.S.S.R. agreed, however, that the fact that information was furnished with regard to the overflight should not be deemed to set a precedent.⁹ Overflight between Russia and Kazakstan has also occurred, but is provided for in an Agreement between the two countries.¹⁰

There will be increasing numbers of flyovers, however, as more States develop Space Shuttle type systems and flyover on return to Earth or as States develop aerospace planes and flyover on take-off and return. The U.S. and the U.S.S.R. Space Shuttle, as well as the currently planned space transportation systems, need approximately 8,000 km from their re-entry into Earth's atmosphere until their point of landing.¹¹ Those vehicles travel for approximately 14 to 15 minutes at a flight altitude lower than 60 km before landing.¹²

The approach of States to delimitation¹³

The United States has consistently maintained the view that discussions of delimitation between air and outer space are premature and advocated the removal of delimitation from the Legal Subcommittee's agenda.¹⁴ The United States has a great concern that once the Legal Subcommittee acknowledges a specific line above which is presumed to be outer space, a number of States would claim that the area below that point is presumed to be air space.¹⁵ Correspondingly, those States would assert

⁹ See Reply of the Russian Federation to Question 7, in Questionnaire Replies I, *id.*

¹⁰ See Agreement between the Russian Federation and the Republic of Kazakstan, 28 March 1994, on the Main Principles and Conditions for Utilization of the Baikonur Launch Site. Reply of Kazakstan to Question 7, in Questionnaire on Possible Legal Issues with Regard to Aerospace Objects: Replies from Member States, Notes by the Secretariat, A/AC.105/635/Add.3, Dec. 4, 1996 [hereinafter "Questionnaire Replies II"].

¹¹ See Reply of Germany to Question 2, in Questionnaire Replies I, *supra* note 8.

¹² *Id.*

¹³ For a reprint of countries' positions on the question of delimitation, see excerpts of their statements between 1967 and 1990 in I THE FUTURE OF INTERNATIONAL TELECOMMUNICATIONS, *supra* note 1, at 77-156.

¹⁴ See, e.g., U.S. statement in U.N. Doc. A/AC.105/C.2/SR.559 (Apr. 8, 1992), at p. 6. Early opposition to delimitation can be seen in I THE FUTURE OF INTERNATIONAL TELECOMMUNICATIONS, *supra* note 1, e.g., U.N. Doc. A/AC.105/C.2/SR.377 (Feb. 22, 1982), at 110-11. See also supporters of the U.S. position, i.e., N. Hosenball, *Delimitation of Air Space and Outer Space: Is Such a Boundary Needed Now?*, in EARTH ORIENTED SPACE ACTIVITIES AND THEIR LEGAL IMPLICATIONS 341-48 (CRASL, Montreal 1982) (Proceedings of a symposium held on Oct. 15-16, 1981 at McGill Univ.)

¹⁵ An examination of U.S. domestic regulations sheds little light on what the United States views as outer space. The Federal Aviation Administration ("FAA") regulates private sector launch activities. 49 U.S.C. Secs. 70101-70121 (the

strong claims as to exclusive sovereignty over activities occurring in that area.¹⁶ The underlying concern of the United States has been that technology could be hindered by a formal delimitation because some States would attempt to restrict overflight of these types of vehicles or other aerospace objects. Further, the absence of agreements has yet to lead to international tension.¹⁷ For example, a futuristic aerospace plane might travel at ultra-high altitudes reaching the fringes of outer space¹⁸ or a new generation of satellites may circle the earth at altitudes lower than the altitude currently possible. If there were a formalized delimitation delineating air and outer space, both activities could fall within the ambit of airspace and require the underlying countries' permission for passage or for satellite operation.¹⁹

Opponents of the traditional United States' position believe that this question needs to be resolved. Of the States favoring a solution,

Commercial Space Act). A launch license is required for a person to "launch a launch vehicle" or to "reenter a reentry vehicle" in the United States and for a U.S. citizen to do the same outside the United States. 49 U.S.C. Sec. 70104. "Launch" is defined as "to place or try to place a launch vehicle and any payload (A) in sub-orbital trajectory; (B) in Earth orbit in outer space; or (C) otherwise in outer space." 49 U.S.C. Sec. 70102(3). The FAA currently employs a three-tiered method of classifying launch vehicles. First, there is the amateur rocket, which is defined in terms of its power, and does not need a launch license; second, there is the launch vehicle intended for sub-orbital trajectory, which requires a launch license; and third there is the launch vehicle intended for outer space. Although outer space is defined as Earth's orbit, no definition is given for sub-orbital trajectory. The fourth category, which does not yet exist as of this writing, but probably will exist in the near future, is the reentry vehicle. It is doubtful that any definition for this new category will shed further light on U.S. views of a boundary. One area to watch, however, is the regulation of amateur rocket activities. They are growing in sophistication, size, power and altitude. There could come a time when there will be a need domestically to distinguish the amateur rockets exempted from licensing requirements and those requiring licenses because they are capable of reach sub-orbital heights.

¹⁶ The issue is of particular concern to the United States because of the expansion of the "Space Shuttle" program and the advent of an aerospace plane. See STEPHEN GOROVE, *DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES* 358 (1991).

