

JOURNAL

OF

SPACE

LAW

VOLUME 28, NUMBER 1

2000

JOURNAL OF SPACE LAW

A journal devoted to the legal problems arising
out of human activities in outer space

VOLUME 28

2000

NUMBER 1

EDITORIAL BOARD AND ADVISORS

BERGER, HAROLD
Philadelphia, Pennsylvania

FINCH, EDWARD R., JR.
New York, N.Y.

BÖCKSTIEGEL, KARL-HEINZ
Cologne, Germany

GALLOWAY, EILENE M.
Washington, D.C.

BOURÉLY, MICHEL G.
Paris, France

GOROVE, KATHERINE M.
Washington, D.C.

COCCA, ALDO ARMANDO
Buenos Aires, Argentina

HE, QIZHI
Beijing, China

DEMBLING, PAUL G.
Washington, D. C.

JASENTULIYANA, NANDASIRI
Vienna, Austria

DIEDERIKS-VERSCHOOR, I.H. PH
Baarn, Holland

KOPAL, VLADIMIR
Prague, Czech Republic

FASAN, ERNST
Neunkirchen, Austria

VERESHCHETIN, V.S.
Moscow, Russian Federation

STEPHEN GOROVE, Chairman
Oxford, Mississippi

All correspondence should be directed to the JOURNAL OF SPACE LAW, P.O. Box 308, University, MS 38677, USA. Tel./Fax: 662-234-2391. Vol. 28 (year 2000) subscription rates for individuals are: \$94.80 (domestic) and \$99.80 (foreign) for two issues, including postage and handling. The rates for organizations are: \$112.80 (domestic) and \$117.80 (foreign) for two issues. Single issues may be ordered for \$65 per issue. Please add \$18 for airmail.

Copyright © JOURNAL OF SPACE LAW 2000. Suggested abbreviation: J. SPACE L.

JOURNAL OF SPACE LAW

A journal devoted to the legal problems arising
out of human activities in outer space

VOLUME 28

2000

NUMBER 1

CONTENTS

In Memory of Margaret J. Gorove.....I

Articles

Policy/Legal Framework for Space Tourism Regulation.....1
Richard W. Scott, Jr.

Delimitation of Outer Space and the Aerospace Object - Where
is the Law?11
Katherine M. Gorove

Events of Interest

A. PAST EVENTS.....29

U.N. Reports

Review of the Work of Scientific and Technical Subcommittee (7-18
February 2000) of the United Nations Committee on the Peaceful
Uses of Outer Space.....29
Charles W. N. Davies

The Legal Subcommittee Considers Three New Agenda Items and Reaches an
Agreement on the Issue of the Geostationary Orbit at its Thirty-Ninth Session.. 37
Ms. Natercia Rodrigues

Other Report

Symposium on Legal Aspects of Commercialization of Space Activities... 48
Ernst Fasan

Comments

An International Space Flight Organization Envisaged 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.....	53
<i>Stephen Gorove</i>	

<i>Case Developments</i>	57
--------------------------------	----

Short Accounts

Anti-Missile Defense and the ABM Treaty.....	58
--	----

Establishment of the National Remote Sensing and Space Law Center of Excellence.....	59
---	----

Stephen Gorove

<i>Executive and Legislative Notes</i>	62
--	----

(a) <i>Enacted Space Legislation</i>	62
--	----

(b) <i>Proposed Space Legislation</i>	63
---	----

<i>International Developments</i>	65
---	----

<i>Manfred Lachs Space Law Moot Court Competition</i>	66
---	----

<i>Other Events</i>	66
---------------------------	----

<i>Brief News in Retrospect</i>	67
---------------------------------------	----

<i>B. FORTHCOMING EVENTS</i>	68
------------------------------------	----

Book Reviews/Notices

INTERNATIONAL LAW, CLASSIC AND CONTEMPORARY READINGS, edited by Charlotte Ku and Paul F. Diehl (Lynne Rienner 1998),.....	70
--	----

ANNOTATED SUPPLEMENT TO THE COMMANDER'S HANDBOOK ON THE LAW OF NAVAL OPERATIONS, edited by A.R. Thomas and James C. Duncan (U.S. Naval War College International Law Studies, vol. 73, 1999).....	71
---	----

THE CASE FOR MARS V, edited by Penelope J. Boston (Univelt 2000), THE CASE FOR MARS VI, MAKING MARS AN AFFORDABLE DESTINATION, edited by Kelly R. McMillen (Univelt 2000),.....	71
---	----

MYRES SMITH MCDUGAL, APPRECIATIONS OF AN EXTRAORDINARY MAN, edited by Cheryl A. DeFilippo <i>et al.</i> (Yale University 1999),.....	71
---	----

SEEKING NEW WORLD VISTAS - THE MILI TARIZATION OF SPACE by Roger Handberg (Praeger, Greenwood Press 2000).....	71
---	----

Recent Publications

Books.....	73
------------	----

Contributions to Books.....	73
-----------------------------	----

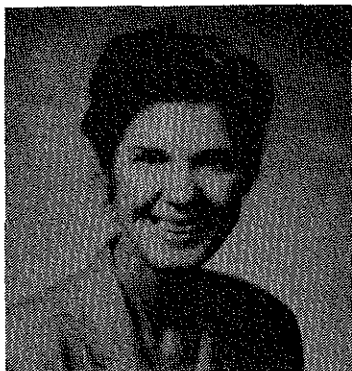
Articles.....	75
---------------	----

Reports.....	76
Comments.....	77
Short Accounts.....	77
CaseNotes/Developments.....	77
Executive and Legislative Notes.....	77
International Developments.....	78
Forthcoming Events.....	78
Book Reviews/Notices.....	78
Official Publications.....	78

Current Documents

REPORT OF THE THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE.....	87
XI. Conclusions and proposals of the Workshop on Space Law in the Twenty-first Century, organized by the IISL.....	87
XV. Conclusions and proposals of the Workshop on Space Debris.....	91
XVII. Conclusions and proposals of the Workshop on Intellectual Property Rights in Space.....	92
MANFRED LACHS SPACE LAW MOOT COURT COMPETITION 1999.....	84
Case Concerning The Mor-Toaler Sea-Launch Project (Brezonec vs. Mastodonia).....	94
Summary of Arguments in Memorial of the Applicant by Irene Aupetit and Mickael Torrado University of Paris XI. Winners of the "JOURNAL OF SPACE LAW" Award for the Best Memorial.....	97

In Memory of Margaret J. Gorove



Dr. Nandasiri Jasentuliyana expressed his and his wife's deepest sorrow and condolences to Professor Stephen Gorove "on the sad occasion of the passing away of his dear wife", Margaret J. Gorove, on May 20, 2000.

As President of the International Institute of Space Law, Dr. Jasentuliyana also expressed the condolences of the IISL and that of its Board of Directors. He added that "she has not only been a tower of strength" to Professor Gorove "but she was an ardent well wisher of the IISL."

* * *

Members of the JOURNAL OF SPACE LAW's Editorial Board and Advisers together with the Journal's staff are deeply saddened by the untimely passing of Mrs. Gorove. As a member of the International Academy of Astronautics, Mrs. Gorove was in the front row of participation in interdisciplinary inquiries and correspondence.

In recognition of her ever ready support, unfailing encouragement and the innumerable occasions and ways in which she contributed for almost three decades to the JOURNAL's operation and existence, including the inspiring artistic design of its cover, the JOURNAL OF SPACE LAW wishes to record its profound gratitude and admiration by respectfully dedicating this issue to her memory.

POLICY/LEGAL FRAMEWORK FOR SPACE TOURISM REGULATION

Richard W. Scott, Jr.*

I. INTRODUCTION

The concept of citizens being able to "tour the heavens" sometime not too far into the 21st century is one that is exciting to millions and may well entice tens of thousands to try. But whether the tourism is in an orbiting hotel, a reusable launch vehicle [RLV] or something more modest such as a ride in balloon above 100,000 feet, one thing is clear, there will be government regulation of these activities.

Why and to what extent regulation will be imposed will to a large degree depend on the policy and legal framework for such regulation and the degree and specificity of guidelines that flow from it. While marketeers and manufacturers are pursuing customers and hardware designs, a concomitant effort to ensure that Space Tourism projects do not inadvertently proceed into a regulatory box canyon is essential.

So, what do we mean by "policy/legal framework?" Basically, that there is a hierarchy of international agreements, policies, laws and regulations that control space activities of citizens. And why do we need this layering of red tape? It's because activities that involve public safety, economic activity, the environment, national security or foreign policy, all require a regulatory framework to assure operation that redounds to the public good. So where do we begin to look for this Policy/Legal Framework? An authoritative place to begin might be the 1967 Outer Space Treaty [*Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*]. For a long time it was the only governing document that covered commercial space activities. For example, when Space Services, Inc. of America decided to conduct the first commercial space launch in 1982, there were no statutes, policies, or regulations on the books anywhere. Only this Treaty, which holds that States are responsible for the activities of their own government, or non-government entities' activities. On its own, SSI undertook to contact and get clearance from all the US government agencies it thought might have concerns about a commercial launch. Agencies contacted included the State Department; North American Aerospace Defense Command; the US Navy;

* Richard W. Scott, Jr. is a Senior Associate with the National Institute for Public Policy. A retired US Air Force colonel, and former vice-president of Space Services Inc., he was Associate Director of Commercial Space Policy and International Affairs in the Office of the Secretary of Transportation.

Bureau of Alcohol, Tobacco and Firearms; the Coast Guard and a number of others. The problem was that there were no standards, guidelines or anything upon which agencies could or should base a decision. In the end, in only five months, concurrence was received and Conestoga I was launched into sub-orbit out over the Gulf of Mexico.

As is well known, that launch prompted the Reagan Administration to eventually push for legislation establishing a central regulating authority in the Department of Transportation under the 1984 Commercial Space Launch Act. Since that time the Act has been amended and recodified in Title 49, Subtitle IX of the US Code. Now, however, we are facing a new challenge. Space Tourism is uncharted territory. Let's start with the Outer Space Treaty and see what new issues present themselves when tourists want to travel or vacation in space.

II. OUTER SPACE TREATY ISSUES.

States' Responsibility. We've already discussed the basic requirement of the Treaty that States [countries rather than the 50 US states] are responsible for their non-governmental entities' [NGE's] activities in space. It is not much of a stretch to assume that both passengers and crew of Space Tourism vehicles or facilities [orbiting habitats] would be covered by the "entities" provision. But does "being responsible" mean that, if it wanted, a country could chose a *laisse-faire* approach? Apparently, anticipating possible difficulties in this area, the Treaty does specify, "The activities of nongovernmental entities in outer space. . . shall require authorization and continuing supervision by the appropriate State Party..." [Article VII]

Liability. Here the Treaty provides that States are internationally liable for damage to another State or its natural or juridical persons by objects launched into outer space. The liability goes to the launching State or State from which the launch takes place. If the State is liable, there is a natural supposition that it would hold some liability leverage over its NGE's that engage in space activities. However, here it is unclear what liability might accrue in the event an NGE space mission resulted in harm to a foreign citizen. This suggests perhaps some sort of Warsaw Convention guidelines might be needed regarding, for instance, how much monetary compensation a person might be entitled to in the event of an international space touring accident.

Jurisdiction and Control. Unlike the Law of the Sea with, depending on the State, either a 12 mile limit or a 200 mile limit for jurisdiction, the Treaty [Article VIII] states that, "A State on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, *and over any personnel* thereof, while in outer space.. ." So, would this mean that the US, for example, would retain jurisdiction and

control over all space tourists on US NGE missions, regardless of their nationality? What and who would have jurisdiction and control if an international passenger on a US Space Tourist mission committed a crime against another international tourist? In this instance, what legal sanctions would apply? National, state, both? These are policy/legal framework issues that must be addressed at some juncture in the future.

Assistance to Astronauts. This seems straightforward on the surface, yet could be one of those issues that needs consideration. Article V of the Treaty provides that States shall render to astronauts all possible assistance in the event of accident, distress or emergency landing on the territory of another State or high seas." Very straightforward; however, what is an astronaut? Webster's defines astronauts simply as, "A person trained to make rocket flights into outer space." And that definition surely fits the Space Shuttle crew today, they are highly trained and the Shuttle is launched by solid rocket motors and onboard main engines that function like rockets. The key distinction is "highly trained." Space tourists are not going to be highly trained, although there would be some brief familiarization with emergency procedures as we have on airliners today. So, although logic would lead one to the conclusion that the provisions of this Article would apply to passengers as well as "astronauts", it is a lacuna in the policy/legal framework that will need to be filled.

Cooperation and Mutual Assistance. This Article gives a State the right to seek consultation with another State if activities planned would cause harmful interference in the peaceful use of outer space. Although it seems prosaic, this is a potentially important provision for Space Tourism. When a new commercial market is being developed, many creative ways to reap economic benefit emerge, often far beyond the scope of policymakers' imaginations. It is not unreasonable to expect some visionary entrepreneur to develop a project that might impinge on the sensibilities of another sovereign State. The Treaty ensures that State to State consultation can be arranged to address any troublesome issues.

III. NATIONAL SPACE POLICY ISSUES.

The National Space Policy of 1996 contains a number of provisions designed to promote and encourage commercial space activity. However, nowhere does it address the prospect of private citizens traveling into outer space on commercial vehicles. A brief review of some of the salient points actually in the Policy might give some indication of what additions or modifications will be needed for Space Tourism.

Access to and Use of Space. The Introduction states that access to and use of space is central for [among other things] preserving commercial interests. The US will pursue greater levels of partnership and cooperation

to ensure the continued use of outer space for peaceful purposes. What could be more peaceful use than Space Tourism? When this Policy was signed in 1996, no one contemplated Space Tourism. But, by the time that technology and the market have advanced sufficiently for Space Tourism missions to become reality, the National Space Policy of that era will need to include specific reference to the issue.

Goals of the US Space Program. Apart from the military and scientific aspects, current policy includes enhancing economic competitiveness, encouraging private sector investment in use of space technology and promoting international cooperation. These are all grand, broad-brush statements, but when hundreds, or even thousands of citizens are clamoring for a ride to the heavens, the topic will be important enough to mention specifically.

Regulation of Commercial Space Activities. Here the Policy has a reasonable approach. Regulation shall be supervised or regulated only to the extent required by law, national security, international obligations and public safety. With Space Tourism there will be two dimensions that have not yet been specifically addressed: safety of tourists, and economic activity of the carriers providing the touring services. The reasons for these omissions go back to the previously mentioned fact that this Policy did not contemplate private citizens traveling in space for pleasure. Also, the Policy calls for the government to identify and propose appropriate amendments to or elimination of US laws and regulations that unnecessarily impede space sector activities. This is an important provision that should remain. Whereas, since the lives and safety of ordinary people are going to be involved in these missions, there will be a natural inclination to impose a regulatory regime to preserve their safety to the utmost possible. However, it is important that, while assuring safety to a reasonable, but not absolute degree [as with aviation], regulations should not become so onerous and burdensome that a budding industry is smothered before it has a chance to flower. And if a very conservative regulatory regime is later recognized as being unnecessarily burdensome, it is incumbent upon government agencies to propose amendments to or elimination of regulations and laws that unnecessarily impede space sector activities.

US Government Fosters International Competitiveness. While recognizing that the Government will not directly subsidize US Space Tourism, there are things it can do to foster competitiveness. When new facilities or launch vehicles are being developed by the government, there often will be commercial considerations that, if factored into government decisions, can materially benefit the Space Tourism industry.

IV. LEGISLATIVE ISSUES AFFECTING SPACE TOURISM.

Treaties and National Space Policies set the general direction for allowing space activities and establishing appropriate general constraints to preserve public safety and well being. However, the actual regulation of citizen's activities comes from statutory authority given to a responsible government agency. Unlike 1982, when SSI was launching the Conestoga rocket, today there is a designated responsible agency, and it has authorizing legislation. Title 49, Subtitle IX of the US Code provides the Secretary of Transportation [DOT] and his executive agent, the Administrator of the Federal Aviation Administration [FAA], with authority and responsibility to support and regulate commercial space launch activity. Space Tourism will be a subset of launch activity, and it is difficult to imagine that any agency but DOT/FAA will have the mandate to oversee it.

Looking broadly at the current legislation, not surprisingly, there are a number of provisions that reflect the concepts and ideas set forth in the National Space Policy that will easily apply to Space Tourism. However, since commercial space transportation presently does not involve launching humans into space, some new provisions will be required to implement provisions of the Policy.

Some of the issues and concepts that Congress had in mind when it enacted the legislation can briefly be summarized.

Peaceful uses of outer space are beneficial. Those uses and the private application of technology have achieved economic benefit.

New technologies and services are being developed for traditional space activities. However, the specific inclusion of commercial activities involving humans in space, to include Space Tourism, is needed. It is reasonable that the primary focus of new legal language should be "commercial activities involving humans," of which Space Tourism is a major, but not exclusive element. By the time that Space Tourism missions begin, there may already be commercial activity in space, perhaps in the International Space Station.

New launch vehicles and services will enable the US to retain its international competitive position. Space Tourism would certainly fall under the "new services" category and needs mentioning.

The US should encourage private sector launches and associated services [Space Tourism] and only regulate them to insure compliance with international agreements and preserve public health and safety. This virtually mirrors the National Space Policy.

Space transportation is an important element of the national transportation system. Certainly the RLVs that will be used for Space Tourism will be a very important element, and will open the interior of the

US to space activity and opportunities in ways that were not possible with the use of expendable launch vehicles [ELV's]

State governments have the ability to encourage and support private sector space activities. Space Tourism will be another such activity.

What authority has Congress given the Secretary of Transportation specifically? Basically, to encourage, facilitate and promote commercial space launches. He is to take actions to facilitate private sector involvement in commercial space activity and promote public-private partnerships with the US Government, state governments, and the private sector to build, modernize and expand or operate a space launch infrastructure. Regulatory authority stems from the legal requirement for any US citizen or anyone in the United States or its territory desiring to conduct a commercial launch or operate a launch site to obtain a license. US citizens can conduct launches or operate launch sites outside the US if an agreement has been reached with the foreign government that it has jurisdiction over such activities. Space Tourism missions will have to have launch licenses. Another requirement is that payloads must comply with US laws. This is a new area with potential Space Tourism implications that will also have to be addressed [i.e. items, (payload) that passengers would be prohibited from bringing aboard].

An important authority is the ability to stop any launch if it appears unsafe. With commercial human space travel, and particularly Space Tourism, safety will be paramount. Man-rated missions will come under critical scrutiny, as the safety requirements will be much higher. A 95% launch success rate is not nearly enough for operations involving humans.

V. REGULATORY ISSUES.

The final level of the policy framework encompasses the actual regulations themselves and the issues they must address. The Treaty laid certain responsibilities on the nation, the Policy outlined goals, the Statute specified responsibilities and authority. But for all this to be meaningful there must be specific regulations. And, deriving from the Statute, these regulations will have to address all the important issues and concerns involved with transporting humans into outer space for pleasure. So, what are some of those issues?

Passenger safety will be the primary issue. No matter what the mode of Space Tourism, reusable launch vehicle, balloon, or aircraft, safety of the passenger will be the paramount regulatory issue that the industry must address. People are allowed to take virtually unlimited risks on their own. But a commercial entity that carries passengers must demonstrate some threshold level of assurance that the people who pay for the trip have a reasonable chance of completing it safely. For Space Tourism we have

several areas of safety to consider. First is safety of passengers, second crew and lastly third parties.

Safety of passengers will rest on three immediate considerations: reliability of the RLV; training and skill of the flight and ground crews; and, adequacy of the launch and landing sites. In addition, although there is no analogous requirement for airline flight, there may also be some minimum physical and psychological requirements for passengers. Even as tourists, passengers may be subject to stresses that they have never experienced before. Space travel is unlike any previous form of tourism. If passengers were denied tickets on the basis of not meeting some physical/psychological standard for space flight, there might even be lawsuits under, say, the Americans With Disabilities Act. Some disabilities might be manageable on a Space Tourism mission, others might not. Another issue could be whether children would be allowed on Space Tourism missions, and if so, would there be a minimum age? Would a passenger who could otherwise afford it be allowed to bring a pet on board? These are issues that the airlines have had to deal with, and it's quite possible that Space Tourism missions could involve the same kinds of concerns. In any event, the regulatory process by which the determination is made regarding physical/psychological requirements for crew and passengers will undoubtedly entail a great deal of effort. Nevertheless, this is an area where it will be important to get the right balance between a regulatory regime that protects passengers and crew and yet is not so burdensome that the missions become economically infeasible. And, operating guidelines will have to ensure a reasonable degree of safety for uninvolved third parties, as is the case with the airline industry today. These missions will be flying over populated areas; perhaps even using major airports as launch and landing sites. Third parties will be at some potential risk.

