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UNIVERSITY OF MISSISSIPPI SCHOOL OF LAW
A JOURNAL DEVOTED TO SPACE LAW AND THE LEGAL PROBLEMS ARISING OUT OF HUMAN ACTIVITIES IN OUTER SPACE.

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FOREWORD

THE JOURNAL OF SPACE LAW: 30TH ANNIVERSARY

Joanne Irene Gabrynowicz[1]

"The longer you look back, the further you can look forward."
--Winston Churchill

This volume marks the 30th anniversary[2] of the JOURNAL OF SPACE LAW. Thirty years ago, the *Salyuts* and *Skylabs* of the Soviet Union and the United States were the center of human space activities. In planetary space, the focus was Mercury, Mars and beyond. *Mariner 10* launched and became the United States', and history's, only Mercury mission. The Soviets launched three Mars missions. The United States' *Pioneer 11* launched and then explored Jupiter and Saturn. It later became the second spacecraft to leave the solar system. Numerous launch vehicles carried scores of communications, remote sensing, weather, environmental, life sciences and national security satellites into orbit. The names *Aeros*, *Agena*, *Altair*, *Anik*, *ANS*,[3] *Atlas*, *ATS*,[4] *Aureole*, *BMEWS*,[5] *Burner*, *Copernicus*, *Cosmos*, *DMSP*,[6] *DSCS*,[7] *Explorer*, *Hawkeye*, *Helios*, *IMEWS*,[8] *Inter-*

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[1] Joanne Irene Gabrynowicz is the Editor-in-Chief of the JOURNAL OF SPACE LAW. She is also a professor of space law and remote sensing law and the Director of the National Remote Sensing and Space Law Center at the University of Mississippi School of Law. Prof. Gabrynowicz was the recipient of the 2001 *Women in Aerospace Outstanding International Award* and is a member of the International Institute of Space Law and the American Bar Association Forum on Air and Space Law. She may be reached at www.spacelaw.olemiss.edu.

[2] The numerical anniversary would have been 2003. However, no issue was published in 2002 due to the death of the JOURNAL OF SPACE LAW's founder, Dr. Stephen Gorove. Therefore, 2004 is the 30th production anniversary.

[3] Astronomical Netherlands Satellite

[4] Applications Technology Satellite

[5] Ballistic Missile Early Warning System

[6] Defense Meteorological Support Program

[7] Defense Satellite Communication System

[8] Integrated Missile Early Warning Satellite

cosmos, *Intasat*, *ITOS*,[9] *Luna*, *Mars*, *Meteor*, *Miranda*, *Molniya*, *NTS*,[10] *Oscar*, *Pioneer*, *Prognoz*, *San Marco*, *SDS*,[11] *SESP*,[12] *SMS*,[13] *Soyuz*, *Symphonie*, *Tansei*, *Telesat*, *Titan*, *Transtage*, and *Westar* entered or continued in the space lexicon.[14]

In 2004, human spaceflight centers on the 16-nation *International Space Station*. The focus of planetary science is Mars, Saturn, comets and asteroids. The United States' rovers, *Opportunity* and *Spirit* are on the surface of Mars, and the European Space Agency's (ESA) *Mars Express* is in its orbit. All have returned historic data. ESA's *Rosetta* mission is on its way to Comet 67P and the United States' *Deep Impact* is set to be launched toward Comet Tempel 1. The Moon continues to be a destination of interest and ESA's *Smart 1* is currently en route. The United States and Europe are almost at Saturn and its Moon, Titan, with their respective missions, *Cassini* and *Huygens*. Japan's *Hayabusa* completed its Earth swing-by and is well on its way to the asteroid Itokawa. In physics, *Gravity Probe- B* is testing two of Albert Einstein's predictions of general relativity. Launch vehicles continue to transport numerous application satellites into space that carry out the many services upon which humanity has come to rely.

On a smaller time scale, since the last volume of the JOURNAL OF SPACE LAW, United States President George W. Bush announced that the United States has a new direction in civil space activities: returning to the Moon permanently and then on to Mars. Important steps were taken toward establishing global environmental monitoring systems. The Group on Earth Observations held the second Earth Observation Summit in Tokyo and adopted a Framework Document for a 10-Year Implementation. The European Commission is developing a

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[9] Improved TIROS Operational Satellite
[10] Navigation Technology Satellite
[11] Satellite Data System
[12] Space Experiments Support Program
[13] Synchronous Meteorological Satellite
[14] DESMOND G. KING-HELE, ET AL., THE R.A.E. TABLE OF EARTH SATELLITES 1957 - 1989, 320-389 (Royal Aerospace Establishment, Famborough, Hants, 4th ed. 1990) (this list is for 1973 – 1974).

white paper to define a Global Monitoring for Environment and Security strategy.

In terms of the exploration and use of space, reasonable people may hold different views as to whether progress has been made in the last thirty years or whether the *status quo* has simply been maintained. However in legal terms, all would have to agree that one thing has changed. There is now a new generation of space lawyers entering the field, bringing with them the unique perspective of their generation. For them, *Apollo* was something that happened in their parents' generation. They were infants when the *Skylabs* and *Salyuts* were the focus of space activities. This generation of space lawyers is as likely to deal with issues of space tourism liability as it is with international public space law.

Another new trend is the expansion of the space law community with a complement of specialists from other bodies of law. The complexity of satellite financing, for example, has catalyzed the private international financing law community to promulgate the Convention on International Interests in Mobile Equipment[15] and its Preliminary Draft Protocol on Matters Specific to Space Assets.[16]

President Bush's announcement already has space lawyers, the new generation and the more experienced, revisiting treaty negotiation histories. The global monitoring plans are raising long-term legal issues being addressed by space lawyers and non-space lawyers alike. The nascent legal foundation of these activities, including the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters[17] is challenging signatories to define

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[15] Convention on International Interests in Mobile Equipment, Nov. 16, 2001, UN Doc. No. A/AC.105/C.2/2002/CRP.3 (now referred to as the Cape Town Convention).

[16] Preliminary Draft Protocol on Matters Specific to Space Assets, UNIDROIT 2004, Study LXXIIJ, Doc. 13, *available at* http://www.unidroit.org/english/workprogramme/study072/history.htm (last visited April 24, 2004).

[17] Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, *available at* http://www.disasters-charter.org/charter_e.html (last visited April 24, 2004).

"space data" and "space facilities" as well as "crisis" and "natural or technological disaster."[18]

The 30th Anniversary issue of the JOURNAL OF SPACE LAW reflects these important space law trends. It includes articles from George S. Robinson and Frans G. von der Dunk, established and well-respected space lawyers, as well as Anna Marie Balsano, Aude de Clercq, Donna M. Shafer, and Amy Voight LeConey, members of the new generation of space lawyers. There is also an article by Hans P. Sinha, a Swedish native, international criminal law expert and professor of clinical criminal law. He examines the jurisdiction provisions of the *International Space Station* Intergovernmental Agreement from the perspective of international criminal law. Representing the space law student community—the source of both future space lawyers and other specialists—is a paper by Maria Nikolaevna Bjornerud, a native Russian speaker and an official translator, and a law student. She also translated the legal agreements appended to her paper. Another law student, Tracy Bowles, contributed the updated space law bibliography.