¹⁷ U.N. COPUOS, U.N. Doc. A/AC.105/C.2/SR.316 (Apr. 4, 1979) at 2.

¹⁸ For a discussion of U.S. and other countries' national aerospace plane programs, see D. Radzanowski, J. Moteff & M. Smith, *The U.S. National Aero-Space Plane: A Comparison with Aero-Space Plane Programs in Other Countries, and Future U.S. Options* (Congressional Research Service, Nov. 14, 1989) and J. Moteff and D. Radzanowski, *National Aero-Space Plane* (Congressional Research Service, May 30, 1990).

¹⁹ The argument is that space vehicles should not be subject to air law just because they dip below the "delimitation line" or vice versa. Report of the Legal Subcommittee on the Work of Its Twenty-Ninth Session to the Committee on the Peaceful Uses of Outer Space, at para. 9, U.N. Doc. A/AC.105/457 (1990).

some States advocate the spatial approach; others favor the functional approach.²⁰

The spatial approach favors the establishment of a demarcation line between air and outer space, normally, the lowest perigee of an artificial earth orbiting satellite, currently around at an approximate altitude of one hundred kilometers above the earth's surface.²¹ Of the States advocating the spatial approach, some States wish to exercise sovereignty over all that they believe to be theirs -- all space up to the point of outer space to preserve territorial integrity and ensure security. Some developed States, such as the former U.S.S.R., have also favored the spatial approach but for a different reason: in order that States do not further their claims of sovereignty to include portions of space lying in outer space. Indeed, the former U.S.S.R. submitted proposals on several occasions to the Legal Subcommittee that the boundary line be set via treaty at around 100-110 km.²²

The functional approach looks at the nature or purpose of the activity, not the place of the activity.²³ If it is a "space activity," it will remain a space activity even if the flight crosses sovereign airspace of a

²⁰ See, e.g., Lubos Perek, *Delimitation of Air Space and Outer Space: Is It Necessary?*, in EARTH ORIENTED SPACE ACTIVITIES AND THEIR LEGAL IMPLICATIONS 275-86 (CRASL, Montreal, 1982) (Proceedings of a symposium held on Oct. 15-16, 1981, at McGill Univ.) and Bin Cheng, *For Delimiting Outer Space*, in *id.*, at 230-74.

²¹ See Report of the Legal Subcommittee on the Work of Its Twenty-Seventh Session to the Committee on Peaceful Uses of Outer Space, at 29, para. 6, U.N. Doc. A/AC.105/411 (Apr. 8, 1988) [hereinafter "1988 Report"] and Report of the Legal Subcommittee on the Work of Its Twenty-Eighth Session to the Committee on Peaceful Uses of Outer Space, at 29, para. 6, U.N. Doc. A/AC.105/430 (Apr. 26, 1989) [hereinafter "1989 Report"]. See also Maureen Williams, *The Problem of Demarcation Is Back in the Limelight*, 22 PROC. COLLOQ. L. OUTER SPACE 245, 247-48 (1979).

²² U.N. Doc. A/AC.105/L.112, at 1 (June 20, 1979), reprinted in I THE FUTURE OF INTERNATIONAL TELECOMMUNICATIONS, *supra* note 1, at 97. See suggestion of the U.S.S.R. 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 kilometers or more. (2) Space objects of States shall retain the right to fly over the territory of other States at altitudes lower than 110 kilometers above sea level for the purposes 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 Earth. U.N. Doc. A/AC.105/L.168 (June 5, 1987), reprinted in 1988 Report, *supra* note 21, U.N. Doc. A/AC.105/411 (April 8, 1988), Ann. III, at 55. See also U.N. Doc. A/AC.105/L.112 (June 20, 1979), reprinted in *id.*, at 44; and U.N. Doc. A/AC.105/C.2/L.139 (April 4, 1983), reprinted in *id.*, at 45. See also discussions in K. Gorove & E. Kamenetskaya, *Tensions in the Development of the Law of Outer Space*, in BEYOND CONFRONTATION: INTERNATIONAL LAW FOR THE POST-COLD WAR ERA 225-74, at 243-48 (Damrosch *et al.* eds. 1995).

²³ Report of the Legal Sub-Committee on the Work of Its Thirty-Third Session to the Committee on Peaceful Uses of Outer Space, para. 37, U.N. Doc. A/AC.105/320 (Apr. 13, 1993).

foreign state.²⁴ Space law will apply for the duration of the flight. Many developed States, including Russia²⁵ (Russia having shifted from the U.S.S.R.'s position), appear now to favor a functional approach to the problem.

The lack of consensus on whether and how to resolve the issue has resulted in a virtual stalemate in the discussion in the Legal Subcommittee of COPUOS. The development, however, of a questionnaire pertaining to delimitation-related issues has furthered thinking in recent years. Specifically, in 1995, COPUOS agreed with the Legal Subcommittee that States' members of COPUOS should be invited to give their opinions on various issues relating to "aerospace" objects and distributed a questionnaire developed by the Legal Subcommittee.²⁶ The questions cover a variety of topics from attempting to define the term "aerospace object", to inquiring about precedents of overflight, to requesting views on the applicable legal regime for "aerospace" objects.²⁷

²⁴ See N. M. MATTE, AEROSPACE LAW 70-74 (1969).