Certification Issues. All common carriers have to meet certain standards of safety before they are certified to carry commercial passengers. Airliners are the most obvious example, and there are rigorous standards that all new aircraft designs have to meet before they can be sold to airlines for passenger service. The same thing will be true of RLV's that will carry tourists. There are already some regulations in place for commercial balloon operations; although, it is not apparent whether these cover commercial operations at extremely high altitudes with outer space-like environment. In any event, a host of issues arises when one contemplates government certification of an RLV for commercial passenger service. Since the FAA regulates commercial space launches, it is not unreasonable that their mandate would likely be expanded to certify launch vehicles as well as license launch operations and sites.

Certification of the Launch Vehicle. In this arena, a number of immediate questions arise. How many flights of an RLV would be required

to certify its spaceworthiness? Who would develop the methodologies for analyzing safety and engineering issues? The FAA? The manufacturer? Expendable launch vehicles always have a destructive flight termination system [FTS]. Obviously, a non-destructive FTS would be needed for an RLV. What kinds of these non-destructive systems could be devised? What sort of Safety System Process would be needed to define the safe operating envelope of the RLV? Recognizing that no transportation system is 100% safe, some acceptance of potential accident is necessary. How safe would an RLV Space Tourism mission have to be? How remote would the likelihood of death or injury have to be? One in a million missions; one in 10 million? What would be an acceptable level of casualties per million flights? And, how would it be possible to determine when an RLV system had reached the acceptable level of safety and reliability?

Launch Sites. Launch site selection and operation will depend on a complex mix of technological, economic, environmental and legal factors. RLV's are more efficient at high altitude launch sites because every foot above sea level is a foot that the RLV engines do not have to travel to get into space. The same vehicle could transport a greater load into orbit from Denver than Cape Canaveral because it had a vertical mile less to go. Depending on the launch technology, operating from a major airport may be possible, but deconflicting it with airline traffic would be required. An assessment of the environmental impact of operating at a major airport may or may not be favorable for RLV operations. Special launch/recovery sites at more remote locations may be necessary. Economically, the sense of adventure for a Space Tourist might be greater at a remote "spaceport" than at a major airport. And there could be greater operating fees at a major airport than out on the [space] range. State and local tax laws and other restrictions may also affect where a Space Tourism company decides to operate. These are normal market forces that will accommodate the policy framework in a manner that is best for themselves.

Environmental Impact. All human activity has real or potential effect on the environment. The Outer Space Treaty reflects some environmental concerns. States should avoid bringing harmful contamination back from outer space that might adversely affect the environment. However, launch and landing activities will be subject to Environmental Law, as is already the case with ELV launches and site operations. As the scope and details of proposed Space Tourism projects emerge, it will be incumbent upon the operators to consult with the FAA and other government offices to make certain that environmental concerns have been satisfied. Indeed, satisfactory environmental impact studies will most certainly be a *sine qua non* for obtaining a launch license. And, apart from any government objections, projects can also be thwarted in the courts by other concerned citizens who may not appreciate the benefits of Space Tourism operations.

International Considerations. The Outer Space Treaty covers many salient aspects of activity, but there are others not contemplated by the Treaty authors that affect Space Tourism. For example, if a Space Tourism firm were offering a landing in a different country than the launch, would there be customs and immigrations issues to be worked out? That is, would passengers need passports? Would their belongings be subject to customs duties at the destination? Again, these are new kinds of issues that always emerge when a new industry is born.

How Much Liability? As the commercial launch industry was developing, a major hurdle was the potential for exposure to third party liability. The favorite scenario was a failed rocket launch that fell from Cape Canaveral back into the Miami Convention Center where the American Bar Association was holding its annual meeting. Thus, Title 49 contained a valuable liability safety net that industry regarded as indispensable for operations in its early days. As is generally known, the FAA Commercial Space Transportation Office after analyzing the license application, determines the amount of third party liability a company must secure in order to obtain a launch license. Once the insurance coverage is obtained, if there were a catastrophic accident and third party liability exceeded the insurance coverage specified in the license, the government, subject to appropriation, would provide indemnity up to \$1.5 billion above the insurance level specified in the license. There has never been a catastrophic failure requiring significant third party liability claims to be paid. So, an important question is whether the Space Tourism industry will feel the need for similar indemnification protection before it can undertake operations. The potential for liability would seem perhaps higher, given that passengers will be involved. The Outer Space Treaty specifies that States are liable for the space activities of their entities, so some legislation covering the possibility of an accident on foreign territory would seem to be required. A separate convention on Space Tourism liability may need to be convened, the Warsaw Convention might be amended to cover space tourism, or some other international agreement may be reached on liability in the event a passenger were killed or injured on a mission. Perhaps an amendment to Title 49 would suffice. However, the issue of liability for accidents in the United States will likely be the subject of great debate in the Administration and the Congress.

VI. SUMMARY.

While most of the attention and effort will be focused on the traditional issues of technology, product development, market research and financial backing, for Space Tourism to be successful there must be an adequate policy/legal framework within which these activities can take place and succeed. Beginning with our international obligations under the

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 overflew another state. State practice in these cases is noteworthy. The former U.S.S.R.'s Buran during its one flight in 1988 overflew countries without providing any notice.⁸ The U.S. Space Shuttle Atlantis in 1990 overflew 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.dfr.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 Kazakhstan 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 Kazakhstan, 28 March 1994, on the Main Principles and Conditions for Utilization of the Baikonur Launch Site. Reply of Kazakhstan 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 Kazakhstan stated the "law applicable to the type of space in which the aerospace object is located should prevail."³¹ Kazakhstan 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, Kazakhstan, 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 Kazakhstan to Question 4, in Questionnaire Replies II, *supra* note 10. Kazakhstan 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.P.H. 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, Kazakhstan 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 to 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.

EVENTS OF INTEREST

A. PAST EVENTS

U.N. REPORTS

I.

Review of the Work of Scientific and Technical Subcommittee (7-18 February 2000) of the United Nations Committee on the Peaceful Uses of Outer Space

Charles W. N. Davies¹

I. Introduction

The thirty-seventh session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space (COPUOS) was held from 7 to 18 February at the United Nations Office at Vienna. Forty-eight Member States, 12 non-Member States, four organizations in the United Nations system and seven other international organizations attended the session.

This was the first meeting of a COPUOS body after the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), which was held at the United Nations Office in Vienna from 19 to 30 July, 1999. It was also the first meeting under the new agenda structure agreed upon by COPUOS in 1999.²

Under the new agenda structure, a number of items, formerly used mostly for information exchange, were combined into the single agenda item entitled "General exchange of views and introduction to reports on national activities". The meeting also discussed the United Nations Programme on Space Applications and the coordination of space activities within the

¹ Associate Political Affairs Officer, United Nations Office for Outer Space Affairs. This summary is the personal work of the author and does not reflect the views of the United Nations.

² *Official Records of the General Assembly, Fifty-fourth Session, Supplement No. 20 (A/54/20), annex I, sect. A.*

United Nations system after UNISPACE III. The Subcommittee's work on the use of nuclear power sources, which had been suspended for the year of UNISPACE III, continued, and the Subcommittee began a four-year work plan on this issue. The Subcommittee considered a number of single issues/items for discussion including space debris (on a priority basis), presentations on new launch systems and ventures, international cooperation in human spaceflight, and the geostationary orbit.³ Finally, the session identified new work plans and single issues/items for discussion at its next session, in 2001.

The meeting was very active, especially with respect to discussion of UNISPACE III. In the Working Group of the Whole, established to consider the future work of the Subcommittee in light of the recommendations of UNISPACE III, Member States agreed upon a number of new agenda items for next year, as well as possible new agenda items for 2002. The Subcommittee also made significant progress on the issue of the use of nuclear power sources in outer space. The report of the session has been issued as document number A/AC.105/736.

II. Symposia and Technical Presentations

Two symposia were held during this session of the Subcommittee. The Committee on Space Research (COSPAR) and the International Astronautical Federation (IAF) organized a symposium on "Space Commercialization: An Era of New Opportunities and Challenges". Speakers at the symposium included government and corporate representatives, research professionals, and journalists. In addition, the first of an annual industry symposium, originating from a recommendation of UNISPACE III,⁴ was

³ The full title for this agenda item is "Examination of the physical nature and technical attributes of the geostationary orbit and of its utilization and applications, including, *inter alia*, in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries".

⁴ Report of UNISPACE III, A/CONF.184/6, Chapter II, para. 409(a). The full text of the recommendation states:

The role of the United Nations in promoting international cooperation in the peaceful uses of outer space could further be enhanced by the following actions:

(a) Enrichment of the work of the Scientific and Technical Subcommittee, in accordance with the new approach to the agenda agreed upon by the Committee on the Peaceful Uses of Outer Space at its forty-second session, in 1999, through, *inter alia*, strengthening the partnership with industry by organizing during its annual session a one-day industry symposium to

organized. The theme for this year was "Interactive Multimedia Satellite Services: Implications for the Twenty-first Century".

Many technical presentations were made under various agenda items, including the items on space debris, the use of nuclear power sources in outer space, remote sensing of the Earth by satellites, international cooperation in human spaceflight, and the item entitled "Presentations on new launch systems and ventures".

III. The Use of Nuclear Power Sources in Outer Space

The Subcommittee resumed its work on the use of nuclear power sources in outer space after the year of UNISPACE III, in which the Subcommittee's agenda was shortened and the item on nuclear power sources suspended.

The Principles Relevant to the Use of Nuclear Power Sources In Outer Space were adopted by the General Assembly in 1992.⁵ In accordance with Principle 11,⁶ the Legal Subcommittee of COPUOS has been considering an agenda item entitled "Review and possible revision of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space" since the Principles were adopted. Each year, the Legal Subcommittee has agreed that the Principles would remain valid for the time being and that the Scientific and Technical Subcommittee should consider the need for revision in light of changing technology before the Legal Subcommittee or COPUOS undertake any actual revision.⁷ Towards this, the Scientific and Technical Subcommittee this year started a four-year work plan to develop a framework for safety assurance processes and standards for nuclear

provide Member States with updated information on commercially available products and services and on ongoing activities of space-related industries and to offer opportunities to managers from space-related industries to express concerns and to make suggestions preferably aimed at promoting, in particular, the interests of developing countries;

Id.

⁵ General Assembly Resolution 47/68.

⁶ "These Principles shall be reopened for revision by the Committee on the Peaceful Uses of Outer Space no later than two years after their adoption'. Id., Principle 11.

⁷ See, e.g., Report of the Committee of the Peaceful Uses of Outer Space on the work of its fortieth session, *General Assembly Official Records, Fifty-second Session, Supplement No. 20 (A/52/20)*, para. 109.

power sources in outer space.⁸ The topic for the first year was "Identification of terrestrial processes and technical standards that may be relevant to nuclear power sources, including factors distinguishing nuclear power sources in outer space from terrestrial nuclear applications". The task for the first year of the work plan was modest, with experts from Member States identifying documents and processes relevant to the four-year work plan that can be studied in greater depth in subsequent years. The Subcommittee reconvened the Working Group on the Use of Nuclear Power Sources in Outer Space.

Terrestrial processes

The Working Group identified three classes of terrestrial (including marine) processes that might have relevance to nuclear power sources in outer space: a) nuclear reactors⁹ (stationary and mobile); b) packaging and transport of radioactive materials; and c) use of radioactive sources¹⁰ in terrestrial applications.

Technical standards

The Working Group also identified international technical standards that might be relevant to the safety of nuclear power sources in outer space. These documents include relevant Safety Series publications of the International Atomic Energy Agency (IAEA) and conventions such as the Convention on Nuclear Safety. The IAEA participated in this session of the Subcommittee and offered to conduct a preliminary review of the documents listed by the Working Group for the second year of the work plan, "Review of national and international processes, proposals and standards and national working papers relevant to the launch and peaceful use of nuclear power sources in outer space".

⁸ See Report of the Scientific and Technical Subcommittee on the Work of its Thirty-fifth Session, A/AC.105/697 (25 Feb. 1998), para. 80.

⁹ Nuclear reactors are a specific type of large nuclear power source found, for instance, in nuclear power plants.

¹⁰ "Radioactive sources" is a general term, referring to sources, for instance, in X-ray machines or geiger counters. Radioactive sources are widely used in space for heating instruments during deep space missions (far from the Sun where solar power may be insufficient) or for meeting other modest energy demands.

Factors distinguishing nuclear power sources in outer space from terrestrial nuclear applications

Referring to the variety of applications for nuclear power sources both on the Earth's surface and in outer space, the Working Group agreed that the differences and similarities between terrestrial nuclear power sources and nuclear power sources in outer space depended on the specific application in each case. The Working Group nevertheless identified nine aspects of a nuclear power source that could be examined to compare or distinguish various types. Among the nine aspects are: "quantity of radioactive material"; "frequency and duration of use"; "complexity and designed reliability of systems"; and "end of service".

IV. Space Debris

Discussions on space debris this year concentrated on a review of recommendations of the Inter-Agency Space Debris Coordination Committee (IADC) and standards of the International Telecommunication Union (ITU) for the disposal of satellites in geosynchronous orbit at the end of their useful life. There is special international concern about disposal of satellites in geosynchronous orbit, for at least three reasons. First, the geosynchronous orbit is heavily used, especially for telecommunications services, so debris may create a greater risk to spacecraft in this area. Second, there is no natural mechanism removing satellites from geosynchronous orbit.¹¹ Third, the population of space debris less than one meter in diameter near the geostationary orbit is not well known.¹² After hearing technical presentations on this subject, the Subcommittee reached two conclusions. First, it concluded that the IADC recommendations and ITU standards have been adopted recently and are not mandatory. Second, it concluded that most satellite operators are aware of the seriousness of the space debris situation around the geostationary orbit and the wisdom of debris mitigation measures, but that even self-imposed guidelines are not being followed in some cases, for technical and managerial reasons.

¹¹ Close to the Earth, air friction on satellites is significant and causes satellite orbits to "decay", or move closer to the Earth. Satellites in low-Earth orbit (LEO) may reenter the Earth's atmosphere in a matter of years or decades. Satellites in geosynchronous orbit, however, are located a large distance, roughly 42,000 km., from the center of the Earth, at which distance friction from the atmosphere is minimal.

¹² Technical Report on Space Debris, A/AC.105/720 (United Nations: New York, 1999), para. 88.

Following the successful adoption of the "Technical Report on Space Debris" in last year's session of the Subcommittee, Member States discussed future directions for the Subcommittee and for COPUOS regarding space debris. France submitted a working paper on behalf of sixteen countries, including a number of European countries, Canada, Morocco, India, Pakistan and Indonesia. The working paper proposed that COPUOS ask the Legal Subcommittee to give its views on the Technical Report on Space Debris and on the applications of current outer space treaties to space debris. Other delegations considered it premature for the Legal Subcommittee to start discussing legal issues relevant to space debris.

Germany, Japan and the United States all introduced working papers proposing future work related to space debris in the Scientific and Technical Subcommittee. Based on these working papers, the Subcommittee agreed upon two topics for discussion next year. The first is the question of the costs and benefits of space debris mitigation measures. Under this subject, States could report on 1) the costs of various debris mitigation measures, 2) the consequences of taking no debris mitigation measures, and 3) an analysis of costs and benefits in various debris mitigation scenarios. The second is an examination of the passivation¹³ and limitation of mission-related space debris for launch vehicles.

V. Geostationary Orbit

The Czech Republic submitted a working paper proposing that the Subcommittee agree that geostationary orbit "is an integral part of outer space". According to the working paper, this principle would follow from two principles agreed upon by COPUOS in 1998.¹⁴ Other delegations stated that they would require additional time to consider the proposal contained in the working paper and that the Subcommittee should continue to consider the geostationary orbit until a consensus is reached. In addition, one delegation was of the opinion that various aspects of the

¹³ Passivation is the process of making an object less reactive or harmful. Examples could include ejecting fuel from a fuel tank or discharging chemical batteries.

¹⁴ These two principles were that: 1) The existence of orbits of all satellites, including geostationary satellites, depended mainly on gravitational phenomena generated by the entire body of the Earth; and 2) A geostationary satellite, whether acted upon by natural forces only or by man-made impulses, was not fixed over a point on the Earth's equator: between corrective impulses of its station-keeping, it was in a natural flight caused by gravitational as well as non-gravitational forces generated by the Earth, the Sun and the Moon. *Official Records of the General Assembly, Fifty-third Session, Supplement No. 20 (A/53/20)*, para. 107.

geostationary orbit are unique to it, including aspects related to space mechanics, ground stations, and launching, positioning and retirement from service of geostationary satellites.

VI. Implementation of the Recommendations of UNISPACE III

The Working Group of the Whole met under two agenda items, that on the "United Nations Programme on Space Applications and the Coordination of Space Activities within the United Nations system following UNISPACE III" and that on the "Draft provisional agenda for the thirty-eighth session of the Scientific and Technical Subcommittee", to consider the future work of the Subcommittee in light of the recommendations of UNISPACE III. The report of the Working Group of the Whole was endorsed by the Subcommittee.

The Working Group agreed upon a draft agenda for the next session of the Subcommittee, in 2001. In addition to continuing work on the use of nuclear power sources in outer space, according to the second year of the four-year work plan,¹⁵ there was consensus on starting two new work plans. One is entitled "Implementation of an integrated, space-based global natural disaster management system". The three-year work plan would start by reviewing types of natural disasters and space technologies useful for their management, and would culminate in a review of possible global operational structures to handle natural disaster management, making maximum use of space systems.

The second new work plan is entitled "Means and mechanisms for strengthening inter-agency cooperation and increasing the use of space applications and services within the United Nations system and among United Nations specialized agencies and bodies". Under this work plan, the Subcommittee would review the existing uses of space technology within the United Nations system, identify barriers to the greater use of space applications and services, and make specific proposals to strengthen inter-agency coordination and promote the use of space technology in the United Nations system.

With respect to single issues/items for discussion, the Working Group agreed that the Subcommittee should continue its work on space debris.¹⁶ In addition, the Subcommittee agreed on a new single issue/item for discussion, entitled "Government and private activities to promote education in space science and engineering". The Working Group also noted three other proposals, for which there was no space on the agenda for 2001, and agreed that these proposals should be considered for possible

¹⁵ See, *supra*, Section III.

¹⁶ See, *supra*, Section IV.

inclusion on the agenda for the thirty-ninth session of the Subcommittee, in 2002.

Towards promoting the participation of youth in space activities, the Subcommittee recommended that the Youth Advisory Council (YAC) be granted observer status in COPUOS. Establishment of a youth advisory council for COPUOS, to enable young people to take an active role in the promotion and development of space, was a recommendation of the Space Generation Forum, a meeting of university students and young professionals at UNISPACE III.¹⁷ The YAC is modeled on an organization of the same name that participates in the work of the United Nations Environment Programme (UNEP). Two representatives from the YAC made a presentation to this session of the Subcommittee on the organization and structure of the Council.

¹⁷ Report of UNISPACE III, A/CONF.184/6, Annex II, para. 9.

II

THE LEGAL SUBCOMMITTEE CONSIDERS THREE NEW AGENDA
ITEMS AND REACHES AN AGREEMENT ON THE ISSUE OF THE
GEOSTATIONARY ORBIT AT ITS THIRTY-NINTH SESSION

*Ms. Natercia Rodrigues**

I. Introduction

The thirty-ninth session of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space (COPUOS) was held in Vienna, Austria, from 27 March to 6 April 2000, under the Chairmanship of Vladimir Kopal (Czech Republic).¹ At this session the Subcommittee was introduced to the new agenda structure, agreed upon at the forty-second session of the Committee on the Peaceful Uses of Outer Space in 1999². In addition to the new structure the Subcommittee also considered three new agenda items, namely, "Status of the international treaties governing the uses of outer space", "Information on the activities of international organizations relating to space law" and "Review of the concept of the "launching State".

The session was attended by 45 of the 61 member States³ of the Committee on the Peaceful Uses of Outer Space. Representatives from 8

* BLC., LLB., Associate Political Affairs Officer, United Nations Office for Outer Space Affairs. The views expressed in this paper are the author's personal views and do not reflect the position of the United Nations Office for Outer Space Affairs.

¹ See UN Document A/AC.105/738 for the Report of the Legal Subcommittee on its thirty-ninth session.

² *Official Records of the General Assembly, Fifty-fourth Session, Supplement No. 20* and corrigendum (A/54/20 and Corr.1), paragraph 125 and Annex I.

³ Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Cuba, the Czech Republic, Ecuador, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, Kazakhstan, Kenya, Lebanon, Mexico, Morocco, the Netherlands, Nigeria, Philippines, Poland, Portugal, the Republic of Korea, Romania, the Russian Federation, South Africa, Spain, Sweden, Turkey, Ukraine, the United Kingdom of Great Britain and northern Ireland, the United States of America and Uruguay.

non-member States⁴, as well as 6 intergovernmental and non-governmental organizations and specialized agencies⁵ attended the session as observers.