On the 60th anniversary of the JOURNAL OF SPACE LAW, one can imagine the then Editor-in-Chief sitting down to write the foreword to the anniversary volume. That Editor might think it a good idea to compare space activities as they existed at the time of the JOURNAL's founding with the space activities of 2034. It is harder to imagine what that comparison might look like. Nonetheless, that Editor will be able to say what this Editor is saying: one thing is certain. There will be a new generation of space lawyers and visiting experts from other fields to serve humanity as it continues its journey in exploring and using space.

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[18] *Id.* at art. 1.

THE COMMUNITY PATENT AND SPACE-RELATED INVENTIONS

Anna Maria Balsano[*] *and Aude de Clercq*[**]
Legal Affairs
European Space Agency

I. INTRODUCTION

Can inventions made in outer space be patented on Earth? Can the use of patented inventions be protected in outer space? These two questions lacked clear answers before the European Council reached agreement on a common political approach regarding the Community Patent Regulation (Regulation) in March 2003.[1] This paper will demonstrate that the answers to these questions are in the affirmative.

The Regulation, long awaited by intellectual property specialists and industry, will create a unitary patent valid Community-wide with centralised and simplified procedures. But it is also an important instrument for reasons specifically pertinent to space activities. The Regulation is made explicitly applicable to inventions created or used in outer space, including on celestial bodies or on spacecraft which are under the jurisdiction and control of one or more Member States (Article 3).[2]

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[1] Proposal for a Council Regulation on the Community Patent. Ref., COM(00)412 final; 2000/0177 (CNS) Brussels, *available at* http://register.consilium.eu.int/pdf/en/03/st08/st08539en03.pdf (Jan. 8, 2000) [hereinafter Proposal].

[2] *Id.* at art 3, §2, p. 38, "This regulation shall apply to inventions created or used in outer space, including on celestial bodies or on spacecraft, which are under the jurisdiction and control of one or more Member States in accordance with international law."

II. MAIN ISSUES SURROUNDING SPACE-RELATED INVENTIONS

The issue of patentability of space-related inventions is becoming increasingly important, especially with the International Space Station (ISS)[3] nearing completion. The ISS, one of the most important examples of cooperation among spacefaring nations, is the most appropriate test case for reviewing the effect of the regulatory environment with respect to intellectual property rights in outer space. This is because the astronauts' long-term presence in the ISS research environment could lead to inventions eligible for patent protection. Similarly, patented inventions made on Earth will be used in the Space Station.

For what kinds of experiments could the ISS be used? Human physiology, medicine, biology, physical science or the pharmaceutical sector have been identified as areas which will definitely benefit from use of the ISS. If we take the pharmaceutical field for instance, the production of Interferon is extremely difficult on Earth and the conditions, due to the environment in outer space, might be more suitable.

Let us then assume that a scientist/astronaut invents a medicine while on board the ISS. Which patent law will be applicable to protect such a research result in space? And if this result is patentable, can the owner be protected against an unauthorised use, infringement, of the patented invention made in outer space?

In principle, national and international patents are enforceable only within the territorial boundaries of designated countries. Outer space, like the high seas and Antarctica, is not subject to national appropriation and does not fall under any national sovereignty. This implies that outer space cannot be appropriated by use or claim or any other means.[4] With regard

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[3] The International Space Station (ISS) is a co-operative programme between Europe (eleven (11) European Space Agency Member States), the United States, Russia, Canada, and Japan for the joint development, operation and utilisation of a permanently inhabited Space Station in low-Earth orbit.

[4] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, art. II, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force on Oct. 10, 1967) [hereinafter Outer Space Treaty].

to applicability of national patent regulations, problems occur when an invention is used or infringed in outer space, because these regulations are applicable only on the territory of the specified State which, by definition, excludes the extraterritorial domain of outer space.

Nonetheless, a State retains jurisdiction and control over objects it sends into outer space.[5] Hence, the simple solution to this legal gap would be to make patent law applicable to space objects under the jurisdiction and control of a given country. This is exactly what was done by the United States in November 1990. According to the U.S. Patent Act any invention made, used or sold in outer space on board a spacecraft under the jurisdiction or control of the US is considered to be made, used or sold on U.S. territory except where an international agreement has been concluded.[6] With the exception of the United States, only Germany modified (de facto)[7] its patent law when signing the Intergovernmental Agreement (IGA)[8] on the ISS to make its patent law applicable to inventions created on board a European Space Agency (ESA) registered module. Apart from these two examples, the national patent laws of other countries do not contain provisions that would make the national patent law applicable on board a spacecraft.

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[5] *Id.* at. art. VIII. "A State Party to the Treaty 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 or on a celestial body. Ownership of objects launched into outer space including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return."

[6] 35 U.S.C. § 105 (2003). The U.S. Patent Act is found in Title 35 of the U.S. Code and contains Federal statutes governing patent law in the United States. In Chapter 10, entitled "Patentability of Inventions", Section 105 deals explicitly with inventions in outer space.

[7] German Act of 13 July 1990 on the Ratification of the IGA, 1988 BJBL. II 637.

[8] Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, *available at* 1998 U.S.T. LEXIS 212 (entered into force Mar. 27, 2001) [hereinafter IGA].

With the development of space-related projects such as the ISS, involving a great deal of cooperation among partner States, there is a need for harmonisation of patent laws. It has also been widely accepted that the most obvious solution for a nation that wants certainty in protecting its technology is to follow the U.S. example. With Europe becoming more and more integrated, the Community Patent Regulation appears to be the most appropriate instrument to bring solutions to the needs and problems described above.

III. INVENTIONS MADE IN OUTER SPACE AND THE COMMUNITY PATENT

A. The Community Patent

Discussions on the creation of a Community Patent were launched by the Green Paper of 24 June 1997 on the Community Patent and the European Patent System.[9] Later, the importance of introducing a Community Patent without delay was reasserted at the European Council meeting in Lisbon on 23 and 24 March 2000.[10] The outcome was a proposal for a Regulation presented by the Commission, the text of which was agreed on by the Member States on 3 March 2003. This Regulation replaces, and is mostly based on, the Community Patent Convention, which was agreed on in Luxembourg in 1989 but never entered into force.[11]

It basically seeks to create a unitary industrial property right in order to eliminate distortions of the internal European market which might result from the territorial nature of national protection rights; it is also one of the most suitable means of ensuring the free movement of goods protected by patents.[12] It

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[9] Proposal, *supra* note 1, Explanatory Memorandum, at p. 5.

[10] *Id.*

[11] Agreement Relating to Community Patents, Dec. 15, 1989, 1989 O.J. (L 401) 1 [hereinafter Luxembourg Convention]. The Luxembourg Convention was signed in 1975 and amended in 1989. It aimed to give a unitary effect to European patents applied for in respect of community territory.

[12] Proposal, *supra* note 1, art. 2 §1, at p. 6.

will enable Europe to reap the full benefits of research and to stimulate private research and development investment.

Up until now, patent protection in Europe has been provided by two systems. The first is the national patent system, which are patents granted by national patent offices. The second is the European patent system, patents granted by the European Patent Office in Munich, based on the European Patent Convention signed in 1973 (Munich Convention).[13] The Munich Convention enables the patentee to apply for "a bundle of national patents" designating one or more Member States.[14] Yet the procedure is cumbersome, lengthy and costly. Moreover, in the event of disputes, national courts are competent so there could be twenty-four different legal proceedings with different procedural rules and the risk of different outcomes.[15]

That is why the objective of the Regulation is to create in Europe a system of patent protection based on a legal instrument that would simplify procedures, increase protection and reduce costs.