²⁵ Russia initially affirmed its support for a spatial approach in 1992, when submitting a Working Paper which formed the basis for the U.N. Questionnaire on Possible Legal Issues with Regard to Aerospace Objects., *infra* note 25. From its Replies to the Questionnaire, submitted in 1996, it appears that Russia has shifted its approach to a functional one. See Questionnaire Replies I." *supra* note 8.

²⁶ U.N. GAOR, 50th Sess., Supp. No. 20, at para 117, U.N. Doc. A/50/20 (1995). The questionnaire stemmed from a working paper submitted by Russia in 1992, "Questions concerning the Legal Regime for Aerospace Objects," U.N. Doc. A/AC.105/C.2/L.189 (Mar. 30, 1992), *reprinted in* Report of the Legal Subcommittee on the Work of Its Thirty-First Session to the Committee on Peaceful Uses of Outer Space, at 48-49 (1992).

²⁷ The following questions are included in the questionnaire:

Question 1: Can an aerospace object be defined as an object which is capable both of traveling through outer space and of using its aerodynamic properties to remain in airspace for a certain period of time?

Question 2: Does the regime applicable to the flight of aerospace objects differ according to whether it is located in airspace or outer space?

Question 3: Are there special procedures for aerospace objects, considering the diversity of their functional characteristics, the aerodynamic properties and space technologies used, and their design features, or should a single or unified regime be developed for such objects?

Question 4: Are aerospace objects while in airspace considered as aircraft, and while in outer space as spacecraft, with all the legal consequences that follow therefrom, or does either air law or space law prevail during the flight of an aerospace craft, depending on the destination of such a flight?

Question 5: Are the take-off and landing phases specially distinguished in the regime for an aerospace object as involving a different degree of regulation from entry into airspace from outer space orbit and subsequent return to that orbit?

Summary of States' Replies to the Questionnaire on Possible Legal Issues with Regard to Aerospace Objects

It should be noted at the outset that somewhat less than one-third of the States' members of COPUOS have replied to the Questionnaire (or at least, that is all the replies to which this author is aware).²⁸ Nonetheless, it is useful to analyze these responses.²⁹

A few States' replies indicated their preference for a spatial approach. Korea, in particular, argued that "[g]iven such legal problems as sovereignty over airspace, aerial safety and so on, the spatial approach has more merit than the functional approach under the present international legal system because the former can more easily decide the law to be applied."³⁰ Kazakstan stated the "law applicable to the type of space in which the aerospace object is located should prevail."³¹ Kazakstan acknowledged that even if the aerospace object were currently on a space

Question 6: Are the norms of national and international air law applicable to an aerospace object of one State while it is in the airspace of another State?

Question 7: Are there precedents with respect to the passage of aerospace objects after re-entry into the Earth's atmosphere and does international customary law exist with respect to such passage?

Question 8: Are there any national and/or international legal norms with respect to the passage of space objects after re-entry into the Earth's atmosphere?

Question 9: Are the rules concerning the registration of objects launched into outer space applicable to aerospace objects?

Questionnaire on Possible Legal Issues with Regard to Aerospace Objects, U.N. Doc. A/AC.105/C.2/1995/CRP.3/Rev. 3 (Mar. 31, 1995), *reprinted in* U.N. Doc. A/AC.105/607, App. (1995).

²⁸ Replies have been received from the Czech Republic, Germany, Iraq, Italy, Mexico, Pakistan, Philippines, Korea, Russia, Chile, Greece, Kazakstan, Syria, Turkey, Argentina, India, Colombia, and Lebanon. General responses were received from Indonesia and the United Kingdom. The U.N. has reprinted these replies in U.N. Doc. A/Ac.105.635 (Add. 1-5) during the three year period in which they were received.

²⁹ It should be stressed that it is somewhat difficult to compare the responses, because some States' responses were quite abbreviated in that they answered the question but did not explain their answer. The U.N. Secretariat prepared an analysis of fourteen replies in 1997 on each of the nine questions. *See Comprehensive Analysis of the Replies to the Questionnaire on Possible Legal Issues with Regard to Aerospace Object*, Note by the Secretariat, U.N. Doc. A/AC.105/C.2/L.204, Feb. 18, 1997 [hereinafter "Comprehensive Analysis"].

³⁰ See Reply of Korea to Question 4, in Questionnaire Replies I, *supra* note 8.