In accordance with the General Assembly resolution 54/67⁶, the Working Group on agenda item 6 "Matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of the International Telecommunication Union" was re-established under the Chairmanship of Héctor Raúl Pelaez (Argentina), the Working Group on agenda item 7 "Review and possible revision of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space" was suspended and a Working Group on agenda item 9 "Review of the concept of the "launching State" was established under the Chairmanship of Kai-Uwe Schrogl (Germany).

II. Discussion of the substantive items on the Legal Subcommittee's agenda

*a) Agenda Item 4 "Status of the international treaties governing the uses of outer space"*⁷

Agenda item 4 was one of the two new regular items on the agenda of the Legal Subcommittee at this session. This agenda item provided the Subcommittee with the opportunity to make reports on any additional signature or ratification as well as on application of the outer space treaties.

An update on the current status of signatures and ratifications of the five international treaties governing the use of outer space, was also

⁴ Bolivia, Costa Rica, Guatemala, Panama, Peru, Saudi Arabia, Slovakia and Sri Lanka.

⁵ United Nations Educational, Scientific and Cultural Organization (UNESCO), International Telecommunication Union (ITU), European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), European Space Agency (ESA), International Astronautical Federation (IAF) and International Mobile Satellite Organization (IMSO).

⁶ 6 December 1999.

⁷ UN Document A/AC.105/738, paragraphs 19-26.

provided to the Subcommittee.⁸ This information was included in an insert to the booklet entitled "United Nations Treaties and Principles on Outer Space: a Commemorative Edition"⁹ which was produced and distributed by the Secretariat to the Subcommittee.

Some member States also reported on the current status of action being undertaken concerning the accession and the practical application of the treaties and also provided recent examples of notifications in accordance with the provisions of the treaties.

b) Agenda item 5 "Information on the activities of international organizations relating to space law"¹⁰

Agenda item 5 was the second new regular item on the agenda of the Subcommittee. On the invitation of the secretariat, nine United Nations system and international organizations submitted written reports and/or made statements to the Subcommittee on their activities relating to space law.¹¹ The written reports were compiled by the Secretariat and circulated to the Subcommittee in two conference room papers.¹²

The Subcommittee welcomed these reports and agreed that international organizations should again be invited to report on their

⁸ With the accessions of Indonesia and Liechtenstein and the succession of Saint Vincent and the Grenadines, the number of ratifications and signatures of United Nations Treaties governing outer space increased as follows: the Outer Space Treaty has been ratified by 96 States and signed by another 27 States; the Rescue Agreement has been ratified by 87 States parties and signed by 26 other States; the Liability Convention has been ratified by 81 States and signed by 26 other States; the Registration Convention has been ratified by 42 States and signed by 4 other States and the Moon Agreement has been ratified by 9 States and has been signed by 5 other States.

⁹ UN Document A/AC.105/722 and Add.1.

¹⁰ UN Document A/AC.105/738, paragraphs 27-35.

¹¹ The International Telecommunication Union (ITU), World Intellectual Property Organization (WIPO), European Centre for Space Law (ECSL), European Space Agency (ESA), International Institute for Space Law (IISL), International Mobile Satellite Organization (IMSO), International Law Association (ILA), European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and International Institute for the Unification of Private Law (UNIDROIT).

¹² UN Documents A/AC.105/C.2/2000/CRP.4 and CRP.10.

activities relating to space law. Some member States also reported on activities related to the development of space law which would take place in their countries during the year.

c) *Agenda item 6 "Matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of the International Telecommunication Union"*¹³

Agenda item 6 was considered by the Subcommittee as a regular item. As in previous years, two issues were discussed under this agenda item, namely the question of the definition and delimitation of outer space and the question of the character and utilization of the geostationary orbit. Both issues were before the Plenary and the Working Group for consideration.

As regards the definition and delimitation of outer space, the Subcommittee's interest was revitalized with some member States expressing the need to renew discussions on this issue, in particular with reference to aerospace objects and the document entitled "Questionnaire on Possible Legal Issues with regard to Aerospace Objects: Replies from member States"¹⁴ which contained replies from member States to the questions elaborated by the Subcommittee. Although some member States reiterated the view that there was no need for a definition and delimitation of outer space because no problems had as yet been experienced due to the of lack of a definition and delimitation of outer space, others felt that such a definition and delimitation was needed and that Subcommittee should continue to actively discuss the issue. The discussions relating to the definition and delimitation of outer space took place primarily in the plenary sessions, with the Working Group only touching briefly upon it.

The second question, namely, the character and utilization of outer space was extensively discussed not only during the Plenary and Working

¹³ UN Document A/AC.105/738, paragraphs 36-49, Annexes I and III.

¹⁴ UN Document A/AC.635 and Add. 1-5.

Group meetings but also in informal discussions amongst delegations. In response to a request by the Subcommittee at its last session, in 1999, the secretariat updated, with the assistance of the ITU, the document entitled "An analysis of the compatibility of the approach contained in the working paper entitled 'Some considerations concerning the utilization of the geostationary orbit' with the existing regulatory procedures of the International Telecommunication Union"¹⁵ and a compilation of documents relating to the geostationary orbit.¹⁶ In addition to these documents the Subcommittee also had before it a working paper tabled by the delegation of Colombia at the thirty-fifth session of the Subcommittee entitled "Some consideration concerning the utilization of the geostationary satellite orbit".¹⁷

In the Working Group, the delegation of France circulated a non-paper which was intended to assist member States in reaching consensus on an issue which had been the concern of the Legal Subcommittee for many years. As result of discussions amongst delegations, France with the support of a number of countries¹⁸ submitted a conference room paper to the Working Group for consideration. Following discussions in the Working Group and a short session of informal consultations among delegations, the Working Group amended the text and was able to achieve consensus. The consensus text was presented to the Subcommittee in a conference room paper for consideration. The Subcommittee discussed the paper, made a minor change to the language and adopted the

¹⁵ UN Document A/AC.105/C.2/L.205. The updated document is referenced A/AC.105/C.2/L.205/Rev.1.

¹⁶ The original compilation of documents can be found in UN Document A/AC.105/C.2/1997/CRP.3/Rev.1. The compilation was updated and is contained in document A/AC.105/C.2/2000/CRP.3/Rev.1.

¹⁷ UN Document A/AC.105/C.2/L.200 and Corr.1.

¹⁸ The paper was supported by Austria, Belgium, the Czech Republic, Germany, Greece, Hungary, Italy, the Netherlands, Portugal, Romania, Spain and Sweden. Subsequently the delegation of Colombia joined in sponsoring the paper.

recommendations contained in Annex III of the Report of the Legal Subcommittee at its thirty-ninth session.¹⁹

Apart from the recommendations made in respect of the use of the rational and equitable use of the geostationary orbit, which the Subcommittee agreed should be made available to the ITU,²⁰ the Subcommittee agreed that agenda item 6 would continue to remain on the agenda of the Legal Subcommittee for discussion, but that the Working Group would in the future not discuss the equitable use of the geostationary orbit. This decision could be re-examined in due course, in accordance with the Subcommittee's normal procedure, if further developments warranted.

*d) Agenda item 7 "Review and possible revision of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space"*²¹

Agenda item 7 was the only item considered by the Subcommittee this year as a single issue/discussion item. In accordance with its recommendation in 1999, the Subcommittee did not reconvene the Working Group.

Although the Subcommittee did not debate this item extensively, member States welcomed the work which was being done by the Scientific and Technical Subcommittee. The Subcommittee also agreed this item should continue to be included on the agenda in order for the Subcommittee to follow the work being done by the Scientific and Technical Subcommittee.

*e) Agenda item 8 "Review of the status of the five international legal instruments governing outer space"*²²

Agenda item 8 was one of two items discussed by the Legal Subcommittee under work plans. In accordance with the work plan²³

¹⁹ UN Document A/AC.105/738.

²⁰ See paragraph 8 of Annex III of the Report.

²¹ UN Document A/AC.105/738, paragraphs 50-57.

²² UN Document A/AC.105/738, paragraphs 58-76.

²³ UN Document A/AC.105/674 Annex II Section B, pages 22-23.

agreed in 1997, the Subcommittee concluded its discussion of this item at this year's session. The Subcommittee endorsed the following recommendations on measures to be adopted in order to achieve the fullest adherence to the five international instruments governing outer space, which were agreed upon by the Working Group in 1999:

a) States that have not yet become parties to the five international treaties governing outer space should be invited to consider ratifying or acceding to those treaties in order to achieve the widest applicability of the principles and to enhance the effectiveness of international space law;

b) States should be invited to consider making a declaration in accordance with operative paragraph 3 of General Assembly resolution 2777 (XXVI), binding themselves on a reciprocal basis to the decisions of the Claims Commission established in the event of a dispute in terms of the provisions of the Convention on International Liability for Damage Caused by Space Objects; and

c) the issue of the strict compliance by States with the provisions of the international legal instruments governing outer space to which they were currently parties should be examined further with a view to identifying measures to encourage full compliance, taking into account the interrelated nature of the principles and rules governing outer space.

Following a discussion on the future of this item, the Subcommittee agreed that further consideration of issues relating to the five international legal instruments could in future be discussed under agenda item 4.

f) Agenda item 9 "Review of the concept of the "launching State"²⁴

Agenda item 9 was the second item to be considered under work plans and third new item to be considered at this session of the

²⁴ UN Document A/AC.105/738, paragraphs 77-90 and Annex II.

Subcommittee. In terms of the three-year work plan²⁵ agreed at the forty-second session of the Committee on the Peaceful Uses of Outer Space, in 1999, the Subcommittee would in its first year, hear special presentations on new launch systems and ventures within a Working Group. In addition to the work plan of the item the Subcommittee and the Working Group had before them a compilation of the presentations made earlier at the Scientific and Technical Subcommittee, at its thirty-seventh session, on new launch systems and ventures.²⁶

Following presentations made by the delegations of France, Germany, Japan, the Russian Federation and the United States of America, the Working Group recommended that discussion of this item should under the second year of the work plan include consideration in greater detail of the observations made during the first year of the work plan and that it hear presentations on the practice of space law, including presentations on national space legislation and other relevant texts. A compilation of the presentations made during the Working Group, was prepared by the secretariat and distributed to the Subcommittee.²⁷

In addition to being requested by the Working Group to prepare a compilation of documents relevant to this agenda item, the Secretariat was also requested to prepare a paper setting out the key elements of existing national space legislation that, in the Secretariat's judgement, illustrated how States are implementing, as appropriate, their responsibilities to authorize and provide continuing supervision of non-governmental entities in outer space.

g) *Agenda item 10 "Proposals to the Committee on the Peaceful Uses of Outer Space for new items to be considered by the Legal Subcommittee at its fortieth session"*²⁸

²⁵ Official Records of the General Assembly, Fifty-fourth Session, Supplement No. 20 and corrigendum (A/54/20 and Corr.1), paragraph 114.

²⁶ UN Document A/AC.105/C.2/2000/CRP.8.

²⁷ UN Document A/AC.105/C.2/2000/CRP.12.

²⁸ UN Document A/AC.105/738, paragraphs 91-114.

Agenda item 10 replaced the previous practice by the Subcommittee of holding informal consultations to consider new agenda items for possible inclusion in the agenda of the Legal Subcommittee. The Subcommittee was reminded that the new agenda structure necessitated a recommendation by the Subcommittee to the Committee on the Peaceful Uses of Outer Space on the items to be included on its agenda at its next session. In particular the Subcommittee was requested to consider new single issues/discussion items. In order to facilitate its work, the Subcommittee agreed to hold informal consultations, coordinated by Niklas Hedman of Sweden.

The Subcommittee was also reminded of the proposals which had been made in the past by the delegations of Argentina²⁹, the Czech Republic³⁰, Brazil³¹, Chile³², Greece³³, Spain³⁴, Germany³⁵ and the Netherlands³⁶ for new items to be included on the agenda of the Legal Subcommittee. The Subcommittee also recalled that Spain had withdrawn its proposal, that Brazil, Greece and the Netherlands had announced that their proposals could be considered at a later stage, that Chile would in future be submitting their work plan for the item they had proposed and that the

²⁹ Commercial aspects of space activities (e.g. property rights, insurance and liability).

³⁰ Review of existing norms of international law applicable to space debris. See also note 31.

³¹ Legal aspects of space debris. This item was proposed by the delegations of Brazil and the Czech Republic.

³² Comparative review of the principles of international space law and international environmental law.

³³ Review of the Principles Governing the Uses by States of Artificial Earth Satellites for International Direct Broadcasting and the Principles relating to Remote Sensing of the Earth from Outer Space.

³⁴ Comparative study of the provisions of the law of the sea and international space law.

³⁵ Improvement of the Convention on Registration of Objects Launched into Outer Space. This item was proposed by the delegation of Germany on behalf of the member States of ESA and States having signed cooperation agreements with ESA.

³⁶ Examination of the Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 as a model to encourage wider accession to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.

item proposed by Germany had been agreed upon by the Committee as a new item for the Legal Subcommittee at its current session. As a result, the Subcommittee had before it for consideration the following items for inclusion in the agenda of the Subcommittee at its next session, in 2001:

- 1) Commercial aspects of space activities (e.g. property rights, insurance and liability) proposed by the delegation of Argentina; and
- 2) Review of existing norms of international law applicable to space debris, proposed by the delegation of the Czech Republic.

In addition, the following proposals were made to be included in the agenda of the Subcommittee as single issue/discussion items, at its fortieth session, 2001:

- a) Matters relating to the low level of ratification of the Moon Agreement, proposed by the delegation of Australia;
- b) Consideration of the preliminary draft of the International Institute for the Unification of Private Law (UNIDROIT) Convention on international interests in mobile equipment and the preliminary draft protocol thereto on matters specific to space property, proposed by the delegation of Italy;
- c) Issues relating to protection of intellectual property rights in connection with outer space activities, proposed by the delegation of South Africa; and
- d) Commercial aspects of space activities, proposed by the delegation of Argentina as an alternative to the proposal contained in its working paper.

The future of the item "Review of the status of the five international legal instruments governing outer space" was also considered. Following enthusiastic discussion the Subcommittee agreed to conclude its discussion of the item as was set out by its work plan but that the discussion, under agenda item 4, re-titled "Status and application of the five United Nations treaties on outer space", would include the status of the treaties, review of their implementation and obstacles to their universal acceptance.

As regards agenda item 6 "Matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of the International Telecommunication Union" the Subcommittee agreed that while the item as a whole would remain on the agenda of the Subcommittee, the Subcommittee would consider it in two parts, firstly, the definition and delimitation of outer space and secondly, the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of the International Telecommunication Union.³⁷

In order to allow the Subcommittee to monitor the developments of the work being done by the Scientific and Technical Subcommittee on the issue of nuclear power sources the Subcommittee decided to retain the item "Review and possible revision of the Principles Relevant to the Use of Nuclear Power Source in Outer Space" as a single issue/discussion item, on the agenda of the Subcommittee at its fortieth session, in 2001.

After numerous discussions the Subcommittee finalised its work under this under agenda item and agreed on the following substantive agenda items for its fortieth session, in 2001: "Status and application of the five United Nations treaties on outer space", "Information on the activities of international organizations relating to space law" and "Matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of the International Telecommunication Union" as regular agenda items; "Review and possible

³⁷ In accordance with the agreement reached in the Working Group on agenda item 6, the Subcommittee also agreed that the Working Group on the item would consider only matters relating to the definition and delimitation of outer space and would not consider the issue of equitable access to the geostationary orbit.

Revision of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space" as a single issue/discussion item; "Review of the concept of the 'launching State'" to be considered under work plans and "Proposals to the Committee on the Peaceful Uses of Outer Space for new items to be considered by the Legal Subcommittee at its forty-first session".

III. Space Law Symposium

The International Institute of Space Law (IISL), in collaboration with the European Centre for Space Law (ECSL) organized a Space Law Symposium entitled "Legal Aspects of Commercialization of Space Activities", at the end of the first day's session of the Legal Subcommittee, 27 March 2000. The Symposium consisted of presentations from four space law experts, who considered issues such as launch services, telecommunication and broadcasting and remote sensing.³⁸ The discussion provoked interesting comments and questions from the Legal Subcommittee and was followed by remarks by the Chairman of the Legal Subcommittee, Mr. V. Kopal. The Subcommittee agreed that the IISL and the ECSL should be invited to hold a further symposium on space law at its fortieth session.

³⁸ A compilation of the papers presented during the Symposium to the Subcommittee was prepared by the Secretariat and circulated as document A/AC.105/C.2/2000/CRP.6.

OTHER REPORT

Symposium on Legal Aspects of Commercialization of Space Activities

On occasion of the 39th Session of the Legal Subcommittee (LSC) of the United Nations Committee on the Peaceful Uses of Outer Space in Vienna, the International Institute of Space Law (IISL), in cooperation with the European Centre for Space Law (ECSL), organised - as in previous years - a Symposium. It took place shortly after the opening of the Session of LSC on March 27th, 2000.

Dr. Nandasiri Jasentuliyana, President of the IISL, had requested *Dr. Ernst Fasen*, Honorary Director of IISL, to serve as coordinator, and *Mr. Phillipp R. McDougall*, Associate Legal Affairs Officer to the UN Outer Space Affairs Office, to act as rapporteur.

Fasen began by congratulating the Chairman of the LSC, *Prof. V. Kopat*, and the new Director of the Office for Outer Space Affairs, *Dr. M. Othman*. He transmitted compliments from *Dr. Jasentuliyana* and welcomed the audience which consisted of most of the distinguished delegates of the Legal Subcommittee Meeting, the president of ECSL, *Dr. G. Lafferranderie*, and several other attendants. He presented the Agenda that dealt with the growing importance of the Commercialization of Space Activities, and the Legal Aspects thereof, to be examined by outstanding speakers, namely:

Dr. Stephen Doyle, USA, on: Space Law and Commercialisation: Overview of the current Law in the light of new commercial Developments;
Dr. Peter v. Fenema, The Netherlands, on: Launch Services;
Dr. Ram Jakhu, Canada, on: Telecommunication and Broadcasting; and
Dr. Gabriella Catalano Sgrosso, Italy, on: Remote Sensing.

The coordinator expressed his hope that the presented papers would informally provide some background information for the audience. He then called on the speakers.

S. Doyle pointed out that there is no time for space lawyers, despite all that has been done, "to rest on their laurels." Commercial uses of Outer Space have seen two major foci of activity in the last twenty years. One is in the International Telecommunication Union (ITU) and the other one "is in the capitals of countries engaging with increasing frequency and intensity in the commercial uses of Outer Space." But while some countries have established detailed laws and regulations, and have created space agencies, others have done little more than "occasional executive instruments or policy statements."

The author pointed out that despite all that had been accomplished by ITU, some commercial institutions, one in his own country, did not understand the role of ITU properly, did not plan accordingly, is now facing bankruptcy, and "tens of satellites placed in space by that organisation are likely to be abandoned there."

So, the task of representatives of UN, ITU, ICAO, or ISO would also be to communicate the result of their work "to the full community of affected parties," and not to keep their work a secret.

P.v. Fenema started with describing the failure and loss of a launch vehicle on March 12, 2000. He gave details of Sea Launch Co., incorporated in the Cayman Islands, and co-owned by Boeing, USA; RSC-Energia, Russia; KB Yuznoye, Ukraine; and Kvaerner, Norway. The Platform and Command Ship were registered in Liberia. He then named other players in this field, and their undertakings regarding launchings.

After that, *v. Fenema* described several national laws: The U.S. Commercial Space Launch Act, with the requirement of a "Launch License" for U.S. citizens, even when operating outside the U.S. Similarly, the U.K. Outer Space Act of 1986 also requires a license. Licensing issues must, as the speaker pointed out, be distinguished from the questions of liability.

The author then described the U.S.-Ukrainian launch trade agreements versus that with Russia or China, which all "affirm the principle that the contracting parties support the application of market principles to international competition" ... "the prices for GEO and LEO launches offered by Russian, Chinese, and Ukrainian launch companies must be comparable to those offered by the so-called 'market economy' launch service providers, such as European Arianespace and the U.S. Companies ..."

V. Fenema pointed out that "the agreement with Russia was not only meant to promote economic stability ... but also to provide hard currency to a country which might otherwise seek to earn revenue by selling missile technology to 'rogue countries'."

He also quoted security reasons for hampering the launch industry. Regarding launch vehicles, he elaborated that the MTC Regime of 1987/1993, even among its approximately 30 members, did not preclude restrictions. He added that in many national legislations satellites are considered 'dual goods' with possible use for military purposes or weapon systems.

V. Fenema concluded by underlining the dilemma between trade interests and national security aspects, a dilemma which cannot be solved through legal means alone. His paper had an annex of the announcement of the sea launch failure, described in the beginning, and of all "1999 Worldwide Orbital Launch Events".