B. Characteristics of the Community Patent

The Community Patent can be described by three adjectives that succinctly summarise its objectives: unitary, affordable and autonomous. According to Article 2, "unitary" means that the Community Patent produces the same effect throughout the territory of the Community and may be granted, transferred, declared invalid or allowed to lapse only in respect of the whole of that territory.[16]

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[13] Convention on the Grant of European Patents, Oct. 5, 1973, 1065 U.N.T.S. 254 [hereinafter Munich Convention].

[14] *Id.* at art. 2.

[15] *See* discussion *infra* Part III.E for the implications in relation to the ISS and, in particular, vis-à-vis Article 21.4 of the IGA, *supra* note 8.

[16] Proposal, *supra* note 1, at art. 2.

"Affordable" means that the Community Patent is attractive since it is more economical than the existing European and national systems of protection.[17] To achieve this result, requirements regarding translations have been reviewed and reduced.[18]

Finally, "autonomous" means that the Community Patent is subject only to the provisions of the Community Patent Regulation and to the general principles of Community law. The Regulation introduces specific provisions applicable to Community Patents. It should be noted that the Community Patent Regulation embraces most of the substantive principles of the Munich Convention and national patent laws, such as for instance, the conditions of patentability.[19]

However, while the provisions of the Community Patent Regulation are in line with the Munich Convention, Article 3 introduces a new element to the provisions of the Munich Convention. It makes the Community Patent Regulation applicable to space-related inventions.[20]

C. *Article 3 of the Community Patent Regulation: Inventions Created or Used in Outer Space*

Article 3.2 of the Community Patent Regulation states, "this Regulation shall apply to inventions created or used in outer space, including on celestial bodies or on spacecraft, which are under the jurisdiction and control of one or more Member States in accordance with international law."[21] This provision, designed to protect inventions made or used in space, is essential in order to improve the competitiveness of European industry as compared, in particular, with that of the United States. It

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[17] *Id.* at p.10. "At present, an average European patent (designating eight Contracting States) costs approximately EUR 30,000. The fees due to the Office for such an average European patent account for approximately 14% of the total cost of the patent. The translation required by the Contracting States account for approximately 39% of the total cost."

[18] *Id.* at art. 24(a), §1. According to the proposed solution the cost of translating the patent documents into one of the Office's three working languages and the claims into the other two amounts to EUR 2,200.

[19] *See infra* n. 28.

[20] *Id.* at art. 3.

[21] *Id.* at art. 3.2.

is necessary in order to be in line with European commitment to the ISS.[22] Therefore, the Community Patent is applicable to any spacecraft in outer space if one or more Member States have jurisdiction and control over it.

Therefore, the answers to the questions asked at the beginning of this paper are in the affirmative, since the use of a patented invention in outer space will be protected by the Community legislation.[23] A European court will have jurisdiction to hear a case of unauthorised use of an invention in outer space.[24]

D. Conditions for Community Patent Protection

The conditions of patentability for a Community Patent are those laid down in the Munich Convention (Articles 52 to 57).[25] According to that Convention, "patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step."[26] Those requirements are not new and are basically the same as in most European national laws since national laws have been harmonised with the Munich Convention. The fact that an invention has been made in outer space does not change the basic conditions of patentability.[27]

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[22] *See* discussion, *supra*, p. 1.

[23] *See supra* Part I.

[24] *See* discussion *infra* Part III.E.

[25] *See* Munich Convention, *supra* note 13.

[26] *Id.* at art. 52(1).

[27] *Id.* at arts. 52-57. The conditions of patentability are:

1) Novelty, which is assessed with regard to existing knowledge prior to a patent application. This means that prior disclosure to the public renders an invention unpatentable. If it is necessary to divulge the invention to a third party, for experimentation for instance, it is important to conclude a confidentiality agreement. The IGA covering the ISS sets rules concerning confidentiality but it would doubtless be very difficult to keep things secret in such an environment.

2) Inventive step, which means that the invention is not obvious for people skilled in the given technical field.

3) Industrial application is quite a broad condition, which implies that a product or process can be reproduced by industry.

E. Jurisdiction

A centralised Community jurisdiction, within the framework of the European Court of Justice, specialising in patent matters would best ensure unity of law and consistency of case law throughout contracting States.[28]

Within the framework of the ISS, the centralised jurisdiction of the Community Intellectual Property Court will give greater protection to intellectual property rights registered in more than one European ISS Partner State. In fact, according to Article 21.4 of the IGA,[29] if an act of infringement of intellectual property rights protected in several European Member States occurs in, or on, an ESA-registered element, the owner cannot

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[28] "The legal basis to be used for the establishment of a Community Patent jurisdiction was introduced into the EC Treaty by Article 2 (26 ff.) of the Treaty of Nice amending the Treaty on European Union, the Treaties establishing the European Communities and certain related acts which entered into force on 1 February 2003, inserting Article 229a and Article 225a into the EC Treaty." Proposal for a Council Decision conferring jurisdiction on the Court of Justice in disputes relating to the Community patent, Dec. 23, 2003,COM(03)827 final at 5, *available at* http://europa.eu.int/eur-lex/en/com/pdf/2003/com2003_0827en01.pdf (last visited Apr. 10, 2004).

> The Court will be composed of chambers of first instance and appeal. The centralised court will have exclusive jurisdiction for some actions, including litigation relating to the infringement and the validity of the patent. It will deal specifically with disputes between private parties and will also be empowered to impose sanctions and award claims for damages. Its rulings will be enforceable. Other disputes concerning Community patents such as ownership disputes will be handled by national courts. There will be a transition period for setting up the Community Patent Court until 2010 at the latest. Until such time each Member State will designate a limited number of national courts to have jurisdiction in patent disputes such as actions and claims on invalidity and infringement.

[29] IGA, *supra* note 8. Article 21 of the IGA sets the rules concerning intellectual property rights. Article 21.4 reads:

> Where a person or entity owns intellectual property which is protected in more than one European Partner State, that person or entity may not recover in more than one such State for the same act of infringement of the same rights in such intellectual property which occurs in or on an ESA-registered element. Where the same act of infringement in or on an ESA-registered element gives rise to actions by different intellectual property owners by virtue of more than one European Partner State's deeming the activity to have occurred in its territory, a court may grant a temporary stay of proceeding in a later-filed action pending the outcome of an earlier-filed action. Where more than one action is brought, satisfaction of a judgment rendered for damages in any of the actions shall bar further recovery of damages in any pending or future action for infringement based upon the same act of infringement.

recover in more than one State for the same act of infringement. Therefore, if the patent holder owns a Community Patent, in a case of infringement of his/her rights, the decision of the Court will be applicable to all European Member States. Thus, this system presents many advantages for dealing with infringement occurring in the framework of the ISS. These include the simplification of procedures and the unitary court system that will reduce the costs of proceedings; a system with a sole court that will set uniform standards; and, if the decision favours the patent owner whose rights have been infringed, he or she will receive higher damages because the infringement will be deemed to have occurred on the whole territory of the Community, not just a single State. Therefore his or her intellectual property rights will be recognised as valid in all European Member States.