³¹ See Reply of Kazakstan to Question 4, in Questionnaire Replies II, *supra* note 10. Kazakstan also replied "yes" to Question 6, "whether norms of national and international air law are applicable to an aerospace object of one State while in the airspace of another State?" *Id.*

mission, national and international air law would apply while it were transiting another State's airspace. Argentina stated that "[a]ir law applies to aerospace objects moving through airspace" and "[s]pace law applies to aerospace object traveling through outer space."³² Iraq had a similar view.³³

Some of the States favoring the spatial approach conceded that a new legal framework should be developed to apply generally to aerospace objects.³⁴ Argentina favored establishment of "a special regime that takes account of the special characteristics" of aerospace objects.³⁵ Similarly, Korea stated that "[t]he current international legal system does not provide for any special legal procedures for aerospace objects which take into account the diversity of their functional characteristics, their aerodynamic properties and their design features. Therefore, it is necessary to prepare a unified regime for aerospace objects in order to prevent legal disorder...."³⁶

The majority of States responding to the Questionnaire appeared to take a functional approach.³⁷ For example, Chile stated: "[w]e consider that

³² See Reply of Argentina to Question 2, in Questionnaire on Possible Legal Issues with Regard to Aerospace Objects: Replies from Member States, Notes by the Secretariat, A/AC.105/635/ Add.4, Apr. 1, 1997 (hereinafter "Questionnaire Replies III").

³³ See Reply of Iraq to Question 4, in Questionnaire Replies I, *supra* note 8.

³⁴ A number of writings have dealt with issues relevant to "aerospace object." See I.H.PH. DIEDERISK-VERSCHOOR, AN INTRODUCTION TO SPACE LAW 87-8 (2d rev. ed., Kluwer 1999) and the literature noted therein. In this author's view, strong arguments have been made that the definition of aerospace object for which the Questionnaire requested comments encompasses both the U.S. Space Shuttle type vehicle, as well as planned vehicles along the lines of the U.S. National Aerospace Plane. On issues relevant to the aerospace plane, see discussion in Stephen Gorove, *Aerospace Object - Legal and Policy Issues for Air and Space Law*, 25 J. SPACE L. 101, at 103-04 (1997). The present paper assumes this definition of "aerospace object." On the basis of replies and suggestions received, the U.N. Secretariat set forth "common elements" of an aerospace object in its Comprehensive Analysis, *supra* note 29, at para 16. They included: ability to fly in airspace; ability to travel in outer space; performing a space activity or mission; design characteristics permitting a landing on Earth after re-entry into Earth's atmosphere, like an airplane.

³⁵ See Reply of Argentina to Question 2; see also Reply to Question 4, in Questionnaire Replies III, *supra* note 32.

³⁶ See Reply of Korea to Question 3, in Questionnaire Replies I, *supra* note 8.

³⁷ See, e.g., Czech Republic, Germany, Italy, Russia, Chile, Greece, Syria, Turkey, India, Colombia, and Lebanon. Some States' Replies are difficult to categorize as either spatial or functional. For example, Pakistan appeared to be taking a spatial approach, stating that "[t]echnically speaking, the regime applicable to the flight of an aerospace object should therefore differ according to whether it is located in airspace or in outer space." See Reply of Pakistan to Question 2, in Questionnaire Replies I, *supra* note 8. But Pakistan, in answer to another question appeared to have a functional approach, stating that "a suitable regime should be developed for such objects while in airspace and outer space, depending on their destination," Reply of Pakistan to Question 4, in *id.*, but that

there should be no distinction made in the regime applicable to the flight of aerospace objects where the mission performed is a space mission."³⁸ Likewise, if "the same spacecraft overshoots and flies over airspace outside its outgoing and return flight paths, then it should no longer be covered by space law."³⁹ Greece also advocated a functional approach, pointing out that "[s]pace law should prevail in the overall flight of aerospace objects; if they are destined to serve primarily outer space activities...."⁴⁰ Colombia advocated "applying either one regime or the other throughout the entire flight, according to its destination" because of the "problems" that would be caused by "applying either air law or space law depending on the type of space crossed by the trajectory of the aerospace object."⁴¹ Similarly, India supported such an approach, stating that if an aerospace object's "passage through the airspace of another State is part of its direct passage to or from outer space on launch or return for landing, and is only incidental thereto, it would be subject to the law relating to outer space." But if an aerospace object did not fall in that category and operated "in areas subject to the jurisdiction of a State, it is subject to the laws of that State and international air law."⁴² India further stipulated, however, as regards questions of safety and liability, the higher standards should apply.⁴³

None of the respondents taking a functional approach failed to acknowledge the relevance of international air law. For example, Germany stated that "international air traffic law can also be applicable after [an aerospace object's] re-entry into the Earth's atmosphere especially since international air traffic law can possibly interfere with their flight after re-entry into Earth's atmosphere."⁴⁴ Pointing to the flyover by the Buran

in such a regime a "distinction has to be made between airspace and outer space." Reply of Pakistan to Question 6, in *id.* The Philippines also initially appeared to be advocating a spatial approach, stating that "[r]ules and regulations applying to the flight of aerospace objects should differ according to whether it is located in airspace or outer space." See Reply of Philippines to Question 2, in *id.* But in another answer, the Philippines conceded that "[a]erospace object, like the United States Space Shuttle, are designed as spacecraft and should remain as such. Their flexibility/capability to manoeuvre as aircraft is only incidental to their intended use." See Reply of Philippines to Question 4, in *id.* Mexico was also somewhat difficult to categorize, stating that the "differences with regard to the regime applicable ...relate both to the delimitation of outer space and to the rights of States over their airspace." See Reply of Mexico to Question 2, in *id.*

³⁸ See Reply of Chile to Question 2, in Questionnaire Replies II, *supra* note 10.