R. Jakhu first discussed the "State of the Satellite Telecom Industry", which in 1998 had shown revenues of \$97.6 billion. It was estimated to grow to \$577 billion in 2002. And in the next 20 years 775 GEO commercial communications spacecraft are expected, with an additional 1,800 satellites in LEO. He explained the undertakings of developing countries, like India's "Agrani" Satellite. The author was of the opinion that according to UNGA Res. 1721 of 1961 "satellite communication services should be made available on a global and nondiscriminatory basis", and that the INTELSAT Agreement followed this principle. However, as *Jakhu* pointed out, that would not be the same as the imposition of "universal service obligation."

The speaker then spoke about the necessity of fair management of frequencies, done by ITU in a successful way. But he pointed out that

countries like India and Indonesia had had difficulties in this respect as early as the 1970's. He added that the ITU lacks "enforcement methods whereby the so-called victims do not have any resource to a fair justice." Here, a distinct need exists.

As a follow up, *Jakhu* elaborated on "the increased possibility of the so-called 'space wars'" using the example of remote sensing services, and on "the increased possibility of so-called 'cyber-terrorism'." He felt that the increase in Internet offenses called for an international solution.

A large part of his paper dealt with "direct broadcasting, DBS", a controversial issue. The "freedom of information", as stated for instance in Art. 19 of the 1948 Human Rights Declaration, has limits as "securing due recognition and respect for the rights and freedom of others . . .", and the 1936 Convention on Broadcasting gives an early example for this.

Regarding radio frequency co-ordination requirements the author quoted ITU Regulation No. S23.13 §4 about reducing to the maximum the radiation over another country, the UNESCO Declaration concerning DBS, and the UNGA Resolution A/RES/37/92 on direct broadcasting. And he showed, on the other hand, that "countries like Canada and France still remain concerned about the erosion of their cultures and have adopted national regulations limiting foreign contents over their broadcasting system", and he then disputed the "four channel" system in Malaysia.

In conclusion, *Jakhu* requested the Legal Subcommittee of COPUOS to start considering a new declaration in order to solve the demonstrated problems.

G. Catalano Sgrosso pointed out that regarding Remote Sensing "the most controversial point is the interpretation of the principle of sovereignty, from which both parties (developed versus developing countries) move to reach opposite results." Developing countries see sovereignty extended to information about resources.

The author then discussed UNGA Res. 41/65 of 1986, which had become a kind of "code of conduct". While Principle XII does not exclude the Commercialization of data, it is necessary to distinguish between primary data, *i.e.* numeric signals coming from satellites to the ground, and processed data (through geometric and radiometric corrections), and analyzed information stemming therefrom and from other inputs (cartographic, geological, etc.).

Here, the right of intellectual property (copyright) comes in. The operation is to be legally controlled in the processing of the data.

The paper then analyzed the law of the United States with its use of confidential trade secret procedure. France, on the other hand, applied copyright law to the collection of remote sensing data, while ESA keeps the full property to the data of ERS1 and ERS2.

The speaker then came to Principles X and XII with its special system for the dissemination and use of data for the protection of the environment, one of the most urgent problems of the modern world. Here, the tasks of the European Environment Agency and of the Earth Observation World Information Centre were discussed, and then especially Principle XI concerning "protection of mankind from natural disasters". She explained UNGA Resolution 42/189 of 1987 declaring the Nineties as the

"International Decade for Natural Disaster Reduction", and the ensuing activities.

Regarding the "Legal Nature of UN principles" *Catalano Sgrosso* pointed out the Resolution had been adopted "by consensus, and that customary law could be established".

Speaking about "Remote Sensing Military activities", the author found that "the activity of military surveillance and reconnaissance satellites is now generally considered lawful by the States", and proved her point in some detail. She even deliberated the opinion that "the placing of arms in outer space could be justified as a defensive program" which is, in her opinion, the "weak point of the whole regulation...."

An international surveillance organization might constitute a good deterrent instrument against.... eventual subversive actions by some States, favoring a stable and long-lasting international equilibrium."

After the presentations of these papers there followed a questions and answers period in which distinguished delegates from Argentina, Egypt, France, and the Russian Federation participated.

The closing remarks were given by the Chairman of the Legal Subcommittee, *Prof. Vladimir Kopal*, who expressed his view that today's Symposium was especially fruitful and interesting.* He then closed the Symposium with thanks to IISL and ECSL for organizing the event and expressed his hope for a similar Symposium on the occasion of the next session of the Legal Subcommittee in 2001.

Dr. Ernst Fasan
Honorary Director,
International Institute of Space Law (IISL)

* The Proceedings of this symposium were drafted by the rapporteur and published "For Participants only" as UN Doc. A/AC.105/C.2/2000/CRP.6. They will also be published in 43 PROC. COLLOQ. L. OUTER SPACE (2000).

COMMENTS

**An International Space Flight Organization Envisaged
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**

Stephen Gorove*

If one glanced at the crystal-ball of the Federal Aviation Administration's Office of Commercial Space Transportation,¹ an operational environment is projected for the earlier part of the first decade of the new millennium in which the demand for access and use of national airspace will rise sharply due partly to the growth of the commercial space transportation industry and the significant increases in conventional air travel.

Since the first commercial launch in 1989, over 100 licensed commercial launches have taken place. Consumer demand for services - such as mobile telephony, data communications, remote sensing imagery, etc. - have led to the emergence of new commercial space markets in practically all earth orbits. Forecasts indicate that approximately 1,200 space launches will occur worldwide in the next ten years and by 2005 launch rates will grow by more than one per week and commercial space operations would need to consider a variety of commercial space missions. Anticipated developments in the earlier part of the first decade of this new century include reusable launch vehicles, aerospace planes, launch operations conducted from airports, coastal, inland, and sea-based commercial spaceports.

The preceding brief, learned projections of anticipated commercial space developments and increases in commercial air travel underscore the need for an operational concept relying on the use of improved technologies that can be leveraged to precisely predict, accommodate and manage both aviation and space traffic. In responding to this need, the projected model of the Office of Space Transportation, depicting the commercial space transportation's concept of operations in 2005,² details the various commercial space mission phases of flight, starting with Mission Planning.³ It also provides guidelines for the operational integration of these missions into the overall air traffic environment.

* Chair, Ed. Board and Advisors, JOURNAL OF SPACE LAW.

¹ Federal Aviation Administration, Office of Commercial Space Transportation, *Commercial Space Transportation - Concept of Operations in the National Airspace System in 2005* (Feb. 8, 1999).

² *Id.*

³ Mission Planning would require providing data under the heading of Mission Information Posting, such as Payload/Manifest, flight profile, launch location, destination, point of re-entry, landing location, airspace configuration, mission duration, trajectory, weather, space and solar conditions, etc.

If the mission involves international concerns, or will penetrate international airspace, the Space Operations Center collaborates with an entirely new body, the International Space Flight Organization (similar to the International Civil Aviation Organization), to serve as a focal point for international collaboration and exchange representing international space missions' interests. Any traffic management initiatives needed to accommodate the mission are coordinated by the Mission Planning Specialist and other air and space traffic entities, together with the International Space Flight Organization, to alleviate conflicts and finalize the mission profile.

The Office of Space Transportation's projected model also covers the additional flight phases of the mission, including Launch/Takeoff,⁴ Ascent through the Airspace,⁵ Re-entry,⁶ Descent through Airspace and Landing.⁷

Upon completing the pre-mission analysis and mission profile, the Mission Planning Specialist is to coordinate this information with the Federal Aviation Administration's Air Traffic Services (Air Traffic Control System Command Center) to finalize the mission plan. This collaboration occurs well in advance of mission commencement to allow timely notification to be disseminated to other National Airspace System users and pertinent organizations both domestically and internationally. The required lead time depends on the mission profile and vehicle profile.

When a mission profile is filed by the Mission Planning Specialist the Air Traffic Control system functioning as a Space Operations Center reviews the National Airspace System operational requirements in conjunction with the affected Air Traffic Control facilities. Based on this review, the mission profile is revised, as needed, based on the predicted status of the National Airspace System in light of projected traffic flows, dynamic density (including other space missions), weather and infrastructure status.

⁴ There are a number of actions associated with both vertical and horizontal departures. Space vehicles make either a vertical or a horizontal departure. Vehicles making a 'vertical departure include rocket types that operate from a launch pad, and spaceplanes that operate from a runway and immediately begin a vertical ascent. Vehicles making 'horizontal departures' include spaceplanes that depart from a runway and climb out in the manner of a conventional aircraft, and vehicles that are carried/towed by a conventional aircraft to an airborne launch point.

Functions/organizations involved in the planning of space missions extend to Launch Safety Operations, such as the monitoring of all factors related to the go/no-go decision, and the assurance of vehicle safety during initial ascent and in the event of an abort.

⁵ There are a series of basic options for handling ascents through the National Airspace System. Entry to orbit requires a nearly vertical, high acceleration ascent phase that precludes the use of positive air traffic control techniques. The vertical ascent of all missions is accommodated with a Space Transition Corridor.

⁶ As to re-entry for missions of about one week or less, the re-entry plan is included in the initial Mission Information Posting. For longer missions, the re-entry plan is coordinated at a predetermined time period prior to the re-entry. The latest re-entry information is disseminated to domestic and international users and service providers along with notices to airmen, mariners, and the military.

It is anticipated that by 2005 segments of the commercial space transportation industry would be regulated by a structure similar to that which is currently in place for the aviation industry. Each space transportation company would have a Mission Operations Center, similar to the Airlines Operations Centers of today's airlines, to carry out mission planning, mission-control and mission management functions.⁸ Like today's air carriers, commercial 'aerospaceline' companies would coordinate flights plans and ensure that the vehicle's operation conforms to these plans.⁹

While most of the aforementioned procedures have already been used and tested in connection with the Space Shuttle flights, and only adjustments and refinements may be needed in view of anticipated increases in air and space operations and in light of any technological improvements, there is an entirely new, as yet not operational system involving hypersonic point-to-point transportation of passengers and/or cargo by a projected vehicle - the aerospace plane. The ultra-high-altitude flights of this vehicle may involve transition through the national airspace, entry into international airspace, and return to base; for flights originating from other countries this sequence is reversed. These international missions involve reusable vehicles that are essentially very fast, very high altitude and very long range airplanes that operate several times a day to regularly scheduled destinations.¹⁰

There can be little doubt that the establishment of the projected International Space Flight Organization, would be a major policy initiative to deal with both a) hypersonic point-to-point international flights and b)

⁷ Descent through the airspace is handled in one of two ways: either 1) the vehicle is protected by a Space Transition Corridor for the entire transition from the upper limit of airspace to the surface, or 2) it is accommodated by a combination of such a Corridor for an initial re-entry to the airspace and positive air traffic control as it assumes the performance characteristics of a conventional aircraft for landing. Powered vehicles that are eligible for positive Air Traffic Control may be accommodated by a Space Transition Corridor for the entire return, based on the operational decision of the relevant traffic manager. Unpowered vehicles, such as those using gliding or ballistic returns, are always accommodated by a Corridor.

⁸ Traffic Management System would extend to Air Traffic Control providing separation assurance to space traffic while it transitions through airspace to and from space and to Space Operations Control to collaborate with commercial space operators to de-conflict space missions and to coordinate with traffic managers who may organize major air traffic flows in order to integrate space transportation operations and air traffic.

⁹ The aerospaceline's Missions Operations Center collaborates with the Space Operations Center and the International Space Flight Organization to develop a Mission Information Posting and the necessary follow-up procedures and ensures compliance with them for the safety of international travel.

¹⁰ For a comprehensive analysis of the legal and policy issues surrounding the aerospace plane, see Stephen Gorove, *Legal and Policy Issues of the Aerospace Plane*, 16 J. SPACE L. 147-56 (1988).

commercial space flights bound for orbit, originating in the U.S. but terminating at international locations or *vice versa* to carry out end-to-end mission planning, including contingencies, as well as all other flight phases safely and efficiently with due regard to all the necessary accommodations. Last but not least, the projected acceptance of a defined upper limit for the U.S. National Airspace System - to which up to now the U.S. has not agreed - is another important policy choice in support of a rational effort to accommodate space vehicles transitioning to and from space.

The preceding projected developments and policy initiatives envisaged by the U.S. to become conceivably operational around 2005, if they do materialize, may well put to rest much of the long-standing and vexatious issues associated with the delimitation of airspace and outer space.

CASE DEVELOPMENTS

Space Imaging Europe, Ltd. v. Space Imaging L.P., not reported in F. Supp. 2d, 1999 WL 511759 (S.D.N.Y. July 19, 1999)(dismissing defendant's unfair competition, false advertising, and false designation of origin violation of the Lanham Act counterclaims). **Pfund v. U.S.**, 40 Fed.Cl. 313 (1998), appeal dismissed by **Pfund v. U.S.**, 155 F.3d 572 (Fed. Cir. 1998), *aff'd* by **Pfund v. U.S.**, 178 F.3d 1313 (Fed. Cir. 1999), rehearing denied, in banc suggestion declined (Apr. 5, 1999)*

In **Hughes Communications Galaxy, Inc. v. U.S.**, 38 Fed. Cl. 578 (1997) Hughes was granted a motion in limine, which prevented the government from introducing evidence during damage phase of a lawsuit on how it passed financial losses along to third party customers. The underlying lawsuit was 34 Fed. Cl. 623 (1995), which found the government liable for breach of contract to launch commercial satellites.

In **PanAmSat Corp. v. F.C.C.**, 198 F.3d 890 (D.C. Cir. 1999), PanAmSat Corporation, an operator of telecommunications satellites, attacked the FCC's exemption of COMSAT from "space station fees," because of COMSAT's relationship with Intelsat and Inmarsat. Finding that the FCC does license COMSAT satellites, the court granted PanAmSat's petition and remanded it to the FCC for reconsideration. The court also found that the FCC's decision to extend fees for "international circuits" to PanAmSat was justified, and that petition was dismissed.

Space Systems/Loral, Inc. v. Lockheed Martin Corp. 88 F.Supp. 2d 1095 (N.D. Cal. 2000) involved a dispute over a patent for a device modulating the thrust generated by satellite thrusters during satellite stationkeeping. The court held that Space Systems/Loral did not infringe Lockheed's patent on method of controlling satellite attitude.

Satcom Intern. Group PLC v. Orbcomm Intern. Partners, L.P., 55 F.Supp.2d 231 (S.D.N.Y. 1999) concerned arbitration proceedings. In the underlying dispute Satcom, licensee of LEO satellite system, sued Orbcomm, licensor, over termination of agreement.

* A brief background information on these cases may be found in 27 J. SPACE L. 173 (1999).

SHORT ACCOUNTS

Anti-Missile Defense and the ABM Treaty

The US Administration is seeking modest amendments to the 1972 ABM Treaty. While preserving the ABM Treaty, a US proposal reportedly advanced at the U.S.-Russian presidential summit in June would permit construction of a **limited system** that could intercept missiles of "rogue states" but would not be large enough to stop several hundreds of warheads.

A missile - which was to be part of a national missile defense (NMD) system to shield the U.S. against **limited missile attacks** - was successfully launched last October but a second missile failed to hit its target in January 2000, justifying a warning by the Welch Panel, which had earlier re-examined the NMD, of a rush to failure.

U.S. critics have also argued that the Pentagon testing plan cannot distinguish between enemy warheads and decoys and thus is flawed. Others stressed that the threat has been defined almost exclusively by technological abilities, discounting political, economic and social factors that could make a threat less likely.

Notwithstanding the failure of an intercept test in early July, Congress and the White House appear to be in agreement that moving forward on the national missile defense is not a question of if, but when.

The Russians and some European NATO allies say that the U.S. plan to deploy a limited system intended to shoot down long range missiles fired at the United States by "rogue nations", would not only violate the 1972 Anti-ballistic Missile Treaty but would undermine the framework of arms control agreements and lead to a renewal of the arms race. According to Moscow, the U.S. plan would lead to wholesale abandonment of the treaty prompting Russia to pull out of all arms control agreements.

The U.S. has insisted that the missile shield would pose no threat to Russia, but Moscow claims that the concept was intended to give the U.S. the ability to strike first and then destroy a Russian retaliatory attack.

To counter Washington's efforts to build an NMD system, Moscow proposed a less clearly defined anti-missile system which would shoot down attacking missiles close to the launch on the way up rather than from the territory being targeted as the missiles descend. The United States has, however, maintained that such technology will not be ready in time to protect it from missiles that rogue states could develop.

Russia also appeared in favor of the use of "theatre" anti-missile systems allowed under the 1972 Treaty to shoot down short- and medium-range missiles that threaten Europe. On its part, the U.S. has been deeply skeptical of both the feasibility and desirability of the idea. In the U.S. view, the system would not provide protection to the United States or to most of Europe.

There have been reports indicating that Russia might offer to restrain North Korea's missile program if the U.S. abandons its plan to build an anti-missile system. Also, European allies have expressed

concern about U.S. Administration plans to allow deployment of a missile shield. **Europe** would like to be consulted in the actual decision.

China, on its part, has not only warned that a missile shield would lead to a destabilizing arms race but has also warned against including Taiwan under a regional missile shield in East Asia.

After the recent meeting of President Putin and Chancellor Schroeder, the Chancellor warned that the U.S. proposal for a national missile defense system must not be allowed to lead to a new arms race or undo existing agreements, including the ABM Treaty that President Clinton wants Russia to agree to amend.

Complicating matters for the current administration is strong opposition by the U.S. Senate Foreign Relations Committee to any arms control agreements that would limit U.S. options for a national missile defense system.

In the latest test undertaken July 7, 2000 a Minuteman II missile fired from the Vandenberg Air Force Base and flying 144 miles above the Pacific, was the target of another missile launched from the Kwajalein Atoll in the Marshall Islands about 5000 miles away. However, the kill vehicle failed to separate from the interceptor rocket and missed its target. A U.S. decision of how to proceed in the next phase is not expected until after a formal report is filed by the Pentagon. Notwithstanding Washington's assertion that the system is not designed to ward off Chinese missiles, China warned again that development of the system would disrupt the global nuclear balance. Russia has also reiterated its strong opposition adding that the system is logically and technically impossible of implementation in the foreseeable future. Faced with uncertainties about the system's feasibility by a full-scale deployment target date of December 2005 as well as strong international and domestic criticism and, at the same time, heightened concern about U.S. national security, President Clinton will have to decide whether to go ahead with building a nationwide shield against missiles or leave the decision to the next administration.

The price tag of a full anti-missile system would be about \$60 billion.

Establishment of the National Remote Sensing and Space Law Center of Excellence

The National Aeronautics and Space Administration recently established a national Remote Sensing and Space Law Center of Excellence at the University of Mississippi Law School. Funded at \$2 million (\$500,000 per year for four years) the Center plans to collaborate with the Mississippi Space Commerce Initiative (MSCI), a five-year joint partnership between NASA and agencies of the State of Mississippi, including the University of Mississippi and the Mississippi Department of Economic and Community Development.

As recently reported by the University of Mississippi Faculty and Staff Newsletter,⁺

⁺ June 5-11, 2000, at pp. 1-2.

Located at the School of Law the Center serves the state's emerging commercialization of remote sensing, geographical information systems and related geospatial information technologies. Thought to be the only one of its kind in the United States, the center is expected to become an internationally recognized research, advisory and training resource...

Remote sensing refers to satellite and or aircraft technology used to observe the Earth from distant vantage points. Cameras mounted on these platforms capture detailed pictures of the earth which can be employed for a range of business applications.

'Its stunning to think of all potential applications' said Dr. Ron Borne, Ole Miss interim vice chancellor for research and one of the new center's three co-principal investigators. 'We're talking about what eventually could become a \$5 billion industry.'

However, despite its growth potential the unsettled legal environment associated with the collection, dissemination and commercial use of geospatial products remains a serious impediment to industry expansion and becomes the focus of the new center.

Co-principal investigators with Borne are Dr. Richard McLaughlin, associate professor of law, and Dr. Ron Rychlak, professor of law and associate dean. The three serve the center until the current national search identifies executive and associate directors.

Also participating in the center's activities will be Dr. Stephen Gorove, a faculty member for 23 years before retiring and attaining professor emeritus status. Known worldwide for his scholarship in international and space law, Gorove long ago proposed establishment of a center such as this one.

The purpose of the center is to conduct a systematic survey of actual or potential commercial remote sensing user groups in order to identify and prioritize those domestic and international legal and related issues which are of the greatest concern to industry. The results of such a survey would serve as the basis of a series of working papers on selected high priority legal topics which upon completion would either be published as monographs and articles, or reports suitable for the JOURNAL OF SPACE LAW; they could also serve as the foundation of a basic desk book on remote sensing and space law, with annual supplements.