F. Relationship to Other Patent Laws and Conventions

The Community Patent is not intended to change current patent law but to stand alongside the existing national and European systems. Inventors remain free to choose the type of patent that best suits their needs. The Community Patent Regulation will supplement the Munich Convention. The Community Patent will be issued by the same Office as the European Patent, the European Patent Office, specifying the territory of the Community instead of individual Member States. Once a Community Patent is granted, the Community Patent Regulation applies.

Since the Regulation seeks to create a symbiosis with the Munich Convention, it will be possible to switch from a European Patent application to a Community Patent and vice versa at any time up to the grant of either. For example, a European Patent application designating all the Member States of the Community can be converted into a Community Patent application designating the entire territory of the Community. Conversely, a Community Patent application which designates the entire territory of the Community may be converted into a European Patent designating one or more Member States of the Community (European Patent) before the grant of the patent.

The relationship between the Community Patent and national patent laws raises a similar issue since dual protection for the same territory is out of the question. Therefore, Article 54 of the Community Patent Regulation[30] prohibits simultaneous protection. It provides that in such a situation the national patent will cease to have effect as soon as the Community Patent is granted.

However, it will not be possible to convert a Community Patent into a European or national patent once it has been granted. Nor will it be possible to convert a national patent into a European Patent or a Community Patent. The Community Patent Regulation will be applicable to future patent applications.

IV. CONCLUSION

The role played by intellectual property in space activities is important in order to protect and promote results of research and development and to encourage industry to pursue creative options. A solution to fill the legal lacunae that existed in the field of space-related inventions was absolutely necessary.

Creators of space-related inventions will at last have access to appropriate legal protection of their work when the Community Patent Regulation comes into force, since they will be able to file an application for a Community-wide Patent to cover any invention created in outer space and to protect its use before the Community Intellectual Property Court. Thanks to the specific features of the Community Patent, inventors will benefit from a European system of reference, unitary and affordable. This is

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[30] Proposal, *supra* note 1, at art. 54.1, "Prohibition of simultaneous protection," determines three situations in which a national patent:

> shall be ineffective to the extent that it covers the same invention as the Community Patent, from the date on which:
>
> (a) the period for filing an opposition to the decision of the Office to grant a Community Patent has expired without any opposition being filed;
>
> (b) the opposition proceedings are concluded with a decision to maintain the Community Patent; or
>
> (c) the national patent is granted, where this date is subsequent to the date referred to in point (a) or (b), as the case may be."

the first European legal instrument applicable to inventions made in outer space. Adoption of the Regulation will revolutionise the core question of applicability of patent laws to space-related inventions, notably with regard to Article 21.4 of the IGA.[31]

[31] IGA, *supra* note 8, at art. 21.4.

BAIKONUR CONTINUES: THE NEW LEASE AGREEMENT BETWEEN RUSSIA AND KAZAKHSTAN

Maria Bjornerud[1]

The Russian President, Vladimir Putin, and the President of the former Soviet Republic of Kazakhstan, Nursultan Nazarbayev, have signed a new historic agreement on the *Baikonur* launching facility. Russia will be able to lease the *Baikonur* space center, which was built back in the Soviet era and had its first launch in 1957, for fifty more years.[2]

Baikonur is Russia's largest cosmodrome.[3] *Baikonur* has eleven assembly and test buildings, and nine launching complexes equipped with fifteen launching ramps for *Tsiclone*, *Energia*, *Molnia*, *Soyuz* and *Rokot* type boosters. It is the prime Russian site for the launch of commercial rockets and it is the only facility that can be used to launch *Proton* class boosters and crewed craft flights.[4] The area of cosmodrome is 6,717 square kilometers.[5] It is 125 kilometers (75 miles) long and 85 kilometers wide.[6] The area allocated for jettisoning rocket stages is more than 18 million hectares.[7] The cosmodrome has approximately 80,000 employees.[8]

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[1] Third year law student at the University of Mississippi School of law, student researcher for the National Remote Sensing and Space Law Center, *Journal of Space Law* editor, and Associate member of American Translators Association.

[2] Andrei Reut, *Russia Will Be Able to Use the Baikonur Space Center Until 2050*, GAZETA 3 (Jan. 12, 2004).

[3] Mark Wade, *Baikonur*, ENCYCLOPEDIA ASTRONAUTICA (Aug. 9, 2003), *at* http://www.astronautix.com/sites/baikonur.htm (last visited Apr. 7, 2004).

[4] Reut, *supra* note 2.

[5] *Id.*

[6] *Russia, Kazakhstan Extend Baikonur Cosmodrome Lease to 2050* (Jan. 9, 2004), *available at* http://www.spacedaily.com/2004/040109151358.forhgci8.html (last visited May 11, 2004).

[7] *Id.*

[8] *Id.*

I. THE EARLY LEGAL HISTORY OF THE COSMODROME

Kazakhstan inherited the *Baikonur* facility in 1991 after the collapse of the Soviet Union.[9] During the Soviet era there was no specific legislation on space activity or on the use of the *Baikonur* cosmodrome.[10] The space programs were subject to secrecy, and the majority of regulations and executive orders were never made public.[11] While some decisions were made by the Central Committee of the Communist Party, others were the result of general national legislation.[12] The federal law of the Soviet Union and the laws and civil codes of the republics within the Union governed space activity.[13] After the disintegration of the Soviet Union, the legal and organizational framework for ownership and exploitation of the *Baikonur* complex was based on several agreements between the newly-emerged sovereign states, members of the Commonwealth of Independent States (CIS).[14] Taking into consideration the vast technical, scientific and military legacy of the Soviet space program, the States expressed the desire to carry out joint space activities.[15] The nine members of the CIS signed the *Agreement on Joint Activities in the Exploration of Outer Space* on December 30, 1991 in Minsk.[16] The importance of cooperation by member-states in space activity was apparent from the fact that the agreement practically followed the creation of the CIS.[17] The Minsk Agreement emphasized the necessity of combined efforts in the development of space science and technology, defense and

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[9] *Id.*

[10] Elena Kamenetskaya, *The Present Developments of Legal Regulations of Space Activities in Russia and the Commonwealth of Independent States*, 26 AKRON L. REV. 465, 470 (1993).

[11] *Id.* at 470.

[12] *Id.*

[13] *Id.*

[14] Agreement Establishing the Commonwealth of Independent States, Dec. 8, 1991, 31 I.L.M. 143 [hereinafter Minsk Agreement].

[15] *Id.* at 471. Kamenetskaya, *supra* note 10, at 471.

[16] Agreement on Joint Activities in the Exploration of Outer Space, Dec. 30, 1991, *available at* http://www.jaxa.jp/jda/library/space-law/chapter_4/index_e.html (last visited May 16, 2004).