³⁹ See Reply of Chile to Question 6, in *id.*

⁴⁰ See Reply of Greece to Question 4, in *id.*

⁴¹ See Reply of Colombia to Question 4, in Questionnaire Replies 1998, *supra* note 4.

⁴² See Reply of India to Question 2, in Questionnaire Replies III, *supra* note 29. See further Reply of India to Question 4, in *id.* ("where the passage through airspace is part of a direct and continuous journey to or from outer space, the object shall be considered as a spacecraft.")

⁴³ See Reply of India to Question 4, in *id.*

⁴⁴ See Reply of Germany to Question 2, in Questionnaire Replies I, *supra*

in 1988, Germany said that "serious precautions have to be taken to avoid a possible collision with aircraft."⁴⁵ Indeed, "the flight path of a re-entering space object has to be cleared from air traffic altogether, especially as the re-entering space craft does not have the same maneuverability as a motor driven aircraft, once it has been brought into its descent and landing trajectory."⁴⁶ Greece stated that "it is self-evident that all air law rules concerning safety of air navigation should also be jointly applicable"⁴⁷ to aerospace objects. Italy also conceded that while it believed the legal framework for aerospace objects had to be a unified one, it was "advisable to examine such flight activity with respect to the existing rules of air navigation in order to solve possible interferences."⁴⁸ Likewise, Turkey acknowledged the applicability of compliance by aerospace objects with the Convention of the International Civil Aviation Organization (ICAO),⁴⁹ as did the Philippines,⁵⁰ and that "[e]xisting international aviation rules as well as national legislation and air traffic arrangements should be taken into account."⁵¹

While recognizing the applicability of aviation rules to aerospace objects, some States pointed out the difficulty in applying all of the rules to aerospace objects. For example, Turkey pointed out that "there may be special requirements different in the take-off and in landing from the existing rules."⁵² The Russian Federation highlighted that "in the case of objects performing Earth-orbit flights, it will be almost impossible in practical terms to meet all the different requirements of air law."⁵³

One country made a distinction between different types of aerospace objects and the applicability of some principles of air law. Specifically, the Czech Republic acknowledged that space transportation systems would have to observe some principles and rules of the other legal regime while transiting through it on the way to their destination,⁵⁴ but was

note 8.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ See Reply of Greece to Question 4 and Question 6, in Questionnaire Replies II, *supra* note 10.

⁴⁸ See Reply of Italy to Question 6, in Questionnaire Replies I, *supra* note 8.

⁴⁹ Turkey stated that "[a]ny object in the air space of a State needs to comply with the International Civil Aviation Convention (ICAC). See Reply of Turkey to Question 6, in Questionnaire Replies II, *supra* note 10. At the same time, Turkey maintained that "[a]erospace objects in airspace should not be considered as aircraft." Reply of Turkey to Question 4, in *id.*

⁵⁰ See Reply to Philippines to Question 6, in Questionnaire Replies I, *supra* note 8.

⁵¹ See Reply of Turkey to Question 4, in Questionnaire Replies II, *supra* note 10.

⁵² See Reply of Turkey to Question 5, in *id.*

⁵³ *Id.*

⁵⁴ The Czech Republic in reply to Question 2 stated yes, subject to "a real flight of a craft in airspace on the basis of principles and technology of aeronautics on the one hand, and the movement of an object to, in and from orbit

unclear as to what air rules would be applicable. In their opinion, however, some air rules would apply, but only "to those aerospace objects which would be capable of serving the purposes of aeronautics, not to those aerospace vehicles which would be essentially considered as space objects."⁵⁵ In other words, some air rules would be applicable to objects resembling aerospace planes, but not to objects resembling Space Shuttles.

Some States not only advocated the application of air rules or laws for safety reasons, but advocated the application of international and domestic air law for national security or other unspecified reasons. For example, although the Syrian Arab Republic advocated a functional approach,⁵⁶ it stressed that "when an aerospace object is located in the territorial airspace of another State, it may be subject to international air law as well as to relevant domestic air law by reason of national security or aerial safety as long as it has characteristics both of an aerospace plane which is subject to air law and a space object which is subject to space law."⁵⁷ In addition to the air traffic rules, Turkey stated that when an object is "within the airspace of a State, national legal norms could be applicable."⁵⁸ Lebanon also expressed the belief that the "provisions of national airspace law or of international airspace law should apply to an aerospace object."⁵⁹

As to registration of aerospace objects, most respondents to the Questionnaire advocated applying the Registration Convention to aerospace objects launched into outer space.⁶⁰ Some of those States advocated a dual registration of aerospace objects as both "spacecraft" under the Registration Convention and as "aircraft".⁶¹ Only a few States advocated

on the basis of principles and technology of astronautics on the other hand." It stated further that the answer "is subject to further considerations taking into account the purposes served by each airspace object." See Reply to Question 2, in Questionnaire Replies I, *supra* note 8.