The JOURNAL OF SPACE LAW, is the only law journal in the world devoted exclusively to the legal problems arising out of human activities in outer space. It enters its twenty-eighth year of operation under the editorial chairmanship of its founder, Professor Emeritus of Law Stephen Gorove, an internationally recognized pioneer in the field of space law, who back in 1965 in Washington, D.C. and again in 1975 in Prague, at major

international conferences, had proposed the establishment of a center such as the one now created. Under his initiative, the Law School became the first in the nation to offer a course on Space Law on a regular basis. This history and its close and long-standing association with the JOURNAL OF SPACE LAW, places the University of Mississippi School of Law in a unique position to house the National Remote Sensing and Space Law Center of Excellence. Professor Gorove was requested and has enthusiastically agreed to participate in the Center's activities which he regards of extreme importance to the university, the state and the world. Discussions will explore mutually beneficial cooperative arrangements between the JOURNAL OF SPACE LAW and the Center.

In fulfillment of its avowed purpose, the Center will undertake research, review and determination (RRD) of the laws and regulations, both domestic and international, that govern the collection, dissemination and use of remote sensing data to determine whether these laws, both hard and soft, continue to serve as an effective framework or require adjustment or revision due to changes in national security policies, international considerations, technical developments or other reasons.

Drawing upon many available resources and capabilities of the University of Mississippi, the Center will be in a unique position to bring an international approach to its program. In collaboration with NASA and other interested partners, the purpose will be to design and utilize faculty resources through offerings of new courses and incorporation of relevant information into existing courses as well as through integration of law school courses with courses from other schools of the University emphasizing the multi-disciplinary nature of the field. The aim will be to prepare students for careers linked to the remote sensing industry, to sponsor student involvement in national and international educational competitions and programs that are related to the projects, and to provide equipment, and facilities for the state-of-the-art studies in the legal aspects of applied remote sensing science.

More immediate plans focus on the reconstitution and enlargement of the Stephen Gorove Space Law Collection in the Law School's Library which originated from Prof. Gorove's personal donations and solicitation from the Smithsonian Institution and other sources.

Projected arrangements include holding of occasional day-long conferences or workshops as well as sponsorship of a major international conference in 2001 on remote sensing and space law. The Center also plans to establish an external advisory board composed of leading authorities from government, industry, science, technology, and academia to provide vision for the direction, design, and operation of the Center.

In speaking to the media⁺⁺ about the Center's role and challenges, Prof. McLaughlin drew attention to what he saw as one of the problems today, namely, that the same kinds of technology that were only available to the government in the past are now available to private firms who are selling that information. He stressed that the legal issues of today are much more complex and far-reaching and they include intellectual

⁺⁺

NORTHEAST MISSISSIPPI DAILY JOURNAL, May 28, 2000, at pp. 2-3B.

property issues regarding who owns the images and how they can be licensed and disseminated. He referred, *inter alia*, to constitutional law and privacy issues associated with advances in technology which enable us to see from space things as small as one meter, perhaps the size of a lawn chair in somebody's back yard. He also noted law enforcement issues such as search and seizure related to remote sensing technology that will need consideration and analysis.

When questioned about the future, Dean Rychlak expressed the hope that, after four years when the NASA funding ends, the industries helped by the center will keep it in operation indefinitely.

Stephen Gorove
Chair, Ed. Board & Advisors
JOURNAL OF SPACE LAW

Executive and Legislative Notes

The February 2, 2000 White House fact sheet regarding the licensing of **private remote sensing** satellite systems has caused concerns among industry officials that the policy guidelines contained therein may have given the government too much control insofar as timing and location were concerned.

The State Department has charged a U.S. company with violation of **arms export laws** for assisting the Chinese in the development of rocket motor technology used to lift a satellite into its final orbit.

The **Interagency Working Group** formed in 1999 submitted its report on Feb. 8, 2000 on the Future Management and Use of the U.S. Space Launch Bases and Ranges. The Interagency Working Group is co-chaired by the White House's Office of Science and Technology Policy and the National Security Council. Member organizations are OMB, DOD, DOC, DOT, USAF, FAA, NASA and NRO. The Group's Report reviewed the future management and uses of the primary U.S. space launch bases and ranges at Cape Canaveral and Vandenberg.

Exec. Order No.13151, established a **Global Disaster Information Network** on Apr. 27, 2000 to use information technology to reduce loss of life and property from natural and man-made disasters, and designated NASA as an Interagency Coordinating Committee member.

The **Dept. of Defense** will soon decide whether U.S. companies may sell satellite imagery with better than **1-meter resolution**.

(a) Enacted Space-Related Legislation

Space-related legislation of the 106th Congress includes the **National Missile Defense Act** of 1999, Pub. L. 106-38, 113 Stat. 205 (1999) and the **National Defense Authorization Act** for FY 2000, Pub. L. 106-65, 113 Stat. 512 (1999).

The **Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies FY 2000 Appropriations Act**, Pub. L. 106-74, 113 Stat. 1047 (1999), authorizes

NASA's Human Space Flight and Mission Support programs, 113 Stat. at 1088; extends space launch indemnification established by 49 U.S.C. 70113(f) for one year, until Dec. 31, 2000, (113 Stat. at 1097); establishes a demonstration program for the commercial use of the International Space Station, (113 Stat. at 1097); and authorizes NASA to provide liability insurance or indemnification for experimental aerospace vehicles, (113 Stat. at 1098)

The Iran Nonproliferation Act of 2000, Pub. L. 106-178 (2000) provides for the application of measures to foreign persons who transfer to Iran certain goods, services, or technology. It also prohibits, with specified exceptions, any U.S. agency from making extraordinary payments to the Russian Aviation and Space Agency in connection with the International Space Station.

The Open-market Reorganization for the Betterment of International Telecommunications Act (or the "ORBIT Act"), Pub. L. 106-180 (2000) amends the Communications Satellite Act of 1962 to promote competition and privatization in satellite communications, privatizes the intergovernmental satellite organizations, INTELSAT and Inmarsat.

(b) Proposed Space-Related Legislation

There are a number of Proposed Space-Related Legislation pending the 106th Congress which include:

H.R. 28: To prohibit the export to the People's Republic of China of satellites and related items.

H.R. 209: "Technology Transfer Commercialization Act of 1999" (to improve the ability of Federal agencies to license federally owned inventions).

H.R. 356: To convey property from the Federal Government to the State of California, namely the approximately 1528 acres of land known as the NASA Ames Research Center and Crows Landing Facility (bill sent to President).

H.R. 1526: "Commercial Space Competitiveness Act of 1999" (to promote the international competitiveness of the U.S. commercial space industry, to ensure access to space for the Federal Government and the private sector, and to minimize the opportunities for the transfer to other nations of critical satellite technologies).

H.R. 1554: To amend the provisions of title 17 of the U.S. Code and the Communications Act of 1934, relating to copyright licensing and satellite broadcast signals.

H.R. 1654: FY 2000-2002 NASA Authorization Bill.

H.R. 2289: "Spaceport Investment Act" (to amend the Internal Revenue Code of 1986 to treat spaceports like airports under the exempt facility bond rules).

H.R. 2542: "Space Access Improvement Act of 1999" (to encourage the reduction of the costs of access to space for the Federal Government and private sector).

H.R. 2607: "Commercial Space Transportation Competitiveness Act of 1999" (to promote the development of the commercial space

transportation industry, to authorize appropriations for the Office of the Associate Administrator for Commercial Space Transportation, to authorize appropriations for the Office of Space Commercialization and to extend to 2004 the commercial space launch damage indemnification provisions of 49 U.S.C. sec. 70113.).

H.R. 3261: "Communications Satellite Competition and Privatization Act of 1999" (to amend the Communications Satellite Act of 1962 to promote competition and privatization in satellite Communications).

H.R. 4205: "National Defense Authorization Act for Fiscal Year 2001" (to authorize appropriations for the Department of Defense, including appropriations to the Army, Navy and Marine Corps, and Air Force for aircraft, missiles, weapons and other procurement).

H.R. 4417: The legislation, titled "Satellite Exports with Security Act" would reverse legislation passed in 1998 that transferred satellite export jurisdiction from Commerce to State in March 1999.

H. Res. 267: Expressing the sense of the House of Representatives with regard to Shuttle Mission SSTs-93, commanded by Colonel Eileen Collins, the first female shuttle commander.

H. AMDT. 98 to H.R. 1654: Amendment clarifies provisions dealing with life and microgravity research, space commercialization, the International Space Station other programs.

H. AMDT. 102 to H.R. 1654: Amendment directs NASA to allocate resources to accelerate the initiatives promoting commercial participation in the International Space Station; consider the impact of NASA policies on commercial participation in policy and program priorities; and publish opportunities for commercial participation.

H. AMDT. 105 to H.R. 1654: Amendment sought to cap total funding for the International Space Station at \$21.9 billion, and the space shuttle costs associated with its assembly at \$17.7 billion.

H. AMDT. 106 to H.R. 1654: Amendment to terminate NASA's partnership with the Russian Government in the International Space Station program.

H. AMDT. 107 to H.R. 1654: Amendment to terminate the International Space Station program.

H. AMDT. 109 to H.R. 1654: Amendment to transfer \$100 million from the International Space Station account to the Aeronautical Research and Technology account.

H. AMDT. 423 to H.R. 2684: Amendment to eliminate funding for the International Space Station program.

S. 247: A bill to amend title 17, United States Code, to reform the copyright law with respect to satellite retransmissions of broadcast signals, and for other purposes.

S. 342: "National Aeronautics and Space Administration Authorization Act for Fiscal Years 2000, 2001, and 2002."

S. 469: "Commercial Space Transportation Cost Reduction Act".

S. 545: Federal Aviation Administration Authorization Act of 1999 (includes commercial space transportation amendments).

S. 832: To extend to 2009 the commercial space launch damage indemnification provisions of 49 U.S.C. sec. 70113.

S. 1239: A bill to amend the Internal Revenue Code of 1986 to treat spaceports like airports under the exempt facility bond rules.

S. AMDT. 555 to S. 1122: To authorize use of \$5,000,000 of Drug Interdiction and Counter-Drug Activities, Defense funds for a ground processing station to support a tropical remote sensing radar.

International Developments

Under an April 1998 agreement between **ISRO** and **Arianespace** microsatellites may be launched on either Ariane or ISRO vehicles.

On December 15, 2000 the National Space Development Agency of Japan (**NASDA**) and the French National Space Research Center (**CNES**) signed an "Action Plan for Cooperation in the Field of Earth Observation for Natural Disaster Monitoring."

Spot Image signed an agreement with **Orbital Imaging Corp. (Orbimage)** covering the distribution of advanced satellite imagery, involving **Orbview 3**, the first of a high resolution (one panchromatic and four-meter multi-spectral optical imaging) satellite to be launched in mid-2000, followed by the launch of **Orbview 4** in late 2000.

In April 2000 both houses of the Russian parliament ratified the **START II Treaty**.

The United States has signed bilateral trade agreements with China, Russia, and Ukraine which included quotas on how many launches they can conduct. The agreement with Russia expires this year and the other two expire in 2001. The US is debating whether to negotiate new agreements or let market forces prevail. The agreement with Ukraine was signed in 1996. Since Ukraine has no launch sites, a joint venture called **Sea Launch** was created by Boeing, Ukraine, Russia and Norway to launch Ukrainian Zenith boosters from a mobile ocean oil rig in the Pacific ocean. The first commercial launch was successfully completed in October 1999. However, the third **Sea Launch** attempt of the consortium which carried a British communications company's satellite ended in failure on March 11, 2000 when its Russian-Ukrainian rocket fell into the ocean.

The Key service module of the International Space Station (**ISS**), named **Zvezda** (Russian for Star), lifted up from Kazakhstan on July 12, 2000 to dock with other pieces of the **ISS** in about 2 weeks. Financial and rocket problems delayed the launch for more than 2 years but NASA still hopes to complete the station by 2005. The 43 foot long service module has been described as the heart, soul and brain of the space station since it has living quarters and flight controls where crews can live and work for months. The \$60 billion **ISS** will be 350 feet in length, weigh more than \$1 billion pounds and will be four times larger than Russia's **Mir** space station.

An extensive re-examination of the existing telecommunications framework of the European Union may be found in the **1999 Communications Review** which also aims at consolidating, simplifying and reducing twenty existing legal instruments to six.

A regional court in Wiesbaden has held an **on-line auction of art work legal**. Under a prior ruling by a regional court in Hamburg on-line auctions required a public permit, otherwise they would be illegal.

Currently, **electronic commerce** is not specifically regulated in Mexico but several commercial and industrial chambers and associations are in support of a set of amendments to existing legislation.

In an important decision that might affect e-commerce development, a criminal court of appeal in Buenos Aires decided in March 1999 that **e-mail is to be protected** in the same way as traditional written mail.

Manfred Lachs Space Law Moot Court Competition

In addition to the preliminaries of the 9th Manfred Lachs Space Law Moot Court Competition ("Case concerning a nuclear powered satellite", *Homeria v. San Marcos*) in Europe and the USA, such rounds for the first time will also be held in the Australasian region. The finals will take place in Rio de Janeiro during the IAF Congress on October 5, 2000.

Other Events

ESA published its new catalogue of European **transferable technologies**, "IMPACT 2000" (earlier known as "TEST") and the Austrian Space Forum (Österreichisches Weltraumforum) held a seminar on "Technology Transfer Activities in Austria" last November.

Asian Aerospace 2000, the first major exhibition and airshow of the millennium, was opened Feb. 22, 2000 in Singapore.

A "**Telecommunications and Space Law 2000**" Conference, organized by the Centre d'Etudes Juridiques Européennes and the University of Geneva was held on March 10, 2000 in Geneva.

On March 24, 2000, the ITU signed an agreement with three international standard-setting organizations to minimize the risk of divergent and competitive approaches to standardization.

ITU Telecom Americas 2000 featuring an Exhibition and Forum for the Americas region was held April 10-15 in Rio. The Exhibition had the latest technology and services on display while the Forum included a Policy and Regulatory Summit, and discussions of issues of Infrastructure and Applications, Telecom Development and the impact of digital revolution.

In addition to reviewing technical matters, the Second National Reconnaissance Office (NRO/AIAA) **Workshop**, meeting May 2-4, 2000 in Chantilly, Virginia aimed at investigating legal and regulatory issues to improve our understanding of the policies and barriers affecting the future direction of the world's space programs.

On May 5, 2000, ITU's Radiocommunication Assembly meeting in Istanbul approved the **IMT-200 radio interface** specifications, a major achievement in the new millennium of wireless communications. Japan is expected to become the first country to deploy IMT-200 services sometime next year.

ITU's World Radiocommunication Conference (WRC 2000), meeting in Istanbul, Turkey on May 8-June 2, 2000 was focusing on issues involving the shared use of the frequency spectrum to allow the deployment and growth of all types of radiocommunications services.

The Global Air and Space International Business Forum and Exhibition on May 10-12, 2000 in Arlington, Virginia discussed global opportunities and challenges in utilizing commercial space.

The International Space Development Conference took place May 25-29 in Tucson, Arizona.

In the next decade, **spy-in-the-sky** photos taken 400 miles up by commercial satellite cameras are to provide pictures of one meter resolution and will be sought after by map makers, geologists, land and city planners, road builders, farmers, disaster relief officials and others.

Brief News in Retrospect

A team of astronomers claim that the first clear images they have obtained of the early universe indicate that the **universe is flat**.

Recent research indicates existence of two **tiny planets** smaller than Jupiter, about the size of Saturn, outside of the solar system.

In light of their new findings some scientists argue that **humans** might be **alone** in the universe because the earth's composition and stability appear extraordinarily rare.

New observations suggest that throughout the universe there are **black holes**, objects whose gravitational force precludes the escape of anything, even light.

The **planetary alignment** of the Sun, Mercury, Venus, Earth, Mars, Jupiter and Saturn which had occurred every twenty years and again in May 2000 brought many doomsday predictions.

A 3-year study by high level French military leaders concluded that there are strong presumptions in favor of the existence of unidentified flying objects (UFOs).

Discovery's long delayed mission to repair the **Hubble** space telescope was successfully completed after Christmas 1999.

NASA's **Galileo** spacecraft flew within 124 miles of Jupiter's volcanically active moon **Io**.

NASA has appointed **review boards** to investigate the failures involving the Mars Climate Orbiter, Mars Polar Lander, and the High Energy Solar Spectroscopic Imager. In response to the reviews, NASA has canceled a planned Mars landing in 2001 and has extended from 6 to 10 years a plan to have a spacecraft return from Mars with soil samples.

The ailing seventeen ton \$670 million dollar **Compton Gamma Ray Observatory**, after nine years of valuable research pertaining to the universe, was brought down in a controlled reentry in a remote area of the Pacific Ocean to avoid the danger of falling much later in an uncontrolled manner on a populated area.

Images from the Near Earth Asteroid Rendezvous (**NEAR**) spacecraft suggest that **Eros** "named for the Greek god of love" is a twenty-mile long rocky formation orbiting the sun. On it, a 200-pound person

would only weigh 2 ounces and could jump a mile high and almost go into orbit. The craft was built by Johns Hopkins University, in Maryland, which is also in charge of the mission - making the first American Planetary mission not managed by NASA.

Photos taken by NASA's **Mars Global Surveyor** show signs of water near the surface that could have flowed 1000 years ago.

NASA plans to distribute images taken by television cameras aboard the ISS on the Internet under a contract with a California company.

The crew of the space shuttle Atlantis replaced dying batteries on the **International Space Station (ISS)** and gave it a badly needed orbital lift since it has been losing about one and half miles a week from its altitude. NASA plans to launch its service module to the ISS late this year if **Russia** fails to launch its module by July, but Russia's ailing **Mir** space station may get a new lease on life from a US company. The first permanent crew is expected in November.

Kibo, Japan's first manned space facility, consisting of a pressurized module, an exposed facility and a robot arm is scheduled to be launched aboard U.S. space shuttles in 2002 and 2003.

Commercial entrepreneurs promoting **space tourism** are offering trips to the fringes of space. Apart from the US and Russia, **ESA**, **China** and **Japan** are also in the race to privatize space but the cost of putting people and payloads into orbit is astronomical: \$10 million per flight, or \$10,000 a pound.

China's Long March 3 rocket placed a meteorological satellite into orbit in June. Reportedly, Russia has been helping **China** to develop a manned space capsule.

The International Astronautical Federation (IAF) as of January 1, 2000 had 161 members from 46 different countries.

B. FORTHCOMING EVENTS

The ECSL Summer Course on Space Law and Policy will be held July 23-August 5, 2000 in **Cologne**, Germany.

During the July 25-29, 2000 **London Conference** of the International Law Association (ILA) the Space Law Committee report dealing with the 1967 Space Treaty, the Liability and Registration Conventions, and the Moon Agreement are scheduled for discussion.

On August 5, 2000, the **Centre de Investigacion y Difusion Aeronautico - Espacial**, **Montevideo**, Uruguay celebrates its 25th Anniversary.

The Third International Conference on "Space Protection of the Earth (SPE) - 2000" will be held September 11-15, 2000 in **Crimea**, **Ukraine**. Political aspects, legislation and international cooperation are among the topics to be addressed.

The program of the **AIAA Space 2000 Conference and Exhibition** on September 19-21, 2000 at Long Beach, CA is to focus on new missions, new opportunities and new challenges to define our future in space.

AIAA & Aviation Week Space Business Conference & Expo will meet Oct. 30- Nov. 1, 2000 in San Jose, California.

As reported in our previous issue, the **43rd Colloquium** on the Law of Outer Space will be held in Rio de Janeiro, Brazil, Oct. 2-4, 2000. Four sessions are slated to address: (1) Law and Ethics of Space Activities in the New Millennium (2) State Responsibility and Liability for Non-State Space Activities (3) The Interrelation between Public International Law and Private International Law in the Regulation of Space Activities (4) Other Legal Matters, including Recent Developments in the Regulation of Space Debris, the Exploitation of Non-Terrestrial Resources, and the Implications of Proposed Missile Defense Systems. In addition to these topics, the International Academy of Astronautics will have several symposia of possible legal interest, such as those on: International Space Plans and Policies; Economics and Commercialization of Space Activities; International Moon/Mars Exploration; and Space Activities and Society.

The second **ESA Conference** on Academic and Industrial Cooperation in Space Research is scheduled to be held in Vienna in November, 2000.

ITU Telecom Asia 2000 will be held in Hongkong, 4-9 December, 2000.

The 3rd **IAA Symposium on Small Satellites for Earth Observation** is to take place April 2-6, 2001 in Berlin, Germany.

An International Symposium on **Impact of Space Technology Innovation on Economic Development**, Co-Sponsored by the Chinese Society of Astronautics and the IAA, is scheduled for April 17-20, 2001 in Shanghai, China.

Work is underway with the Singapore International Law Society and various local interest groups to set up a two-day **Special Workshop ASIA, 2001** in June 2001.