[17] Kamenetskaya, *supra* note 10, at 471.

collective security of member-states.[18] According to the Minsk Agreement, the joint activities had to be within interstate programs of space research and exploration coordinated by the Interstate Space Council.[19] The Joint Strategic Armed Forces were to be responsible for the fulfillment of the military or combined military and civilian applications.[20] The Minsk Agreement also laid out the principles of utilization of space facilities and their financing.[21] The benefits from space exploration were to be allocated based on the proportionate participation of the parties.[22]

Another agreement was signed on May 15, 1992 in Tashkent.[23] The Tashkent Agreement allocated rights over ground infrastructure built for space programs. It stipulated that the ground segment elements such as launching facilities, training and flight control centers were to be considered the property of the states in which they were located.[24] While technically all the former Soviet Republics contributed to the creation of the Soviet space program, only a few of them inherited its property.[25] The Tashkent Agreement transferred the right to use these space facilities to the Strategic Forces of the CIS or other interested parties who had to enter into special agreements.[26] The Interstate Space Council was to coordinate the utilization of infrastructure necessary for the interstate and independent state space programs.[27]

On May 25, 1992, ten days after signing the Tashkent Agreement, Russia and Kazakhstan entered in a bilateral agreement on the terms of utilization of the *Baikonur* cos-

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[18] *Id.*
[19] *Id.*
[20] *Id.*
[21] *Id.* at 472.
[22] *Id.*
[23] The 'Tashkent Agreement' Concerning Arrangements for Maintaining and Using Space Infrastructure Facilities in Pursuance of Space Programmes, May 15, 1992, *available at* http://www.jaxa.jp/jda/library/space-law/chapter_4/4-2-2-3_e.html (last visited May 11, 2004) [hereinafter Tashkent Agreement].
[24] Kamenetskaya, *supra* note 10, at 472.
[25] *Id.* The CIS states which inherited the former Soviet Space Program facilities are: Azerbaijan, Belarus, Kazakhstan, Russia, Turkmenistan, Uzbekistan, and Ukraine.
[26] Kamenetskaya, *supra* note 10, at 473.
[27] *Id.*

modrome.[28] The agreement confirmed that the *Baikonur* cosmodrome was the property of the Republic of Kazakhstan and set the financial contribution of Kazakhstan to cosmodrome infrastructure at six per cent of the Russian contribution.[29] Most importantly, the agreement emphasized that the right to use certain facilities of the cosmodrome could be transferred by Russia and Kazakhstan to the Strategic Forces of the CIS or other concerned parties only upon the mutual approval by both countries.[30]

The intergovernmental Russia-Kazakhstan agreement, signed on October 2, 1992, prohibited privatization of the *Baikonur* cosmodrome facilities, establishment of joint ventures, or any other changes in the property rights of these facilities.[31]

The Minsk and Tashkent agreements and the multiple bilateral Russian-Kazakhstan instruments laid the foundation for the unique legal regime governing the *Baikonur* cosmodrome. Despite these agreements the *Baikonur* cosmodrome was rapidly falling into decay.[32] The fact that cosmodrome was now on foreign territory made Russia reluctant to invest in its infrastructure.[33] The future of the cosmodrome and the Russian citizens who worked there was uncertain.[34] The funding was severely cut and salaries for personnel was chronically late.[35] It led to the deterioration of infrastructure and loss of intellectual humanpower.[36]

II. THE LEASE OF 1994

The situation prompted the agreement *On Basic Principles and Terms of the Utilization of the Baikonur Cosmodrome Agreement Between the Russian Federation and the Republic of*

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[28] *Id.* This agreement was never made public, and is therefore unavailable.

[29] *Id.*

[30] *Id.*

[31] *Id.* at 474. This agreement was never made public, and is therefore unavailable.

[32] Victor Myasnikov, *Zakat Baikonura* [*The Sunset of Baikonur*], AVIA. RU, May 16, 2002, *at* www.avia.ru/press/2002/may/16may-1.shtml (last visited Apr. 7, 2004).

[33] *Id.*

[34] *Id.* Discussing consequences of disintegration of the Soviet Union.

[35] *Id.*

[36] *Id.*

Kazakhstan, signed on March 28, 1994.[37] Under its terms Russia has the right to use the cosmodrome for twenty years with the automatic extension absent objections by either party.[38] The agreement recognized the validity of the earlier bilateral intergovernmental agreements between Russia, Kazakhstan and other members of the CIS.[39] It confirmed that the *Baikonur* cosmodrome was the property of the Republic of Kazakhstan.[40] Under the agreement, the *Baikonur* cosmodrome should be used for the Russian civil and military programs, the joint programs of Russia, Kazakhstan and other members of CIS, and also for the international and commercial projects.[41] Russia was to lease the cosmodrome and the lands designated for jettisoning first stages of the rockets.[42] Kazakhstan was to convert all real property and transfer all movable property for use by the Russian Federation.[43] The agreement called for the sharing of jurisdiction between the Russian and Kazakhstan governments and creation of procedures ensuring the rights of the citizens of both countries.[44]

Russia was to pay $115 million (USD) annually.[45] Part of the price could be offset as mutual compensation.[46] Russia was to assist Kazakhstan in various space projects, including the launching of communications satellites and the training of Kazakhstan cosmonauts.[47] The rights and duties of the Russian military personnel were to continue for the duration of the lease. The Russian military and civilian personnel and members

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[37] On Basic Principles and Terms of the Utilization of the Baikonur Cosmodrome Agreement Between the Russian Federation and the Republic of Kazakhstan, Mar. 28, 1994, Russ.-Kaz, *available at*: http://www.rosaviakosmos.ru/cp1251/laws/baik-s.html (last visited Apr. 7, 2004) [hereinafter Basic Principles]. The unofficial translation of the agreement follows this article. The original lease was signed on October 10, 1994.

[38] *Id.* at art.7.

[39] *Id.*

[40] *Id.*

[41] *Id.* at art. 1.

[42] *Id.* at art. 2.

[43] *Id.* at art. 6.

[44] *Id.* at art. 5.

[45] *Id.* at art. 4.

[46] *Id.*

[47] *Id.*

of their families were subject to the laws of Russia.[48] The lease was for twenty years with an automatic extension for ten more years absent written notice by either party of its desire to denounce the agreement.[49]

The agreement authorized the Central Bank of Russia to make payments to Russian personnel.[50] It announced that the currency of the Republic of Kazakhstan was the only legal tender in cash transactions on *Baikonur*, and prescribed the exchange of the currency through the offices of the Russian Central Bank or the National Bank of Kazakhstan.[51]

Despite the lease agreement the number of launches from *Baikonur* dramatically decreased. The edict, signed by the Russian President on December 17, 1997, provided for the creation of the Baikonur Federal Space Center.[52] At the same time it directed the Russian Defense Ministry to transfer all real and movable property of the *Baikonur* cosmodrome to the Russian Space Agency (RSA) and to the authorities of the city of Baikonur.[53] The edict directed the transfer of the launch pads for the *Soyuz*-type rockets to the *Plesetsk* cosmodrome, and the launch pads for the *Rokot*-type boosters to the *Svobodny* cosmodrome.[54] Under the edict the number of military personnel was to drop from twenty thousand people to the "bare minimum."[55] A total of 775 military personnel were to be transferred to the RSA.[56] The RSA was also getting forty percent of all funds originally allocated to the *Baikonur* cosmodrome.[57] The other sixty percent of funds and the launching pads for crewed space craft had already been transferred to the RSA pursuant to a

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[48] *Id.*

[49] *Id.* at art. 7.

[50] *Id.* at art. 5.1.

[51] *Id.* at art. 5.2.

[52] Vasily Parshin, A. Rodionov, & V. Yaropolov, *Tramplin vo Vselennuyu* [*Trampoline to the Universe*], AVIAPANORAMA, May 2, 1998, *at* http://www.aviapanrama.narod.ru/journal/ 1998_2/5.htm (last visited Apr. 7, 2004).