⁵⁵ See Reply of the Czech Republic to Question 6, in *id.*

⁵⁶ The Syrian Arab Republic stated: "[i]t can be argued that the criterion to be applied in determining whether an aerospace object comes within the jurisdiction of international space law or that of international air law is the purpose of the object's flight." See Reply of the Syrian Arab Republic to Question 4, in Questionnaire Replies II, *supra* note 10.

⁵⁷ See Reply of the Syrian Arab Republic to Question 6, in *id.*

⁵⁸ See Reply of Turkey to Question 6, in *id.*

⁵⁹ See Reply of Lebanon to Question 6, Questionnaire Replies 1998, *supra* note 4.

⁶⁰ See Replies of Germany, Czech Republic, Iraq, Mexico, Pakistan, Reply of Argentina and India to Question 9, in Questionnaire Replies I, *supra* note 8. See also Replies of Chile, Greece, Kazakstan and the Syrian Arab Republic to Question 9, in Questionnaire Replies II, *supra* note 10; see also Replies of Argentina, India, Colombia and Lebanon in Questionnaire Replies 1998, *supra* note 4 and Questionnaire Replies III, *supra* note 32.

⁶¹ See Reply of Turkey to Question 9, in Questionnaire Replies II, *supra* note 10. India also noted "such objects would also be subject to the rules concerning registration of aircraft in case they are capable of and are used for independent flight in airspace." See Reply of India to Question 9, in Questionnaire Replies III,

that "aerospace objects ... be treated as a different species and hence, registration should be lodged in a different body" or that a new registration procedure was necessary.⁶² The Russian Federation and Italy advocated "further investigation," but Russia considered it "premature to make amendments or additions" to the 1975 Registration Convention.⁶³ Greece's view was that "the registration by a State in its appropriate registries of any flying object as an aircraft or a spacecraft is the formal criterion for the application to it of its respective national and international air or space law rules."⁶⁴

In terms of the existence of customary international law and overflight of aerospace object, States took different views of the value of the overflight precedent. Unlike Argentina and the Syrian Arab Republic, which believed there are no precedents and no customary law with respect to overflights after re-entry,⁶⁵ Chile and Greece stated that "customary law" does exist with respect to aerospace objects like the shuttle, whereby such objects are regarded as craft to which the norms of air law do not apply, because there was no objection or opposition raised by third States.⁶⁶ Kazakstan pointed out that there are precedents for overflight by Russian objects which were provided for in an Agreement,⁶⁷ implying that if there had been no agreement then there would have been no unrestricted overflight. The Czech Republic found there to be insufficient support to find a right of passage for an "ascending or descending space object," but noted that such "passage occurs and no protests against it have been raised so far."⁶⁸ Germany also found there to be "no international customary law .. with respect to the passage of space transportation systems *over foreign territory*...."⁶⁹ Russia concurred stating that "[p]rovisions of international customary law with respect to the passage of aerospace objects after re-entry into the Earth's atmosphere are currently in the process of being

supra note 32. See also Reply of the Czech Republic to Question 9, in Questionnaire Replies I, *supra* note 8.

⁶² See Reply of Philippines to Question 9, in Questionnaire Replies I, *supra* note 8; see also Reply of Republic of Korea to Question 9, in *id.*

⁶³ See Reply of the Russian Federation to Question 9, in *id.* See also Reply of Italy to Question 9, in *id.* See also Reply of Argentina to Question 9, in Questionnaire Replies III, *supra* note 32 ("provision should be made for the possibility of elaborating ... a specific regime....").

⁶⁴ See Reply of Greece to Question 6, in Questionnaire Replies II, *supra* note 10.

⁶⁵ See Replies of Argentina to Questions 7, in Questionnaire Replies III, in *supra* note 32. See Reply of the Syrian Arab Republic to Question 7, in *id.*

⁶⁶ See Replies of Chile and Greece to Question 7, in *id.*

⁶⁷ Agreement between the Russian Federation and the Republic of Kazakstan on 28 March 1994 on the Main Principles and Conditions for Utilization of the Baikonur Launch Site. See Reply of Kazakstan to Question 7, in *id.*

⁶⁸ See Reply of Czech Republic to Question 7, in Questionnaire Replies I, *supra* note 8.

⁶⁹ See Reply of Germany to Question 7, in *id.*

elaborated.⁷⁰ Turkey also opined that "[s]ome regulations need to be established."⁷¹ The Russian Federation suggested examining the "possibility of codifying in treaty form whatever norm is agreed upon for the peaceful (innocent) passage through the airspace."⁷² Chile also recognized the utility of "formulat[ing] provisions on the innocent passage of a space object over national airspace."⁷³

A number of States suggested that changes to international space and air law may need to be considered in the future. For example, the Russian Federation acknowledged that as "aerospace technology becomes increasingly sophisticated, the question might arise as to whether the existing provisions of international space and air law need to be supplemented,"⁷⁴ specifically those "relating to international liability for any damage sustained, rescue of crew, etc."⁷⁵ Turkey stated "[i]f need for changes arises by practice, changes in the [International Civil Aviation Convention] may then be considered."⁷⁶ The Syrian Arab Republic also noted that the norms of both air and space law may need supplementing to deal with advances in aerospace technology.⁷⁷ Germany advocated that "air traffic lawyers and space lawyers ... elaborate a common solution with regard to legal norms applicable to space objects re-entering through the airspace of foreign States, taking into account the particular concerns of those legal regimes."⁷⁸

Several States advocated the development of a new legal framework for aerospace objects.⁷⁹ For example, Italy stressed the need for a new legal regime to be developed to formulate a unified approach to the treatment of aerospace objects,⁸⁰ as did Mexico and the Philippines.⁸¹ Greece also

⁷⁰ See Reply of the Russian Federation to Question 7, in *id.*

⁷¹ See Reply of Turkey to Question 7, in Questionnaire Replies II, *supra* note 10.