The **44th IISL Colloquium** on Emerging Legal Issues in Space Activities will be held in Toulouse, France, 1-5 October 2001. The following sessions are planned:

Session 1: Emerging issues of interpretation and application of space treaties (including definitional issues of state responsibility, launching states, space objects and related legal issues);

Session 2: Emerging legal issues in satellite communications (with special attention to the national regulation of licensing mobile satellite systems);

Session 3: Legal issues arising from the commercial availability of high quality remote sensing imagery (topics will include the extent to which such imagery can be admitted as evidence in civil and criminal cases; what legal requirements must be established to guarantee that such digital data used in legal proceedings are unaltered; the extent to which such data can be used to mediate international disputes; and what personal and corporate rights of privacy exist with regard to the acquisition and dissemination of such data);

Session 4: Other Legal Matters, including: the teaching of space law at the dawn of the new millennium; space debris; conflicts relating to space activities; legal aspects of human habitations in outer space; emerging legal issues in the field of navigation by satellite

Geneva is to host **ITU Telecom World 2003**.

BOOK REVIEWS/NOTICES*

INTERNATIONAL LAW, CLASSIC AND CONTEMPORARY READINGS, edited by Charlotte Ku and Paul F. Diehl (Lynne Rienner 1998), pp. 576.

This comprehensive publication dealing with classic and contemporary readings in international law brings together contributions by many leading authorities. The editors, *Charlotte Ku*, who is executive vice president and executive director of the American Society of International Law, and *Paul F. Diehl*, who is director of political science at the University of Illinois at Urbana-Champaign, arranged this anthology in four parts which deal with: Introduction: International Law and Politics; International Law as Operating System; International Law as Normative System; and The Future of International Law.

The carefully arranged collection encompasses both theoretical and policy perspectives, including political as well as legal and philosophical settings. Fortunately for the space law enthusiasts, there are a number of chapters having certain space law relevance. They include "Strengthening Compliance With International Environmental Accords..." (*Harold K. Jacobsen* and *Edith Brown Weiss*), "International Dispute Settlement and the Role of International Adjudication" (*Richard B. Builder*) and "The International Protection of the Environment" (*Alexandre Kiss*). These presentations appear to suggest that while space debris can cause enormous amount of damage, the international space treaties do not currently provide much help in combating it. As to the future, according to *Louis Henkin*, the world environment provides an urgent legal agenda for the international system and he expresses the hope that "states will act on that agenda wisely and in time."

While a number of topics in this collection may not have more than an indirect relevance to space law, there are two contributions meriting closer attention. The first one co-authored by *Christopher C. Joyner* and *Elizabeth A. Martell* is entitled "Looking Back to See Ahead: UNCLOS III and Lessons for Global Commons Law"; the second one written by *Katherine M. Gorove* and *Elena Kamenetskaya*, deals with "Tensions in the Development of the Law of Outer Space."

As to the law of the Global Commons, the authors propose a rethinking of the approaches to negotiations in light of the lessons learned from the Preparatory Conference for the Third United Nations Conference on the Law of the Sea and suggest that governments incorporate and prudently apply them in their negotiating strategies "to keep international law genuinely applicable to managing the commons areas."

* Compiled and edited by Michael A. Gorove, Attorney at Law, Associate Editor, J. SPACE L.

The most comprehensive treatment of specific space law issues is found in the presentation of *Katherine Gorove* and *Elena Kamenetskaya*. They point out that legal regulation of space activities has taken place both at national and international levels. The authors stress that the primary reason for the insistence by developing countries on an international regulatory framework has been their desire to share in any benefits accruing from space activities. More specifically, the developing countries wanted some type of "equity", as reflected in their drive for 1) acceptance of the "common heritage of mankind" concept or at least a sharing of the benefits derived from space activities; 2) access to the geostationary orbit; 3) intergenerational equity, or environmental protection for outer space so as to prevent cluttering outer space with debris; and 4) formalizing or institutionalizing international cooperation.

Apart from environmental issues, this contribution also addresses questions of the delimitation of air and outer space, the legal problems arising from manned space flight, and the perspectives and problems associated with mechanisms for cooperation in space. In the co-authors' view the establishment of practices and standards in connection with (1) manned space flight and (2) the protection of the space commons together with the treatment of space debris could alleviate much of the tension. The authors conclude that U.S.-Russian cooperation for the protection of the space environment and conclusion of a treaty on manned space flight does not mean that a new world space organization is necessary. They feel that the topics should be placed on the COPUOS Legal Subcommittee's agenda so that they could be studied by groups of experts who could aim to draft a treaty on manned space flight and establish standards and recommended practices for protection of the space environment.

Only time will tell whether the authors' suggestion is going to materialize and, if so, when that will occur.

ANNOTATED SUPPLEMENT TO THE COMMANDER'S HANDBOOK ON THE LAW OF NAVAL OPERATIONS, edited by A.R. Thomas and James C. Duncan (U.S. Naval War College International Law Studies, vol. 73, 1999), pp. 526.

This publication sets forth general guidelines for use by operational commanders and staff pertaining to basic principles of international and domestic law governing U.S. naval operations during both peacetime (Part I) and time of hostilities (Part II). While the book makes it clear that it is not a comprehensive statement of the law nor a substitute for definitive legal guidance provided by judge advocates and others responsible for advising commanders on the law, the reader will find a thoroughgoing, well organized, carefully documented and richly annotated analysis.

Within the broad overall scope of naval operations, it is of special interest for a space law publication to find a chapter devoted to military

activities in outer space where the law is succinctly and competently sketched in light of relevant international agreements with special attention to the rescue and return of astronauts and the return of outer space objects. The challenging effort to state the law is admirably met notwithstanding the difficulties which accompany the treatment of the subject matter in such volatile areas as the use of nuclear weapons in outer space where both the *lex lata* and the *lex ferenda* strive for supremacy.

THE CASE FOR MARS V, edited by Penelope J. Boston (Univelt 2000), pp. 552. THE CASE FOR MARS VI, MAKING MARS AN AFFORDABLE DESTINATION, edited by Kelly R. McMillen (Univelt 2000), pp. 560.

These two publications are a follow-up to the Case for Mars I which recorded a conference in March 1981 of a diverse group of scientists, engineers, social scientists, and laypersons interested in Mars exploration.

To keep up continuing interest, preparation for Mars V began in 1993. While this publication deals with a variety of very important scientific, technical, engineering, economic as well as many other issues not directly relevant to space law, international aspects are discussed in some detail together with a review of the chronology of U.S.-Soviet space cooperation.

More directly relevant to space law is the presentation in Mars VI by Robert Michael Beattie, Jr. In the author's view, implementing favorable legislation in the areas of tort-reform, anti-trust, tax, and insurance similar to U.S. laws would stimulate the exploration of Mars as it currently does other sectors of our society.

MYRES SMITH MCDUGAL, APPRECIATIONS OF AN EXTRAORDINARY MAN, edited by Cheryl A. DeFilippo *et al* (Yale University 1999), pp. 140.

This book received in accompaniment of a brief note by Anthony T. Kronman, Yale Law School Dean, contains memorial essays and personal reflections written in honor of a beloved friend and teacher, Myres Smith McDougal, who touched thousands of lives and made an unforgettable impression on all who knew him.

In addition to the speeches delivered at the Memorial on October 4, 1998 and remembrances, including letters, essays, as well as other excerpts and photographs, the book contains a vita and bibliography.

SEEKING NEW WORLD VISTAS - *The Militarization of Space* by Roger Handberg (Praeger, Greenwood Press 2000), pp. 286.

This book focuses on issues associated with what the author sees as a trend toward the militarization of space. Guiding the reader through Space as an arena for the conduct of military activity, the views of

President Eisenhower, Star Wars, Desert Storm, Organizing Military Space for a New Era, the Ballistic Missile Defense system and Operationalizing the Future of Military Operations, he argues that the new policies extending the arms into outer space are likely to lead to a world which is less, not more, secure.

RECENT PUBLICATIONS*

A. Books

- ASSICURAZIONI GENERALI, COMMERCIAL AND INDUSTRIAL ACTIVITIES IN SPACE: INSURANCE IMPLICATIONS - 10th International Conference, Florence, May 25-26, 1999 (1999).
- BENDER R. (ED.), LAUNCHING AND OPERATING SATELLITES (Utrecht Studies in Air and Space Law) (Nijhoff 1998).
- CHENG, CHIA-JUI AND KIM, DOO HWAN (EDS.), THE UTILIZATION OF THE WORLD'S AIR SPACE AND FREE OUTER SPACE IN THE 21ST CENTURY: PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON AIR AND SPACE POLICY, LAW, AND INDUSTRY FOR THE 21ST CENTURY, HELD IN SEOUL, JUNE 23-25, 1997 (Kluwer 2000).
- DIEDERIKS-VERSCHOOR, I.H. PH., AN INTRODUCTION TO SPACE LAW (Kluwer Law Int'l 1999).
- GOROVE, STEPHEN (ED.), UNITED STATES SPACE LAW - NATIONAL AND INTERNATIONAL REGULATION (Releases 1999-3 & 2000-01, Oceana 1999).
- HANDBERG, ROGER, SEEKING NEW WORLD VISTAS - The Militarization of Space (Greenwood 2000).
- JASENTULIYANA, NANDASIRI, INTERNATIONAL SPACE LAW AND THE UNITED NATIONS (Kluwer Law Int'l 1999).
- LARSSON, MARIE-LOUISE, THE LAW OF ENVIRONMENTAL DAMAGE: LIABILITY AND REPARATION (Kluwer Law Int'l 1999).
- SAND, PETER H., TRANSNATIONAL ENVIRONMENTAL LAW: LESSONS IN GLOBAL CHANGE (Int'l Environmental Law & Policy Ser.) (Kluwer Law Int'l 1999).

B. Contributions to Books

- Baker, George D., *The Changing Nature of Commercial Space Operations in the Coming Space Station Era*, in ASSICURAZIONI GENERALI, COMMERCIAL AND INDUSTRIAL ACTIVITIES IN SPACE: INSURANCE IMPLICATIONS, 10th International Conference, Florence, May 25-26, 1999 (1999), at 107.
- Bausch, Romain, *How to Protect Satellite Operators' Activities*, *id.* at 63.
- Bloch, John Jacques, *Alcatel Space's Innovative Satellite Projects and Insurance Implications*, *id.* at 113.
- Boisvert, Laurier, *The Role of Risk Management and Insurance in an Increasingly Competitive Satellite Industry*, *id.* at 59.
- Borota, Mark, *Insuring a Constellation: The New Dynamics of Satellite Coverage*, *id.* at 127.
- Burnett, Dennis J., *So What are the United States Government's Rules on the Export of Satellite and Launch Vehicles?*, *id.* at 169.

* Compiled and edited by Michael A. Gorove, Attorney at Law, Associate Editor, J. SPACE L.

- Cerchiai, Fabio, *Opening Address*, *id.* at 103.
- Clapham, Simon D., *To Help or Hinder*, *id.* at 191.
- Clemente, Guido, *Opening Remarks*, *id.* at 13.
- Cowls, Robert S., *Introduction Speech For Launch Services Panel*, *id.* at 79.
- Dealy, John F., *Resolving Risk Allocation Complexities in Satellite System Insurance Arrangements/Procurement Agreements*, *id.* at 161.
- Desiata, Alfonso, *Opening Remarks*, *id.* at 11.
- Desiata, Alfonso, *Preface*, *id.* at 3.
- Esposito Vezzoler, Daniela, *Opening Remarks*, *id.* at 17.
- Fagan, Barry, *Managing Risk in an Uncertain Global Space Environment*, *id.* at 87.
- Flury, Walter, *Space Debris: A Hazard to Operational Spacecraft?*, *id.* at 41.
- Frankle, Edward A., *Commercial and Research Uses of the International Space Stations*, *id.* at 33.
- Gantois, Gilles, *Where do Insurance and Financing Meet?*, *id.* at 135.
- Gilmore, Gregory C., *Launch Risk Guarantees*, *id.* at 93.
- Gobbo, Giovanni, *The Dark Shadows on the Insurance Industry*, *id.* at 179.
- Gonchar, Dmitry V., *Commercialization of Space Activities: The Russian Perspective*, *id.* at 51.
- Hellinga, Leo, *The Financial Advisor's Point of View*, *id.* at 139.
- Higginbotham, John, *The Equity Investor's Point of View*, *id.* at 143.
- Ignacy, Ted. H., *Risk Management and Insurance: The Telesat Story*, *id.* at 71.
- Jackson, Peter, *What do Satellite Operators Need?*, *id.* at 67.
- Kring, Gunter, *The Insurance Industry as a Business Partner in a Changing Environment*, *id.* at 119.
- Larsen, Steven W., *Converging Lines of Risk Perspectives from Risk Management*, *id.* at 97.
- Le Goueff, Stephan, *Managing the Market Access Risk for GMPCS: Is Insurance an Alternative?*, *id.* at 155.
- Luton, Jean-Marie, *Evolution of the Space Transportation Systems: Insurance Implications*, *id.* at 83.
- Manghetti, Giovanni, *Opening Remarks*, *id.* at 15.
- Moore, Brian, *The Broker's View*, *id.* at 187.
- Nesgos, Peter. D., *Insurance for Space Projects: Where Do Insurance and Financing Meet? The Lawyer's Perspective*, *id.* at 147.
- Pagnanelli, Benito, *Conclusive Remarks*, *id.* at 197.
- Pagnanelli, Benito, *Introductory Report*, *id.* at 23.
- Pagnanelli, Benito, *Opening Remarks*, *id.* at 9.
- Pino Jr., Rudolph V., *Introduction Speech for Legal Experts Panel*, *id.* at 153.
- Robertson, Ernest, *Quality Initiatives of Space Systems/Loral*, *id.* at 123.
- Sadler, Janet, *Good Guys at Last: Where Do We Go From Here?*, *id.* at 183.

C. Articles

- Beckman, James A., *Citizens Without a Forum: The Lack of an Appropriate and Consistent Remedy for United States Citizens Injured or Killed as the Result of Activity Above the Territorial Air Space*, 22 B.C. INT'L & COMP. L. REV. 249 (1999).
- Benkö, Marietta & Schrogl, Kai-Uwe, *Space Law at UNISPACE III: Achievements and Perspectives*, 49 ZLW 74 (2000).
- Bourbonniere, M. & Haeck, L., *Space Imaging Data Policy: A Canadian Perspective*, 24 ANNALS AIR & SPACE L. 33 (1999).
- Bourély, Michel, *La Révision des Accords sur la Station Internationale*, 44 ANN. FR. DROIT INT'L 579 (1998).
- Castro, José Humberto Villalobos, *Problemas Recientes en la Codificación del las Normas de Derecho del Espacio Ultraterrestre*, (Recent Problems of the Codification of the Norms of Outer Space Law), 48-49 LEX DIFUSIÓN Y ANALYSIS 83 (1999).
- Davies, C., Hoban, S., & Penhoet, B., *Moving Pictures: How Satellites, the Internet, and International Environmental Law Can Help Promote Sustainable Development*, 28 STETSON L. REV. 1091 (1999).
- Davis, Michael, *The Regulation of the Australian Space Launch Industry*, 49 ZLW 65 (2000).
- Fabre, H., *Le dispositif législatif russe face à l'essor du marché commercial spatial*, 44 MCGILL L.J. 491 (1999).
- Farand, A., *Développements Récents - l'Agence Spatiale Européenne*, 24 ANNALS AIR & SPACE L. 393 (1999).
- Finch, Edward R., *The Future Of World Peace And Outer Space*, 5 ILSA J INT'L & COMP L. 389 (1999).
- Greenberg, Joel S., *The Economics of orbital debris*, 38 AEROSPACE AMERICA 40 (No.1, 2000).
- Helling, A. and Ghobrial, A., *Assessing the role of advanced technologies in public transit safety*, 66 J. TRANSP. L. LOGIST. & POL'Y 433 (1999).
- Johnson, John A., *Forty Years of Scholarship: Excerpts from Articles in the Virginia Journal of International Law that Charted New Paths and Captured Historic Moments*, 40 VA. J. INT'L L. 849 (2000).
- Krige, John, *The Commercial Challenge to Arianespace: The TCI Affair*, 15/2 SPACE POL'Y 87 (1999).
- Lar, Paul B., *Unidroit Project On Security Interests: How The Project Affects Space Objects*, 64 J. AIR L. & COM. 703 (1999).
- Legendre, B., *Recent Developments at the Canadian Space Agency*, 24 ANNALS AIR & SPACE L. 375 (1999).
- McDougall, P.R., *Report of the Work of the United Nations Committee on the Peaceful Uses of Outer Space and its Subcommittees*, 24 ANNALS AIR & SPACE L. 381 (1999).
- Moenter, Rochus, *The International Space Station: Legal Framework and Current Status*, 64 J. AIR L. & COM. 1033 (1999).

- Sagar, D., *Inmarsat and the Mariner*, 14 INT'L J. MARINE & COASTAL L. 423 (1999).
- Sagar, David, *Provisional Application in an International Organization*, 27 J. SPACE L. 99 (1999).
- Sagar, D., *Special Problems of Privatizing the International Mobile Satellite Organization*, 24 ANNALS AIR & SPACE L. 407 (1999).
- Schmitt, Michael N., *The Principle of Discrimination in 21st Century Warfare*, 2 YALE H.R. & DEV. L.J. 143 (1999).
- Schubert, F. P., *An International Convention on GNSS Liability: When Does Desirable Become Necessary?* 24 ANNALS AIR & SPACE L. 245 (1999).
- Tan, David, *Towards a New Regime for the Protection of Outer Space as the "Province of All Mankind"*, 25 YALE J. INT'L L. 145 (2000).
- Wassenbergh, H., *Access of Private Entities to Airspace and Outer Space*, 24 ANNALS AIR & SPACE L. 311 (1999).
- Wiles, G.E., *The man on the moon makes room for neighbors: an analysis of the existence of property rights on the moon under a condominium-type ownership theory*, 12 INT'L REV. L. COMPUTERS & TECH. 513 (1998).

Reports

- American Institute of Aeronautics and Astronautics, Legal Committee and Orbital Debris Committee on Standards, *MEO/EO Constellations: U.S. Law, Policies, and Regulations on Orbital Debris Mitigation* (1999).
- Davies, Charles W.N., *Third United Nations Conference on the Exploration and Peaceful Use of Outer Space (UNISPACE III)*, 27 J. SPACE L. 134 (1999).
- Hettling, Jana, Marenkov, Dimitri & Wannenmacher, Kathrin, *ECSL Summer Course on Space Law and Policy, Genf, 29 August - 12 September 1999*, 49 ZLW 214 (2000).
- Hoerl, Kai-Uwe, *UNISPACE III: The Space Generation Forum, Vienna 19-30 July, 1999*, 49 ZLW 98 (2000).
- Makiol, Philip Sven, *8th ECSL Practitioners Forum, Paris 26 November 1999*, 49 ZLW 207 (2000).
- Masson Zwaan, Tanja, *IISL Colloquium, Amsterdam*, 27 J. SPACE L. 141 (1999).
- Reif, Susanne, *Project 2001 - Legal Framework for the Commercial Use of Outer Space. Workshop on Legal Issues of Privatising Space Activities 19 July 1999*, 49 ZLW 96 (2000).
- Reif, Susanne, & Schrogl, Kai Uwe, *International Institute of Space Law (IISL) 42nd Colloquium on the Law of Outer Space during the 50th International Astronautical Congress Amsterdam, 4-8 October 1999*, 49 ZLW 209 (2000).
- Rodrigues, Natercia F. & Davies, Charles W.N., *Review of the Work of the United Nations Committee on the Peaceful Uses of Outer Space and its Subcommittees, 1999*, 27 J. SPACE L. 117 (1999).

Comments/Notes

- Angelova, Anastasia A., (Note), *Compelling Compliance with International Regimes: China and the Missile Technology Control Regime*, 38 COLUM. J. TRANSNAT'L L. 419 (1999).
- Beebe, B., *Law's empire and the final frontier: legalizing the future in the early Corpus Juris Spatialis*, 108 YALE L.J. 1737 (1999).
- Cook, Kevin V., (Note), *The Discovery of Lunar Water: An Opportunity to Develop a Workable Moon Treaty*, 11 GEO. INT'L ENVTL. L. (1999).
- Finch, Edward R., Amb. Dr., *Commercial Space Development in Millennium 2000*, 27 J. SPACE L. 161 (1999).
- Hanley, Colleen, (Note), *Regulating Commercial Remote Sensing Satellites Over Israel: A Black Hole in the Open Skies Doctrine?*, 52 ADMIN. L. REV. 423 (2000).
- Jasentuliyana, N., *Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III)*, 27 J. SPACE L. 170 (1999).
- Ratner, Stacy J., (Note), *Establishing the Extraterrestrial: Criminal Jurisdiction and the International Space Station*, 22 B.C. INT'L & COMP. L. REV. 323 (1999).
- Roberts, L.R., *Orbital debris: another pollution problem for the international legal community*, 11 FLA. J. INT'L L. 613 (1997).
- Shoemaker, Jocelyn H., (Note), *The Patents In Space Act: Jedi Mind Trick Or Real Protection For American Inventors on the International Space Station?*, 6 J. INTELL. PROP. L. 395 (1999).