[53] *Id.* The Russian Space Agency was created by the presidential edict, signed on February 27, 1992.

[54] *Id.* Plesetsk and Svobodny are located on the territory of Russia, while Baikonur is located on the territory of Kazakhstan.

[55] *Id.*

[56] Parshin, *supra* note 52.

[57] *Id.*

presidential edict, signed on October 24, 1994. Russia transferred most of its military space activities to the *Plesetsk* cosmodrome.[58] "Russia shall have its own independent access to outer space," stated Sergei Ivanov, the Russian Defense Minister.[59] He emphasized Russia's determination to have its own adequate launching facility and not to depend on the neighbors.[60] The *Baikonur* cosmodrome was losing its main customer, the Russian military.[61]

III. THE NEW LEASE AGREEMENT AND THE POSITION OF THE PARTIES

Despite the transfer of Russia's military space activity to its own territory, the *Baikonur* cosmodrome continued to play an important role in the Russian space program.[62] The cosmodrome was the only launching facility used by Russia for its crewed space missions and for the launches of heavy *Proton* class boosters.[63] The full functioning of the *Baikonur* cosmodrome was absolutely essential to the fulfillment of Russia's international obligations.[64] In 2000, Russian participation in international space activity yielded $800 million (USD).[65] Profit from the international space projects enabled Russian space industry to preserve its scientific and technical potential, its testing and

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[58] Andrei Fomichev, *Rossia Pokidaet Baikonur* [*Russia Is Leaving Baikonur*], UTRO, Oct. 30, 2003, at 2, *available at* http://www.utro.ru/articles/2003/10/30/245489.shtml (last visited Apr. 7, 2004).

[59] *Id.* Citing Sergey Ivanov, the Russian Defense Minister.

[60] *Id.*

[61] *Id.*

[62] A. Dedus, A. Kuznetsov, *Problemy Razvytya i Soverhenstvovanya Obyectov Nazemnoy Kosmitcheskoy Infrastructury Kosmodromov* [*The Problems in the Development and Improvement of the Ground Infrastructure of Cosmodrome*], BULLETIN (Jan. 6, 2002), *at* http://eks.ru/cgi-bin/link.cgi?312 (last visited Apr. 7, 2004).

[63] *Id.*

[64] *Id. See also,* On Measures to Fulfill the Russian Federal Space Program and International Space Agreements, OFFICE OF OUTER SPACE AFFAIRS (Mar. 18, 2002), at http://www.oosa.unvienna.org/SpaceLaw/national/russian_federation/decree_422_1996E.html (last visited May 11, 2004).

[65] Fomichev, *supra* note 58.

manufacturing capability, and to withstand the blow resulting from fourteen per cent reduction in government contracts.[66]

While Russia could not afford to lose *Baikonur*, Kazakhstan had been trying to become Russia's key partner for a number of years and had been seeking active involvement in space activity.[67] The duration of the lease was one of the disputed issues during the negotiation.[68] The original lease, signed on March 28, 1994, was due to expire in 2014.[69] While Russia wanted to extend it for fifty more years starting from 2014, Kazakhstan offered to count fifty years from the day of the original lease in 1994.[70] The RSA unofficially stated that this controversy did not represent a real issue since both dates were far away in the future and it was not clear whether *Baikonur* would continue to play a key role in Russian space projects.[71] The fee was another source of disagreement.[72] Reports indicated that Kazakstan was trying to increase the rent fee or to get the share of profits from the commercial launches citing ecological concerns.[73] These concerns, though, were already addressed by the original lease agreement, which provided for the payment of additional sums as compensation for the damage done by the scattered stages of Russian rockets.[74] Ecological security has been a sensitive issue in the Russia-Kazakhstan relationship for years.[75] Kazakhstan banned rocket launches on July 6, 1999, when a *Proton* rocket explosion scattered debris and fuel over the vast area, leading to

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[66] Dedus, *supra* Note 62. Launching services alone provided sixty-eight per cent of Russia's total income from international space activity.

[67] Bagila Bukharbayeva, *Cosmodrome Lease Extended Until 2050*, MOSCOW TIMES (Jan. 12, 2004), at 3, *available at* http://www.themoscowtimes.com/stories/2004/01/12/012.html (last visited Apr. 6, 2004).

[68] *Id.*

[69] Russian Presidential Edict No. 2005, Oct. 24, 1994, Unofficial Translation, OFFICE OF OUTER SPACE AFFAIRS, *available at* http://www.oosa.unvienna.org/SpaceLaw/national/russian_federation/edict_2005_1994E.html (last visited Apr. 6, 2004).

[70] Bukharbayeva, *supra* note 67.

[71] *Id.*

[72] *Id.*

[73] *Id.*

[74] Basic Principles, *supra* note 37, at art. 2.

[75] M. Ahmed, *Kazakhstan Permits Russians to Use Space Centre, Without Thought to Victims of Nuclear Tests*, MUSLIMEDIA (Sept. 16-30, 1999), *available at* http://www.muslimedia.com/archives/world99/kazak-russ.htm (last visited Apr. 7, 2004).

the mass evacuation of the population.[76] The accident prompted Kazakhstan, concerned with environmental damage and health risks, to demand a payment of millions of dollars Russia owed it for the lease of the cosmodrome.[77] It also led to two-month stand-off between the two countries.[78] Russia agreed to pay for the lease part in cash and part in bartered goods.[79] Following the mutual offset of debts, Russia actually began paying the rent from January 1, 1999.[80] It paid $50 million (USD) in cash and $65 million (USD) in goods and services in 1999.[81] In addition, Russia spends more than $50 million (USD) a year to maintain the cosmodrome infrastructure.[82] Kazakhstan agreed to resume rocket launches back in 1999 with the exception of *Proton* rockets.[83]

The dissatisfaction with the earlier agreement and the desire to continue fruitful cooperation led to the signing of a new agreement on January 9, 2004. The *Agreement on the Cooperation and Effective Use of the Baikonur Cosmodrome* reaffirmed the provisions of the 1994 Lease and followed the terms of the previous bilateral and intergovernmental agreements among Russia, Kazakhstan and the members of the CIS.[84] The purpose of the agreement is to develop the cooperation in furtherance of

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[76] *Id.*

[77] *Id.*

[78] *Id.*

[79] Liz Fuller, *Kazakhstan, Russia Reach Baikonur Agreement*, ASIA TIMES (July 17, 1999), *available at* http://www.atimes.com/c-asia/AG17Ag01.html (last visited May 11, 2004).

[80] Kabar Information Agency, Itar-Tass, *Russia, Kazakhstan to Sign New Baikonur Agreement*, KYRGYZ NATIONAL NEWS AGENCY (Jan. 8, 2004), *at* http://www.kabar.kg/english/04/Jan/08/21.htm (last visited May 11, 2004) [hereinafter Kabar Information Agency].

[81] *See Kazakhstan to Extend Baikonur Lease 10 Years*, SPACE DAILY (Nov. 16, 2000), *at* http://www.spacedaily.com/news/spaceport-00f.html (last visited May 11, 2004).

[82] *See Russia, Kazakhstan Extend Baikonur Cosmodrome lease to 2050, supra* note 6.

[83] *See* Ahmed, *supra* note 75.