⁷² See Reply of the Russian Federation to Question 6, in Questionnaire Replies I, *supra* note 8.

⁷³ See Reply of Chile to Question 2, in Questionnaire Replies II, *supra* note 10.

⁷⁴ See Reply of the Russian Federation to Question 4, in Questionnaire Replies I, *supra* note 8.

⁷⁵ The Russian Federation also stated "The legal regime applicable to an aerospace object's flight must differ according to the purpose of the flight and must be determined in accordance with the corresponding norms of international space or air law; that requires further development of certain norms of international air law and international space law, specifically those relating to international liability for any damage sustained, rescue of crew, etc." Reply of the Russian Federation to Question 2, *id.*

⁷⁶ See Reply of Turkey to Question 6, in *id.*

⁷⁷ See *id.*

⁷⁸ *Id.*

⁷⁹ See Replies from the Russian Federation, Germany, Italy, Lebanon, and Czech Republic in Questionnaire Replies I, *supra* note 8; see also Reply of Lebanon, in Questionnaire Replies 1998, *supra* note 4.

⁸⁰ See, e.g., Reply of Italy to Question 2, in Questionnaire Replies I, *supra* note 8.

appeared to favor the establishment of a new regime, arguing that aerospace objects should be submitted to a sole legal regime "to avoid unnecessary dualism" which would "produce confusion and malfunction of the whole legal system governing space activities."⁸² Lebanon argued that "a special regime should be adopted for each category of space object" because of the "diversity of space objects, their characteristics and uses and the consequent difficulty of establishing a unified regime for them."⁸³ India also favored a "unified regime" to identify "aerospace objects and to clarify their legal status, taking into account the rules regarding territorial sovereignty of States,"⁸⁴ because in its view no specific rules or norms govern passage over third States after an aerospace object's re-entry into the Earth's atmosphere.⁸⁵ Pakistan also advocated different new regimes for each type of aerospace object.⁸⁶

Several countries considered the creation of a new regime premature or remote. Germany stated that a decision could not yet be taken on whether a regime should be developed for these types of "space transportation systems" until the Scientific and Technical Subcommittee of COPUOS has studied current and future space transportation systems.⁸⁷ The Czech Republic concurred. Although acknowledging that aerospace objects will face "two different legal regimes relating to the two categories of activities [air and space] surrounding our planet", "[u]nless a single special regulation" for them is developed, the Czech Republic considered "the probability of the elaboration and firm establishment of a single legal regime to govern [the] activities" of aerospace objects to be "rather remote."⁸⁸ Russia acknowledged that an "argument could be put forward, somewhat cautiously, that at the present stage of the development of aerospace object there is no very urgent need to develop such procedures" for aerospace objects, but admitted that "as the probability increases of various incidents occurring in connection with [aerospace objects'] operation, the question of supplementing and elaborating norms ... might

⁸¹ Mexico advocated the establishment of a "general regime...for aerospace objects." See Reply of Mexico to Question 3. See also Mexico's reply to Question 4. Philippines advocated a "unified regime...[which] may be refined later on..." See Reply of Philippines to Question 3.

⁸² See Reply of Greece to Question 2, in *id.*

⁸³ See Reply of Lebanon to Question 3, in Questionnaire Replies 1998, *supra* note 4.

⁸⁴ See Reply of India to Question 3, in Questionnaire Replies III, *supra* note 32.

⁸⁵ See Replies from India to Questions 7 and 8 in *id.* Argentina is also of the view that there are no norms or rules currently applicable in this situation. See *id.*

⁸⁶ See Reply of Pakistan to Question 4, in Questionnaire Replies I, *supra* note 8.

⁸⁷ See Reply of Germany to Question 3, in Questionnaire Replies I, *supra* note 8.

⁸⁸ See Reply of Czech Republic to Question 3, in *id.*

well actually arise."⁸⁹ "As far as one can tell at present, the issue of paramount importance will be whether or not procedures should be brought into effect for notifying States of the passage of aerospace objects through airspace over their territories."⁹⁰

Conclusion

So what do all the replies of States to the Questionnaire mean at this juncture?⁹¹

The distinction between a functional and a spatial approach is not obvious. In many cases, States appeared to vacillate between the two approaches depending on the question. It appears that even if a functional approach is adopted some assumptions have to be made as to when a country is overflying another country's territory. In other words, when the U.S. Space Shuttle overflew USSR territory in 1990 and provided notification to the U.S.S.R., the United States was making an assumption about where airspace was -- it was acknowledging that the Space Shuttle was in U.S.S.R.'s airspace. Unfortunately, this author has not seen published the notification provided by the United States, so she cannot say at what altitude the United States assumed it would be overflying the U.S.S.R.'s airspace. Nonetheless, an assumption presumably was made that the Shuttle's flying at a certain level was U.S.S.R. airspace.