Short Accounts

- Ailer, William, *Controlling Space Traffic*, 17 AEROSPACE AMERICA 34 (Nov. 1999).
- Cocca, Aldo Armando, Amb., *International Colloquium on Air Navigation Security and Space Contamination*, 27 J. SPACE L. 174 (1999).
- Moore, Amanda, *UNISPACE III: Making Space Policy in Vianna*, AD ASTRA 25 (November/December 1999).
- The Eighth ECSL Practitioners Forum, Paris, France*, 27 J. SPACE L. 174 (1999).

Case Notes/Developments

- Case Developments*, 27 J. SPACE L. 173 (1999).

Executive and Legislative Notes

- Executive and Legislative Notes*, 27 J. SPACE L. 175 (1999).

International Developments

International Developments, 27 J. SPACE L. 176 (1999).

Forthcoming Events

Forthcoming Events, 27 J. SPACE L. 180 (1999).

Book Reviews/Notices

ANDEM MAURICE N., *INTERNATIONAL LEGAL PROBLEMS IN THE PEACEFUL EXPLORATION AND USE OF OUTER SPACE* (Christol), 27 J. SPACE L. 181(1999).

BASLAR, KEMAL, *The Concept of the Common Heritage of Mankind in International Law* (Joyner) 13 EMORY INT'L L. REV. 615 (1999).

ITU'S TELECOMMUNICATION DEVELOPMENT BUREAU, *TRENDS IN TELECOMMUNICATION REFORM*, 27 J. SPACE L. 182 (1999).

METCALF, KATRIN NYMAN, *Activities in Space - Appropriation or Use?* (Uppsala 1999) (Schrogl), 49 ZLW 140 (2000)

ZUBRIN, ROBERT M. & ZUBRIN, MAGGIE (EDS.) *PROCEEDINGS OF THE FOUNDING CONVENTION OF THE MARS SOCIETY - AUGUST 13-16, 1998*, 27 J. SPACE L. 181 (1999).

D. Official Publications**AGREEMENTS**

Constitution and Convention of the ITU (Geneva, 1992). In 1999, *accession* by: Seychelles, *ratifications* by: Albania, Nigeria;

Instruments Amending the Constitution and the Convention of the ITU (Geneva, 1992), Kyoto, 1994. In 1999, *accession* by: Seychelles, *ratifications* by: Albania, Nigeria.

Instruments Amending the Constitution and the Convention of the ITU 1992 (Minneapolis, 1998). In 1999, *acceptances* by: Denmark, Finland, and Slovakia; in 2000, *ratifications* by: Australia, Canada and Tonga.

CENTRE NATIONAL D'ETUDES SPATIALES (CNES)

Helios, Europe's eye in the sky - Dossier, CNES 1 (No. 7, Nov. 1999)

CONGRESS (US)

HOUSE COMM. ON SCIENCE, *HEARINGS BEFORE THE SUBCOM ON SPACE AND AERONAUTICS TO CONSIDER NASA FY2000 AUTHORIZATION REQUEST, PARTS I-V*, FEB. 11, 24, 25, MAR. 3, 11 1999, 106TH CONG., 1ST SESS (1999).

HOUSE COMM. ON INTERNATIONAL RELATIONS, *IRAN NONPROLIFERATION ACT OF 1999*, H. RPT. 106-315, SEPT. 14, 1999, 106TH CONG., 1ST SESS. (1999).

- HOUSE COMM. ON SCIENCE, HEARING BEFORE THE SUBCOM ON SPACE AND AERONAUTICS TO CONSIDER H.R. 1883, THE IRAN NONPROLIFERATION ACT OF 1999, TO DETER FOREIGN ENTITIES FROM ASSISTING IRAN TO OBTAIN NUCLEAR, CHEMICAL, BIOLOGICAL, OR MISSILE TECHNOLOGY, GOODS OR SERVICES, JULY 13, 1999, 106TH CONG., 1ST SESS. (1999).
- HOUSE COMM. ON SCIENCE, PRINTS, CONTINUATION OF A COMPILATION OF PUBLIC LAW TEXTS RELATING TO SPACE, SCIENCE, AND TECHNOLOGY REPORTED BY THE COMMITTEE DURING THE 85TH THROUGH 105TH CONGRESSES, VOL. IV., 106TH CONG., 1ST SESS. (1999).
- HOUSE COMM. ON SCIENCE, A COMPILATION OF FEDERAL SCIENCE LAWS, 106th Cong., 1st Sess. (Comm. Print 1999).
- HOUSE COMM. ON SCIENCE, COMPILATION OF PUBLIC LAWS REPORTED BY THE COMM. ON SCIENCE, 1958-1998, 106th Cong., 1st Sess. (1999).
- HOUSE COMM. ON SCIENCE, HEARING BEFORE THE SUBCOM. ON SPACE AND AERONAUTICS FISCAL YEAR 2000 NASA AUTHORIZATION, PTS. I-V, Feb. 11, 24, 25 and Mar. 3, 11, 1999, 106th Cong., 1st Sess. (1999).
- HOUSE COMM. ON SCIENCE, HEARINGS BEFORE THE SUBCOM. ON SPACE AND AERONAUTICS U.S. COMMERCIAL SPACE LAUNCH COMPETITIVENESS, PTS. 1 AND 2, Apr. 21 and June 10, 1999, 106th Cong., 1st Sess. (1999).
- HOUSE COMM. ON SCIENCE, HEARING BEFORE THE SUBCOM. ON SPACE AND AERONAUTICS SPACE SHUTTLE SAFETY, Sept. 23, 1999, 106th Cong., 1st Sess. (2000).
- SENATE COMM. ON COMMERCE, SCIENCE AND TRANSPORTATION, HEARING BEFORE THE SUBCOM. ON SCIENCE, TECH., AND SPACE OF THE INTERNATIONAL SPACE STATION, 105-762, Sept. 18, 1997, 105th Cong., 1st Sess. (1998).
- SENATE COMM. ON COMMERCE, SCIENCE AND TRANSPORTATION, HEARING BEFORE THE Subcom. on Science, Tech., and Space on International Satellite Reform, 105-829, July 30, 1997, 105th Cong., 1st Sess. (1999).
- SENATE COMM. ON COMMERCE, SCIENCE AND TRANSPORTATION, HEARING BEFORE THE SUBCOM. ON SCIENCE, TECH., AND SPACE ON COMMERCIALIZATION OF SPACE, 105-912, Mar. 5, 1998, 105th Cong., 2d Sess. (1999).
- SENATE COMM. ON COMMERCE, SCIENCE AND TRANSPORTATION, HEARING BEFORE THE SUBCOM. ON SCIENCE, TECH., AND SPACE ON S. 2365, INTERNATIONAL SATELLITE REFORM, 105-1032, Sept. 10, 1998, 105th Cong., 2d Sess. (1999).
- SENATE COMM. ON COMMERCE, SCIENCE AND TRANSPORTATION, HEARING BEFORE THE SUBCOM. ON SCIENCE, TECH., AND SPACE ON THE COMMERCIAL SPACE LAUNCH INDUSTRY, Sept. 23, 1998, 105th Cong., 2d Sess. (1999).
- SENATE COMM. ON GOVERNMENTAL AFFAIRS, HEARING BEFORE THE SUBCOM ON INTERNATIONAL SECURITY, PROLIFERATION, AND FEDERAL SERVICES TO EXAMINE COMPETITION AND NATIONAL SECURITY ISSUES RAISED BY EXPIRING 1993 U.S. BILATERAL SPACE LAUNCH TRADE AGREEMENT WITH RUSSIA (TEXT, AMENDED TEXT, P. 51-73), JULY 21, 1999, 106TH CONG., 1ST SESS., (1999).

CONGRESSIONAL RESEARCH SERVICE (CRS)

Issue Brief, *Space Launch Vehicles: Government Activities, Commercial Competition, and Satellite Exports* (Marcia S. Smith, CRS, March 20, 2000).

Issue Brief, *Space Stations* (Marcia S. Smith, CRS, March 20, 2000).

Executive (US)

INTERAGENCY WORKING GROUP, REPORT ON THE FUTURE MANAGEMENT AND USE OF THE U.S. SPACE LAUNCH BASES AND RANGES, Feb. 8, 2000.

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

Resolutions and Decisions of the Council of the International Telecommunications Union (General Revision, Geneva 1999).

UNITED NATIONS

General Assembly, Committee on the Peaceful Uses of Outer Space, Report of the Scientific and Technical Subcommittee on the Work of its Thirty-seventh session, Doc. A/AC.105/736 (2000).

General Assembly, Committee on the Peaceful Uses of Outer Space, Report of the Legal Subcommittee on the Work of its Thirty-ninth Session, Doc. A/AC.105/738 (2000).

General Assembly, Committee on the Peaceful Uses of Outer Space, *Report of the Committee on the Peaceful Uses of Outer Space*, Off. Rec. 54th Sess., Doc. A/54/20 (1999).

General Assembly, Committee on the Peaceful Uses of Outer Space, *Report of the Committee on the Peaceful Uses of Outer Space*, Off. Rec. 55th Sess., Doc. A/55/20 (2000).

General Assembly, *Report on the United Nations/International Astronautical Federation Workshop on Space: an Integral Part of Sustainable Development (Enschede, the Netherlands 30 Sept.-3 Oct. 1999)*, UN Doc. A/AC/105/733 (2000).

General Assembly, Scientific and Technical Subcommittee of UNCOPUOS, *Technical report on space debris*, UN Doc. A/AC/105/720 (2000).

Office for Outer Space Affairs, *Note by the Secretariat on international cooperation in the peaceful uses of outer space: activities of Member States*, UN Doc. A/AC/105/729 and Add.1 and 2 (2000).

Office for Outer Space Affairs, *Note by the Secretariat on national research on space debris, safety of nuclear-powered satellites and problems of collisions of sources with space debris*, UN Doc. A/AC/105/731 (2000).

Office for Outer Space Affairs, *Report of the Inter-Agency Meeting on Outer Space Activities* (Vienna, 2-4 Feb. 2000), UN Doc. A/AC/105/727 (2000).

Office for Outer Space Affairs, *Report of the Secretariat on the disposal of satellites in geosynchronous orbit*, UN Doc. A/AC/105/734 (2000).

Secretariat, *Report of the Secretary-General on the coordination of outer space activities within the UN system: programme of work for 2000 and 2001 and future years*, UN Doc. A/AC/105/726 (2000).

United Nations Programme on Space Applications and the Coordination of Space Activities within the United Nations System. *Report of the United Nations Expert on Space Applications*, UN Doc. A/AC/105/730 (2000).

E. Miscellaneous

INTERNATIONAL INSTITUTE OF SPACE LAW OF THE INTERNATIONAL ASTRONAUTICAL FEDERATION, PROCEEDINGS OF THE THIRTY-EIGHTH COLLOQUIUM ON THE LAW OF OUTER SPACE, OCT. 1999, AMSTERDAM, THE NETHERLANDS (AM. INSTITUTE OF AERONAUTICS & ASTRONAUTICS 2000). INCLUDED ARE:

IISL Board of Directors..... I

Introduction

N. Jasentuliyana..... III

LEGAL ASPECTS OF SPACE STATION UTILIZATION

Legal Aspects of Commercial Space Station Utilization: Views and Interim Results of the 'Project 2001' International Working Group on Space Stations

W. Stoffel, W. Ley..... 3

Legal environment for the Exploitation of the International Space station (ISS)

A. Farand..... 8

Legal aspects of Space Station Utilization

E. A. Frankle..... 18

US Commercial Space act of 1998 and its Implications for the International Space Station

T. Kosuge..... 28

Legal Status of the Crew in the International Space Station

G. Catalano Sgrosso..... 35

International Liability for Damages Caused by Persons or Space Objects in Outer Space or on Celestial Bodies to Persons, Properties or Environment in Outer Space or Celestial Bodies M. M. Esquivel de Cocca.....	50
--	----

Potential Patent Problems on the ISS C.H. Walker.....	60
---	----

Space Station and Space Debris O. Fernandez Brital.....	71
---	----

Registration and Jurisdiction Aspects of the International Space Station G.P. Zhukov.....	75
---	----

NEW DEVELOPMENTS RELATING TO LEGAL ASPECTS OF
TELECOMMUNICATIONS

Project 2001: Status Report of the Working Group on Telecommunication I. Polley, K.-U. Schrogl.....	83
---	----

Satellite Component of 3. Mobile Communications Generation J. A. Heilbock.....	87
--	----

Piercing the Diplomatic Veil: Encouraging Commercial Satellite Systems to Lead Negotiations Over Radio Frequency Spectrum by Reforming ITU Regulations R. M. Moore III.....	93
---	----

Legal Implications of Globalization Issues: From E-Commerce to the Internet L. F. Martinez.....	102
---	-----

Should GNSS Standard That Are Uniform for All GNSS Users Be Established, or Are Unimodal Standards Satisfactory? P. B. Larsen.....	109
--	-----

Stratospheric Stations: Do Their Operations Cause Sovereignty Problems? R. M. Ramferez de Arellano.....	118
---	-----

Legal Aspects of Geostationary Platforms in the Stratosphere M. Rothblatt.....	127
--	-----

What Future for the Discussions of the Geostationary Orbit?	
L. Perek.....	132

LEGAL IMPLICATIONS OF EXPANDING PRIVATISATION IN SPACE

Legal Framework for Expanding Privatisation in Space: Views and Interim Results from the "Project 2001" Working Group on Privatisation	
S. U. Reif, B. Schmidt-Tedd.....	139
Privatisation, Jurisprudence and Space	
F. Lyall.....	149
Property Rights and Space Commercialization	
J. Clayton-Townsend.....	159
Conference on Space Property Rights: Next Steps	
P. Dasch, M. M. Smith, A. Pierce.....	174
Comity in Space	
D. J. O'Donnell.....	179
Recent Developments in Patents for Outer Space	
B. L. Smith.....	190
Persistence Pays Off: The Case of Hughes Aircraft Company vs USA, 1976-1999	
C. Q. Christol.....	199
Shifts in U.S. Export Controls Force Changes Upon Commercial Satellite Manufacturers and Space Launch Providers	
D. Lihani.....	208
Lockheed Martin Intersputnik (LMI) as a Form of Commercialization in the Activity of the Intergovernmental Satellite Organization	
V.S. Veshchunov.....	218
Legal Implications on Satellite Procurement and Trade Issues between Japan and the United States	
M. Sato, T. Kusuge, P. van Fenema.....	224

Financial Responsibility and Government Indemnities for Commercial Space Launch Activities - The Australian Approach	
M. E. Davis, R.J. Lee.....	240
International Certification for Commercial Reusable Space Transportation	
W. A. Gaubatz.....	246
The 1994 Baikonur Agreements in Operation	
M. Hoskova`.....	263
International Law and Domestic Laws Governing Commercial Space Activity by Space Stations	
G. Gal.....	273
Space Imaging Data Policy and Regulatory Structures	
M. Bourbonniere, L. Haeck.....	278
OTHER ISSUES OF SPACE LAW	
Project 2001: Status Report on the Interim Results of the Working Group Launch and Associated Services	
P.S. Makiol, G. Gruber.....	293
Legal Considerations Affecting Commercial Space Launches from International Territory	
E.A. Frankle, E.J. Steptoe.....	297
Remarks on the Notion of Launching State	
A. Kerrest.....	308
International Cooperation in Launching Facilities	
V. Leister, M. C. Frazier.....	316
Legal Aspects of Launching Space Objects from Non-terrestrial Sites	
M. Longo.....	323
A Launch is a Launch is a Launch is a Launch?	
O.M. Ribbelink, P.H. Tuinder.....	325
Globalization, Sovereignty and the Common Heritage of Mankind	
J. F. Galloway.....	340

The Challenge of the World Knowledge Gap and Space Law J. Monserrat Filho.....	344
Reemerging Concepts of International Space Law Y. Hashimoto.....	353
Exobioethics - Legal Principles for Interactions With Non - Terran Species M. Rothblatt.....	358
What Role for International Organisations in the Century Ahead? G. Lafferranderie.....	361
Implications of a Proposal for Real Property Rights in Outer Space W.N White, Jr.....	366
Earth Observation and Data Policy in Europe: The Legal Issues - The EOPOLE Concerted Action Project F.G. von de Dunk.....	373
Twentieth Anniversary of the 1972 Moon Treaty: The Legal Status of the Moon and Other Celestial Bodies Revisited in the Light of Commercialisation of Outer space Activities M. N. Andem.....	383
Should the Lunar Crater SAHA Be Accorded Special Legal Protection? P.M. Sterns, L. I. Tennen.....	393
Current Legal Issues Pertaining to Space Solar Power Systems P.B. Larsen.....	401
Creating an International Regime for Property Rights under the Moon Agreement R.J. Lee.....	409
Cyber Terrorism and Activities in Outer Space R. Abeyratne.....	419
Japanese Earth Observation Data Policy, Past, Present and Future Prospects M. Onoda.....	433

Eighteenth IAA/IISL Scientific-Legal Roundtable on
PROTECTION OF THE SPACE ENVIRONMENT

Summary.....	444
Planetary Spacecraft Debris - The Case for Protecting the Space Environment	
M. Williamson.....	445
Protection of the Planetary Environment - The Point of View of an Astronomer	
I. Almar.....	456
Man-Made Debris In and From Lunar Orbit	
N. L. Johnson.....	462
Protection of the Space Environment and Law	
F. Lyall.....	472
The Scientific/Legal Implications of Planetary Protection and Exobiology	
P.M. Sterns.....	483
The Ethical Dimensions of Space Settlement	
M.J. Fogg.....	493

ADDENDA

Discussion Session IISL Colloquium Amsterdam 1999	503
Annual Report 1999: Standing Committee on the Status of International Agreements Relating to Activities in Outer Space	507
Manfred Lachs Space Law Moot Court Competition 1999.....	518
Statutes of the International Institute of Space Law of the International Astronautical Federation.....	543
Author Index.....	549

CURRENT DOCUMENTS

REPORT OF THE THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE⁺

XI. Conclusions and proposals of the Workshop on Space Law in the Twenty-first Century, organized by the International Institute of Space Law^{*}

A. Introduction

1. The Workshop on Space Law in twenty-first Century, organized by the International Institute of Space Law, noted that the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, (General Assembly resolution 2222 (XXI), annex, of 19 December 1966) and other international instruments built upon it had been successful in answering the challenge to create a legal framework for exploration and peaceful uses of outer space and had thereby preserved the space environment for the benefit of humankind. However, the present significant changes in space activities had given rise to a need for further developing that framework, while protecting what the international community had gained.

2. The Workshop also noted that the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, as a vehicle for law-making within the United Nations, was currently in a unique position to take up issues related to space law in an exploratory way. Those issues could be dealt with by the Legal Subcommittee in a flexible manner, subject to decision by the Committee and the General Assembly on the sequence in which they should be included in the agenda of the Subcommittee.

3. The Workshop proposed the recommendations listed below.

⁺ UN Doc. A/CONF.184/6

^{*} UN Doc. A/CONF.184/C.1/L.12.

Conclusions and proposals

4. The rapid expansion of private activities in and related to outer space requires examination of many aspects of existing space law, in particular:

(a) With respect to space application services, which give rise to responsibility, liability and jurisdiction issues not currently covered by space law;

(b) The impact of commercialization and privatization of space activities on the public service aspects of such services;

(c) Intellectual property rights and technology transfer issues that may require special treatment for global uniformity in practice;

(d) The protection of investors' rights as regards space objects and space artefacts, which may require totally new approaches in order for it to be effective and enforceable;

(e) The nationality of spacecraft;

(f) The protection of the environment, where private entities are currently not held directly accountable.

It is recommended that a new paragraph 319 *bis* be added to the draft report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (A/CONF. 184/3 and Corr. 1 and 2) as follows:

"319 *bis*. Member States of the United Nations should initiate discussion of and seek solutions to emerging legal problems of relevance and should, in particular recognize the need to consider the expanding role of private enterprise when making new laws. With regard to the protection of the environment, the establishment of launch standards and environmental impact assessments should be examined. Specialized agencies should consider drafting standards and recommended practices as well as models for partnerships involving public and private enterprises in their respective sectors of space activity. The concept of 'public service' and its various manifestations should be developed further, paying particular attention to the global public interest and to the needs of developing countries. The principles of fair trade should be strengthened. Attention should also be paid to the various aspects of the issues of liability and security of ownership in order to arrive at a coherent global framework. The international organizations concerned should make arrangements for effective and focused joint forums."