[84] Agreement between the Russian Federation and the Republic of Kazakhstan on the Cooperation in the Effective Use of the Baikonur Facility, ROSS. GAZETA, Jan. 9, 2004, *available at* http://www.Kremlin.ru/events/articles/2004/01/58551/59021.shtml (last visited May 16, 2004). An unofficial translation of the agreement follows this article.

effective use of the cosmodrome for the benefit of Russia, Kazakhstan and the international community.[85]

Under the agreement, Russia shall give all necessary assistance in modernization of the facility and ensure the equal participation of Kazakhstan in space projects, providing that the laws of Russia concerning states secrets are strictly observed.[86] The agreement calls for the resolution of environmental problems through the development of new ecologically friendly rocket boosters, financing environmental programs, dealing with the launch related pollution, and making necessary changes in international instruments.[87] The agreement urges further development of a new ecologically safe *Baitarek* rocket system.[88] While it does not mention the increase in rent fee, it extends the original lease till 2050.[89] The agreement provides for the increased participation of Kazakhstan in the use of the facility and for the possibility of Kazakhstan's involvement in space exploration projects.[90] During his visit to Astana, Vladimir Putin stated that, "Kazakstan has not only Baikonur to offer, it has a good intellectual potential."[91] Russia also agreed to assist Kazakhstan in launching a communications satellite, providing that Kazakhstan pay for the cost. The new agreement allows Kazakstan to play a bigger role in the future space projects.[92] The parties also signed a memorandum calling for the modification of earlier bilateral instruments within one year of executing of the new lease.[93] The memorandum provided for a speedy

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[85] *Id.* at art. 1.
[86] *Id.* at art. 2.
[87] *Id.* at art. 3.
[88] *Id.* at art. 4.
[89] *Id.* at art. 6.
[90] *Id.* at art. 2.
[91] *See* Bukharbayeva, *supra* note 67 (citing Russian President, Vladimir Putin, during his visit to Astana on Jan. 9, 2004).
[92] *Id.*
[93] Memorandum on Further Development of Cooperation between the Russian Federation and the Republic of Kazakhstan in Ensuring Functioning of the Baikonur Complex, ROSS. GAZETA (Jan. 9, 2004), *available at* http://president.kremlin.ru/events/articles/2004/01/58551/59022.shtml (last visited Apr. 6, 2004). An unofficial translation of the agreement follows this article.

resolution of issues arising out of the re-use of land on liquidated launch sites.[94]

IV. THE RUSSIAN SPACE PROGRAM

Despite the sharp decrease in launch activity in recent years, Russia has expanded its space exploration program for 2004.[95] The RSA anticipates that its budget will be greatly increased.[96] Russia will launch three *Express-AM* telecom satellites; start testing the radio unit of the COSPAS-SARSAT space rescue system; put on-orbit a new generation of distant Earth-probing satellites including the *Resurs-DK* high-resolution optical electric monitoring satellite and the *Monitor-E* optical-electric monitoring satellite.[97] Russia is planning to work on the *Corona-F* program, involving studies of the interrelation of the Sun and the Earth; on the international program *Spectrum,* aimed at the study of the celestial bodies in the electro-magnetic spectrum; and on the launch of two *Soyuz-TMA* crewed and four *Progress-M* cargo spacecraft.[98] The *International Space Station* (*ISS*) will remain the priority and its construction would be completed within two years, despite the delay caused by the grounding of the United States *Shuttle* fleet.[99] At the moment, the *Baikonur* cosmodrome is the only link to the *ISS*.[100] Russia will take part in the *ISS* control, scientific programs and experiments.[101] An indication that *Baikonur* will remain open to private enterprise is the recent agreement between *Space Inter-*

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[94] *Id.*

[95] *Russia Expands Funding for Space Exploration in 2004*, INTERFAX, Jan. 8, 2004, *at* http://www.interfax.com/com?item=Rus&pg=20&id=5680117&req= (last visited Apr. 6, 2004) [hereinafter *Russia Expands Funding*].

[96] *Id.*

[97] *Supra* note 91.

[98] *Russia Expands Funding, supra* note 95.

[99] Sonia Oxley, *Russia Space Boss Slams U.S. Mars Plans*, REUTERS, Jan. 29, 2004, *at* http://www.chron.com/cs/CDA/ssistory.mpl/special/03/mars/jump/2377234 (last visited May 12, 2004) (Citing Yuri Koptev, Director of RSA).

[100] As of this writing, the United States *Shuttle* fleet will be grounded until March 2005. *See* William Harwood, *Next Shuttle Flight Delayed; Rescue Scenario Formed*, SPACEFLIGHT NOW, Feb. 19, 2004, *at* http://www.spaceflightnow.com/shuttle/sts114/040219delay/ (last visited May 12, 2004).

[101] *Russia Expands Funding, supra* note 95.

national Services and *Sea Launch*.[102] The agreement provides for the creation and promotion of a new *Land Launch* project, which will use *Baikonur* as its main launching facility.[103]

V. POTENTIAL SIGNIFICANCE OF THE NEW LEASE AGREEMENT

Despite the reduction in funding, deterioration of infrastructure and the loss of a significant number of military launches, the *Baikonur* cosmodrome remains the largest launching facility in the world. After the disintegration of the Soviet Union it became a unique international space center. At the moment, it is the only access point on Earth to outer space. Despite its international character, *Baikonur* continues to play an important role in the Russian space program, which uses it for the majority of its missions. *Baikonur* is the essential predicate for the fulfillment by Russia of its international obligations.

Despite some tension in recent years, *Baikonur* can become a symbol of fruitful cooperation between Russia and Kazakhstan. The new lease agreement will help secure continued funding by Russia, essential for the modernization of cosmodrome infrastructure and for the prevention of further loss of its workforce. The training of Kazakh cosmonauts and other personnel will ensure equal participation of Kazakhstan in international space programs. In the future it might even allow for the larger participation of Kazakhstan in cosmodrome financing.

Environmental safety will remain a priority in the utilization of the *Baikonur* facility. The stable rent fee and longer lease term can encourage Russia to finance the modernization of cosmodrome infrastructure with less risk of losing a return on its investment. It can also help Russia respond to ecological con-

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[102] *Rossia e Ukraina v Sotrudnitchestve s Kompaniey "Morskoy Start" Sobirayutsya Predlozhit Uslugy po Vyivedeneyu na GeoperehodneyOrbity Sputnikov do 3,5 Ton s Kosmodrama Baikonur* [*Russia and Ukraine Together With Sea Launch Will Offer Launches From the Baikonur Cosmodrome For the Installation of Less Than 3,5 Ton Satellites on Geostationary Orbit*], ROSAVIAKOSMOS, Jan. 29, 2004, *at* http://www.rosaviakosmos.ru/cp1251/news/040122.htm (last visited Apr. 7, 2004). Agreement was signed on Jan. 19, 2004.

[103] *Id.* Under the agreement, *Sea Launch* is to provide marketing and technical assistance. *Sea Launch* will neither finance nor invest in the project.

cerns. The new lease has the potential to bring more government contracts and attract private investors.

There are some jurisdictional issues arising from the unique status of the *Baikonur* cosmodrome. The number of legal instruments, executed by the member-states of CIS, Russia and Kazakhstan, have given several parties and entities the right to use the *Baikonur* cosmodrome, subject to approval by both Kazakhstan and Russia. It has resulted in a mixed jurisdiction, requiring the coordination of efforts of the civil and military authorities of Russia and Kazakhstan, the Russian Space Agency and the CIS Strategic Forces. There are also a number of problems arising out of customs and border regulations, and a special tax status of the cosmodrome.[104] The constitutional rights of personnel remain among the most pressing issues for Kazakhstan and Russia.