There does not appear to be a consensus to develop at this time a new framework for objects like the Space Shuttle, although there seems to be a legitimate concern which could be seen as easily moving into a consensus of sorts -- that interference with aircraft needs to be avoided through adoption of some type of standards and recommended practices. As objects along the lines of the future aerospace plane, it will be a question of the technical parameters of operation -- the potential of those objects to interfere with the safety of aircraft travel. To the extent that there is a greater possibility of interference that we have had with the Space Shuttle to date, then States' replies indicate that many want a new legal framework -- not just supplemental standards and recommended practices.

Although a number of spatial and functional approach supporters are advocating consideration of a new unified regime for aerospace objects which take into account their technical characteristics, no responding State suggested that the lower liability regime apply to aerospace objects while they are in air space. Indeed, Germany and some other States opined to the contrary.⁹² Nonetheless, this author believes that at the point that

⁸⁹ See Reply of Russia to Question 3, in *id.*

⁹⁰ *Id.*

⁹¹ For a discussion of these issues, see Gorove, *supra* note 34, at 101. Vladimir Kopal, *Some Considerations on the Legal Status of Aerospace Systems*, 22 J. SPACE L. 57 (1994).

⁹² See Reply of Germany to Question 4, in Questionnaire Replies I, *supra* note 8.

aerospace planes become a common occurrence, the liability regime of those planes while in airspace would likely need re-examination, perhaps within the context of establishing a new unified regime.

States do not yet believe that there is currently a customary international law right allowing for innocent passage through their airspace for ascending or descending aerospace objects.⁹³ For example, Germany stated there was insufficient state practice to determine any international customary law with respect to re-entry, pointing solely to the Buran mission as its one evidence of state practice.⁹⁴ Although the Russian Federation also stressed that the notification by the United States of overflight of the Shuttle has no precedential value, it went on to say "the transmission of this kind of information suggests the broad lines of the procedures to be followed in notifying States."⁹⁵ It also noted that "[p]rovisions of international customary law with respect to the passage of aerospace objects after re-entry into the Earth's atmosphere are currently in the process of being elaborated."⁹⁶

In conclusion, it should be mentioned that the view was expressed, during the 1998 Legal Subcommittee meeting, that consideration of legal issues relating to aerospace objects should be conducted in two stages. During the first stage, from the year 2000 to 2005, when the use of aerospace objects would not be intense, legal issues could be dealt with by existing international law. New norms such as that pertaining to innocent passage through airspace could develop or be created. During the second stage, from 2005 to 2010, when there would be intense use of aerospace objects, "a proposal to enhance the international space and air laws could be developed, based on the experience that would be accumulated by that time in solving legal issues related to aerospace objects." It was advocated that the Legal Subcommittee should request COPUOS to request its Scientific and Technical Subcommittee to examine scientific and technological aspects of aerospace objects, including their physical and functional features.⁹⁷ This suggestion did not receive a consensus.

⁹³ Scholars disagree on this issue. Andrei D. Terekhov, *Passage of Space Objects Through Foreign Airspace: International Custom?*, 25 J. SPACE L. 1 (1997) says there is no international custom at this point. Others would argue that there is custom. See Gorove, *supra* note 34; see also Stephen Gorove, "Legal and Policy Issues Raised by the U.N. Questionnaire on Aerospace Objects" (Report of the ASIL Space Law Interest Group), 24 J. SPACE L. 52-53 (1996).

⁹⁴ See Reply of Germany to Question 7, in Questionnaire Replies I, *supra* note 8.

⁹⁵ See Reply of the Russian Federation to Question 7, *id.*

⁹⁶ See Reply of the Russian Federation to Question 7, *id.* It has been said that the word "elaborated" is an imprecise translation of what was said in Russian and the better translation is "evolving." See Terekhov, *supra* note 92, at 10.

⁹⁷ See Report of the Legal Subcommittee on the Work of Its Thirty-Seventh Session to the Committee on Peaceful Uses of Outer Space, at para. 32, U.N. Doc. A/AC.105/698 (Apr. 6, 1998).

Nonetheless, it appears that the suggested approach is a rational one in light of the replies of States to the questionnaire at this juncture.⁹⁸

⁹⁸ The projected model of the Federal Aviation Administration's Office of Commercial Space Transportation put forth in *Commercial Space Transportation Concept of Operations in the National Airspace System in 2005* (Feb. 8, 1999) discussed by Stephen Gorove's comment "An International Space Flight Organization Favored by the U.S. to Become Conceivably Operational Around 2005 May Put to Rest Much of the Long-standing and Vexatious Issues of Delimitation of Airspace and Outer Space", see *infra*, is a bit too distant to provide solid ground for a rational determination at this time.