5. The use of outer space is expanding and many of the resources (orbits, frequencies, access to ground infrastructure etc.) have turned out to be limited. Consequently, such resources should be dealt with by means of coherent frameworks for global resource management. The global public interest in this field can be safeguarded primarily by public institutions. There is currently a need for coordination in this area. It is recommended that a new paragraph 319 *ter* be added to the draft report as follows:

"319 *ten* Member States of the United Nations should consider possible coordinating frameworks for space-related global resource management. This work should focus on the needs, the potential conflicts, the natural limits, the values, the costs and the growing privatization of space activities. International organizations involved in space activities should seek coordination at an early stage. There is a need to have at least a code of conduct concerning space debris. To this end, previous work in this area should be taken into account with a view to identifying possible models. The Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, together with its Scientific and Technical Subcommittee, should discuss the topic without delay. The development of a legal regime for low-Earth orbits (LEOs) should be considered, taking into account recent changes in the ITU convention concerning the status of LEOs as limited natural resources. The issue of security of ownership regarding spacecraft should be addressed promptly, for example, by means of an international inventory linked to the Register of space objects maintained by the Secretary-General of the United Nations. The General Assembly should encourage Member States to adhere to the Convention on Registration of Objects Launched into Outer Space (Assembly resolution 3235 (XXIX), annex, of 12 November 1974). In the context of the role of international organizations, the issue of consumer rights should be dealt with. The General Assembly, through the Committee on the Peaceful Uses of Outer Space and/or through special meetings for this purpose, should consider soon how best to coordinate the burgeoning demands on global resources generated by expanding space activities, both governmental and non-governmental."

6. The ongoing development of space activities requires the resolution of a growing number of issues. Space activities are increasingly being affected by the expanding body of international economic law, which is blurring the boundaries between public and private law and generating more reliance on recommended standards and practices. In this environment, it is important to have appropriate dispute settlement mechanisms for giving effect to the principles of outer space law in a flexible and timely manner. It is recommended that a new paragraph 319 *quater* be added to the draft report as follows:

"319 *quater*. The General Assembly should consider the development of effective mechanisms for the settlement of disputes arising in relation to space commercialization. Those mechanisms should take into account existing arbitration rules used in international practice for dispute settlement."

7. The expanding growth in areas such as commercial remote sensing services, commercial complexity, the effect on international cooperation and scientific and industrial applications of services necessitates consideration of appropriate regulations. National restrictions on access to data are emerging. It is recommended that a new paragraph 32 *bis* be added to the draft report as follows:

"321 *bis*. The Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space should initiate the drafting of a treaty covering remote sensing from outer space on the basis of the Principles Relating to Remote Sensing of the Earth from Outer Space (General Assembly resolution 41/65, annex, of 3 December 1986), taking into particular account the expanding growth in commercial remote sensing services and preserving the principle of non-discriminatory access to data."

8. Many emerging issues are influenced by rapid advances in space science and technology. Space law should be based upon a solid foundation of scientific and technological facts to ensure effective legal formulation. Interaction among scientific and legal experts will strengthen the relevance of space law. It is recommended that a new paragraph 321 *ter* be added to the draft report as follows:

"321 *ten* The Legal Subcommittee and the Scientific and Technical Subcommittee should in general meet at the same time so that there can be more interaction involving the work of those two bodies."

9. One of the most challenging new developments in space activities concerns expanding global navigation satellite services. It is recommended that a new paragraph 175 *bis* be added to the draft report as follows:

"175 *bis*. The recommendations set forth in paragraphs [319 *bis*, 319 *ter*, 319 *quater*, 321 *bis* and 321 *ter*] below should apply, where relevant, to GNSS."

C. Final remark

10. The proceedings of the Workshop on Space Law in the Twenty-first Century should be referred to for clarification of the above-mentioned issues and recommendations.

XV. Conclusions and proposals of the Workshop on Space Debris**

1. The objective of the Workshop on Space Debris was to inform participants of the current status of the knowledge and the extent of the space debris problem, applied space debris mitigation measures and activities related to space debris by professional societies, the Inter-Agency Space Debris Coordination Committee and the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space.

2. Presentations were given on the following aspects of the space debris problem:

(a) The complete technical spectrum of the space debris issue, including measurements, modeling, mitigation (active and passive protective measures and debris preventative and reduction measures), the effects of the particulate environment on space systems, hazards in space and on the ground, and risk analysis;

(b) Space debris mitigation measures currently in use by space agencies and space operators;

(c) Activities related to space debris involving space agencies and the Inter-Agency Space Debris Coordination Committee, including the definition of space debris mitigation guidelines and standards;

(d) Activities related to space debris involving professional organizations (the International Academy of Astronautics, the Committee on Space Research and the International Astronautical Federation) and their recommendations;

(e) Deliberations of the Scientific and Technical Subcommittee on space debris. 3. The Workshop participants strongly supported the work being done by the United Nations, the Inter-Agency Space Debris Coordination Committee, the International

Academy of Astronautics and others to develop guidelines designed to minimize the creation of new debris objects.

4. In particular, it was recommended that:

** UN Doc. A/CONF. 184/C. I/L. 16.

(a) The United Nations should continue its work on space debris;

(b) Debris minimization measures should be applied uniformly and consistently by the entire international space-faring community;

(c) Studies should be continued on future possible solutions to reduce the population of on-orbit debris.

5. The Workshop concluded with a round-table discussion on the theme "Future directions of space debris research". In the discussion, the issue of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space considering space debris was addressed.

6. It was noted that the current technical knowledge on space debris had been summarized in the technical report on space debris (A/AC.105/720) of the Scientific and Technical Subcommittee, which was fully supported by the International Academy of Astronautics.

XVII. Conclusions and proposals of the Workshop on Intellectual Property Rights in Space***

1. The results of the discussions held by the participants of the Workshop on Intellectual Property Rights in Space may be summarized as follows:

(a) It was recognized that significant changes and developments in space activities gave rise to new issues, such as those relating to intellectual property rights;

(b) It was realized that the protection of intellectual property rights played an essential role in the development and transfer of space technology under current political and economic conditions, which had resulted in a shift in the focus of space activities towards a greater emphasis on commercial opportunities and the potential benefits of privatization, as described in paragraphs 283, 317 and 321 of the draft report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) (A/CONF.184/3 and Corr.1 and 2);

(c) It was noted that effective and appropriate protection of intellectual property rights should encourage and facilitate the transfer of technology to developing countries;

*** UN Doc. A/CONF.184/C.1/L. 18.

(d) It was recognized that the increasing number of international cooperative programmes in outer space required the continued harmonization of international intellectual property standards and legislation;

(e) It was noted that the subject of commercial aspects of space activities, including property rights, was discussed for possible inclusion as an item on the agenda of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, as described in paragraph 321 of the draft report of UNISPACE III.

2. The participants of the Workshop recommended the following action to address the common challenges:

(a) More attention should be paid to the protection of intellectual property rights, in view of the dramatic growth in the commercialization and privatization of space-related activities. However, the protection and enforcement of intellectual property rights should be considered together with the international legal principles developed by the United Nations in the form of treaties and declarations, such as those relating to the principle of non-appropriation of outer space;

(b) The feasibility of harmonizing international intellectual property standards and legislation relating to intellectual property rights in outer space should be further explored with a view to enhancing international coordination and cooperation at the level of both the State and the private sector. In particular, the possible need for rules or principles covering issues such as the following could be examined and clarified: applicability of national legislation in outer space; ownership and use of intellectual property rights developed in space activities; and contract and licensing rules;

(c) Steps should be taken to increase awareness of the importance of protecting intellectual property rights as a means of promoting the transfer of technology, or providing developing countries with reasonable access to data, and of fostering spin-off benefits. All States should provide appropriate protection of intellectual property rights involving space-related technology, while encouraging and facilitating the free flow of basic science information;

(d) Educational activities concerning intellectual property rights in relation to outer space activities should be encouraged;

(e) The United Nations, through the Committee on the Peaceful Uses of Outer Space and its Legal Subcommittee, should investigate ways to enhance understanding of the issues outlined above. In view of the highly technical aspects of intellectual property rights, the involvement of other

intergovernmental organizations, in particular, the World Intellectual Property Organization, would be highly desirable.

MANFRED LACHS SPACE LAW MOOT COURT **COMPETITION 1999⁺**

Case Concerning The Mor-Toaler Sea-Launch Project (Brezonec vs. Mastodonia)

Statement of Facts

A private consortium, the "Mor-Toaler Company" (hereinafter "Mor-Toaler"), was created in 1992 to launch spacecraft from the sea. It is incorporated under the Law of Crocodilia, an island which is a dependent territory of Mastodonia. Mor-Toaler is owned by several investors, but there is no majority shareholder¹.

In 1997, Mor-Toaler had a self-propelled semi-submersible North Sea oil-drilling platform converted into a launch platform. This conversion was done by the Norwegian company Renrek, a well-known ship builder and minority shareholder in Mor-Toaler. The platform, named "Freya", was registered in and now flies the flag of Freedonia. A number of Western European governmental reports have criticized Freedonia for its failure to meet the requirements of the International Maritime Organization both as to safety matters, and as to the qualifications of officers on board its vessels. The "Assembly and Control Ship" (ACS) from which command functions are performed is the "Nemo", which is also registered in Freedonia.

Mor-Toaler launches are conducted as follows. The first and second stages of the launch vehicle are purchased from the country of Oristan, a former part of the USSR. Stages-to-Go, a company incorporated in the nation of Diamondia, provides the third stage. Other elements for the final assembly are bought on the international industrial market. The various launch components are brought together in San Francisco, and loaded on the

⁺ Statement of Facts reproduced here with AIAA permission. For full texts, including the award-winning Memorial, please see the Amsterdam Colloquium in 42 PROC. COLLOQ. L. OUTER SPACE (AIAA, 2000).

¹ The shareholders include: a Mastodonian company, MastodInvest (20%); the "Société Internationale d'Activités Spatiales" (SIAS) (25%); the British "Outward Bound Company" (OBC) (20%); the "Company for Space Activities" (CSA, a Russian company) (15%); a Norwegian company, "Renrek" (10%); and the Order of Sicily (OS), an organization with charitable purposes and limited international personality, legally akin to the Order of Malta or the Knights of St. John, which has its headquarters in Sicily (5%). The balance of the shareholding is held by minor investors in the USA and Europe.

Nemo before the Nemo proceeds into international waters. Assembly of the launch vehicle is carried out on board the Nemo while in transit to the launch location. Mor-Toaler launches occur near the equator, in an area protected from poor weather. This launch site is in the Exclusive Economic Zone of the nation Brezonec, which has been properly proclaimed in accordance with the 1982 Convention on the Law of the Sea.

The Nemo provides accommodation for up to 300 crew members, as well as for representatives of the customers for a particular launch, and 'Very Important Persons' from other potential customers. On-board services include medical, dining, recreation and entertainment facilities.

On board the Nemo, the launch vehicle "Lega" is assembled and the payload is integrated with it. The launch vehicle with payload aboard is then passed from the Nemo to Freya, in a condition ready to launch. The Nemo then sails to a safe distance and acts as the launch command centre, using radio links. During the launch phase, all personnel are removed from the Freya platform and every operation is controlled from the command ship.

The first launch by Mor-Toaler occurred in January 1998. The payload on the first launch was a satellite named "Loki". It was designed to be used as part of a Global Maritime Safety and Communications System. At launch, Loki belonged to "Zeon", a company incorporated in the USA and the satellite itself was registered on the US Space Registry. Loki was to provide Command, Navigation and Surveillance, Air Traffic Management (CNS/ATM) services for the International Civil Aviation Organization for the use of aircraft in the Atlantic Ocean region.

The launch of Loki was successful. After the launch and almost three months of use without problem, Loki was sold to MastodSpace on April 1, 1998. MastodSpace is incorporated under the law of Mastodonia. The USA was informed of the sale. On April 8, 1998, notification was drafted to transfer Loki to the Mastodonian Space Registry, but this notice had not yet been transmitted to that Registry when, on April 15, 1998, an explosion occurred in the third stage of the vehicle which had placed Loki in orbit and much debris was created.

From telemetry and radar data it is clear that on April 16, 1998, one large piece of the third stage of the launcher collided with Brezosat, a telecommunications satellite. Brezosat was part of an eight-satellite low-earth-orbit satellite telecommunication constellation operated by a Brezonec company, Brezoncom, which is 51% state-owned. Brezosat ceased to function as a result of the collision. Before the collision, the Brezoncom system had already been having problems. A number of its satellites had failed due to faulty manufacturing processes in Brezonec. Further, because of a series of launch accidents the satellites held in reserve for replacement of failing satellites in the Brezoncom system had already been used, and the whole system was considered generally unreliable. As a result of the collision, many customers of the Brezoncom System cancelled

their contracts. A conservative estimate is that the loss of contracted business for Brezoncom amounts to US\$90 million. In addition, Brezonec itself is now paying some US\$50 million a year to foreign satellite systems to provide the services it otherwise would have carried on the Brezoncom system. Brezonec is highly dependent upon its Brezoncom satellite system for its internal and external telecommunication needs.

No public inquiry into the possible cause of the accident has been conducted, but a team formed by insurance companies involved has determined that the explosion likely occurred because the fuel tanks of the third stage of the launch vehicle had not been fully and properly emptied (vented) once Loki had been inserted into its orbit. Neither the law of Mastodonia, nor the terms under which it registers space objects, mention such a procedure. The venting of fuel tanks, however, is an industry standard and the licensing requirements of most other launching states require venting in order to avoid such occurrences.

On April 29, 1998, Loki itself suddenly stopped transmissions. Space surveillance systems have established that it also was hit by debris from the exploded stage three of its launch vehicle. As a result, the accuracy of the regional CNS/ATM system has been greatly diminished and an accident happened to an aircraft relying on the system. The aircraft was owned by Brezonec-Air. It was on a flight from Brezonec-City to Gravascar, a well-known place of pilgrimage in Mastodonia. It crashed with 200 people on board. Most of the passengers were Brezonec citizens. Also among the dead were seven young executives from Oil-Croc, a major privatized oil company incorporated in Crocodilia. Three of these were British, and two Danish. Brezonec-Air, which is wholly owned by the Brezonec government, recently acceded to the International Air Transport Association sponsored revision to the Warsaw Convention system, and therefore faces large claims in respect of these deaths. The current sum claimed in respect of the deaths amounts to US\$250 million, and the aircraft itself cost US\$17 million. It has been determined that the accident was wholly attributable to the failure of Loki.

Following these events, Brezonec requested full compensation from Mastodonia which it held responsible for the damage. An exchange of letters between the Parties concerning the claims, and attempts to settle the matter through diplomatic channels as called for by the Liability Convention failed. Neither Party has requested the establishment of a Claims Commission under the Liability Convention. To resolve the matter, the Parties have agreed to refer the case to the International Court of Justice (ICJ). Brezonec seeks reparation from Mastodonia for the damage caused by the space debris to the Brezosat telecommunication satellite, and for the crash of the Brezonec-Air aircraft. Both Brezonec and Mastodonia have ratified the Outer Space Treaty, the Agreement on Rescue and Return of Astronauts, the Liability Convention, the Registration Convention and

the Moon Agreement. Both are members of the International Civil Aviation Organization and the International Telecommunication Union.

Issues

The ICJ has determined that any questions of quantum - the amount of the claims - shall be deferred until after the Court decides the liability issues. Briefs and argument should not speculate as to quantum. Furthermore, students should not elaborate on the Warsaw System but assume that the amount of damages with respect to the victims of the crashed aircraft is settled.

The following issues are reserved for briefing and argument to the Court under the agreed compromis. There are no issues of jurisdiction or standing, and briefs and arguments with regard to the issues or remedies are to be confined solely to legal principle.

1. Whether Mastodonia is liable under international law for:
 - a) the damage to the Brezosat satellite,
 - b) the loss of business contracts on the Brezoncom system, and
 - c) costs incurred by Brezonec to procure replacement services on other satellite systems.
2. Whether Mastodonia is liable under international law for:
 - a) the loss of the Brezonec-Air aircraft, and
 - b) all or some of the damages which Brezonec-Air may be required to pay under the contractual revision to the Warsaw system of damages in air transport.

Summary of Arguments in Memorial of the Applicant

by

Irene Aupetit and Mickael Torrado

University of Paris XI

Winners of the "Journal of Space Law" Award for the Best Memorial

The case presently in front of the International Court of Justice is neither an unique case nor a fiction. It is based on events and facts fully foreseeable. Rockets' upper stages represent 16% of the objects polluting space. The risks of explosion due to non-venting of the upper stage propellants are evident for all cautious operators. The situation is particularly critical in Low Earth Orbit, which was Brezosat's orbit.

The dangers linked to the negligence of launching States, polluting Outer Space and Earth's orbits, are important enough for the United Nations to raise the question. The attitude of the launching States is in contradiction with the co-operation principle which must prevail in the

use of Outer Space. In the present case, the liability regime for damages caused by space objects is provided by two international conventions: The Outer Space Treaty and The Liability Convention; since both treaties are in force between Mastodonia and Brezonec they are bound by it and must perform the obligation in good faith. When delivering its judgement, the court has not only to remember the co-operation principle which is at the base of Space Law but also offer a safe legal framework for States willing to develop satellite networks in Low Earth Orbit to make benefits for Earth.

Argument no.1: Mastodonia is liable under international law for the damage to the Brezosat Satellite:

- I. The collision is a case of liability according to international space law
 - A. The third stage of Lega is a space object, so the international liability regime is applicable
 1. An interpretation in accordance with the principle of the most evident solution
 2. A solution in conformity with the interpretation according to the "effet utile" principle
 - B. Even if the Court decides that the third stage (of Lega) is a space debris, the international liability regime is still applicable
- II. Mastodonia's status makes it accountable
 - A. Mastodonia is the main (only) launching State
 1. Brezonec is not a launching State
 - a) Brezonec is not a State which launches
 - b) Brezonec did not procure the launching
 - c) The launching did not occur from Brezonec's territory
 - d) Brezonec's facilities have not been used in the launching
 2. Mastodonia is a launching State
 - a) Mastodonia is a State which launches
 - b) Mastodonia procured the launching
 - c) Mastodonia's facilities have been used in the launching
 - B. Mastodonia is an "appropriate State"
- III. Mastodonia has committed a fault
 - A. Mastodonia (through MastodSpace) violated the specific obligation of passivation
 - B. Mastodonia violated the general obligation of due diligence

Argument no. 2 and 3: Mastodonia is liable under international law for the loss of business contracts on the Brezocom system, and costs incurred by Brezonec to procure replacement services on other satellite systems.

- I. Mastodonia has to compensate for the loss of business contract
 - A. The nature of the damage is a direct loss of profit

- B. Even if the loss of contract is an indirect damage it still is recoverable

II. Mastodonia is liable for the cost of replacement of service

Argument no. 4: Mastodonia is liable in regard to loss of Brezonec-Air aircraft.

I. Mastodonia is accountable under the Liability Convention

A. The damage due to the loss of the signal is covered by the Liability Convention

- 1. The signal as a "space object" is within the scope of the Liability Convention
- 2. The signal as a space service is included in the scope of the Liability Convention

B. Mastodonia is the launching State

- 1. Loki belongs to Mastodonia
- 2. The piece of Lega which collided Loki belongs to Mastodonia

C. The damage is proximate

II. Mastodonia is liable as segment provider under International General Law

- A. According to general rules
- B. The ICAO norms

Argument no. 5: Mastodonia is required to pay for all damages.

I. The contractual revision of the Warsaw System applies

II. Mastodonia is at least liable under the Warsaw System

JOURNAL OF SPACE LAW

We have purchased the reprint rights of vols. 1-13 of the

JOURNAL OF SPACE LAW

William S. Hein & Co., Inc., 1285 Main Street, Buffalo, New York 14209

Subscriptions should be made payable to the JOURNAL OF SPACE LAW and paid for by check drawn on a U.S. bank or money order in U.S. dollars or by VISA/Mastercard:

Mail Order Journal of Space Law **Fax Order** (1) 662/234-2391
Post Office Box 308
University, MS 38677 USA

The 2000 subscription rate for two issues, incl. postage and handling:
Domestic USA individuals.....\$94.80
Domestic organizations.....\$112.80
Foreign individuals, regular mail.....\$99.80; airmail.....\$117.80
Foreign organizations, regular mail.....\$117.80; airmail.....\$135.80
Single issue price is \$65.

Special Discounts up to 50% available on vols. 14-25

.....

Order for 1999 Volume 27 (Nos. 1 & 2) \$ _____

Order for 2000 Volume 28 (Nos. 1 & 2) \$ _____

TOTAL \$ _____

Name: _____

Company/Organization: _____

Address: _____

City: _____ State: _____

Country: _____ Zip: _____

Telephone No: (____) _____; Fax No: (____) _____

For Credit Order (please add 5%) _____ VISA _____ MASTERCARD

No: _____ Exp. month _____ Year _____