Despite the complexity of issues facing cosmodrome authorities, the *Baikonur* cosmodrome will continue to be an example of international cooperation. *Baikonur* is more than the historic site of the first human mission. *Baikonur* will be remembered as the first attempt in the creation of a truly intergovernmental space center.

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[104] The Russian Government prohibited use of Baikonur as the offshore zone in 2003. *See Lukoil Give Up Tax Optimization Scheme*, RUSSIAN INSTITUTE OF DIRECTORS, Jan. 13, 2004, *at* http://www.rid.ru/news.php?news_id=6238&l=en (last visited Apr. 7, 2004).

ON BASIC PRINCIPLES AND TERMS OF THE UTILIZATION OF THE *BAIKONUR* COSMODROME AGREEMENT BETWEEN THE RUSSIAN FEDERATION AND THE REPUBLIC OF KAZAKHSTAN MARCH 28, 1994

(Unofficial Translation by Maria Bjornerud)

The Russian Federation and the Republic of Kazakhstan, hereinafter the Parties,

RECOGNIZING the necessity of facilitation of the mutual understanding, development, equal and mutually beneficial cooperation in the exploration and utilization of outer space in the interests of the people of the Russian Federation and the Republic of Kazakhstan, and in the interests of peace and security of both Parties;

FOLLOWING the terms of the agreement *On Friendship, Cooperation and Mutual Assistance between the Russian Federation and the Republic of Kazakhstan,* signed on May 25, 1992, the agreement *On Principles of Utilization of the Baikonur Cosmodrome between the Russian Federation and the Republic of Kazakhstan*, signed on May 25, 1992;

DEVELOPING the earlier agreements on the *Baikonur* facility;

CONSIDERING the fact that the facilities of the cosmodrome and the city of Leninsk, located on the territory of the Republic of Kazakhstan, together with real and transportable property are the property of the Republic of Kazakhstan;

RECOGNIZING their historical responsibility for the preservation and further development of the scientific, technological and industrial potential of the *Baikonur* Cosmodrome, and the social-economic structure of the city of Leninsk;

DESIRING to create a legal basis for the utilization of the *Baikonur* Cosmodrome by the Russian Federation for the civil and defense space programs of the Russian Federation, the Republic of Kazakhstan and other Independent States;

AGREED as follows:

ARTICLE 1

The testing and technological facilities, and the infrastructure of the city of Leninsk together with their real and movable property constitute the single scientific, technological and social *Baikonur* complex.

The *Baikonur* complex is utilized by the Russian Federation for:

- civil and defense space programs of the Russian Federation;
- joint space projects of the Russian Federation, the Republic of the Kazakhstan and other members of the Commonwealth;
- international space programs and commercial space programs.

ARTICLE 2

In order to ensure further utilization of the cosmodrome in the interests of space activity of the Russian Federation, the facilities of the *Baikonur* cosmodrome are being leased to the Russian Federation by the Republic of Kazakhstan.

The Republic of Kazakhstan leaves the right to use the land on which the *Baikonur* facility is located and the lands designated for the fallout of the launch stages with the Russian Federation.

The Government of the Republic of Kazakhstan acts as Landlord and the Government of the Russian Federation as Lessee.

ARTICLE 3

In order to ensure the jurisdiction of the Republic of Kazakhstan over the *Baikonur* complex the Parties agreed on:

- development and realization of the mechanism that would insure the constitutional rights of the Kazakhstan citizens living in the city of Leninsk;

- mutual appointment of the Head of Administration of the city of Leninsk;
- appointment of the Commander-in-Chief of the cosmodrome by President of the Russian Federation with consultation of President of the Republic of Kazakhstan;
- cooperation of the law enforcement branches of the Russian Federation and the Republic of the Kazakhstan;
- procedure governing visits to the cosmodrome and its facilities by the appropriate officials of the Republic of Kazakhstan;
- appointment of the special representative of President of the Republic of Kazakhstan to the *Baikonur* cosmodrome.

In order to implement the provisions of this article the Parties shall work out the necessary agreements and adopt the appropriate regulations.

ARTICLE 4

The Russian Federation and the Republic of Kazakhstan are guided by the following principles concerning the *Baikonur* cosmodrome:

1. The Russian Federation is to ensure the preservation and development of material and technical bases of the *Baikonur* facility by means allocated for the implementation of space programs. The Party, who has financed the construction, acquisition and delivery of a real or movable property after August 31, 1991, has all the rights to such property regardless of the sums expended on maintenance, utilization and routine repairs of the *Baikonur* facilities.

   All new construction on the cosmodrome premises has to be coordinated with the Landlord. The Landlord exercises control over the security of the facilities and over the conditions of their utilization.

2. The Russian Federation shall pay $115 million (USD) for the lease of the *Baikonur* cosmodrome to the Republic of Kazakhstan. By the agreement between the governments of

two countries, a part of the rent fee can be paid annually as compensation.

3. The Parties shall appraise, and the Russian Federation shall compensate, the Republic of Kazakhstan for the loss of property and expenses incurred due to maintenance and utilization of the *Baikonur* complex in 1992-1993, in the amount not exceeding the debt owed by the Republic Kazakhstan to the Russian Federation.

   The procedure and terms of mutual payments by the Parties shall be determined by the Governments of the Russian Federation and the Republic of Kazakhstan within two months of the date of this Agreement.[1]

4. The Russian Federation shall assist the Republic of Kazakhstan in implementation of space projects, primarily in the field of satellite communications; in study of the natural resources of Earth; in development of the joint structures; and in training of the space technology specialists.

5. The military units of the Russian Federation, ensuring the implementation of the space projects taking place on the *Baikonur* cosmodrome pursuant to the lease agreement between the Republic of Kazakhstan and the Russian Federation, shall have status of the Russian military personnel temporarily stationed on the territory of the Republic of Kazakhstan. The military space personnel shall have the rights and duties established for the Chief-of-Staff in charge of space facilities of the Military Forces of the Commonwealth of Independent States according to the agreement on the principles of the utilization of the *Baikonur* cosmodrome, signed by the Russian Federation and the Republic of Kazakhstan on May 25, 1992. The rights and duties of the military space personnel shall continue for the time necessary to fulfill the terms of the *Baikonur* cosmodrome lease agreement.

   The Russian military units shall carry out their activities according to the law of the Russian Federation, and the

[1] *See* Protocol on the Settlement of the Mutual Financial Obligations between the Russian Federation and the Republic of Kazakhstan, Jan. 20, 1995, 1995-20/1 Biulletin' Mezhdunarodnykh Dogovorov RK, No. 2-3.

rules and procedures of the Military Forces of the Russian Federation, while taking into account the law of the Republic of Kazakhstan. On the territory of the *Baikonur* cosmodrome, the Russian military and civilian personnel and the members of their families are subject to jurisdiction and the laws of the Russian Federation. The Republic of Kazakhstan has jurisdiction and its laws control in all other cases.

6. Lease of the *Baikonur* complex shall be for the period of twenty (20) years with an option to extend it for ten (10) more years by the mutual agreement of the Parties.

ARTICLE 5

1. Financing of the activities of the juridical persons of the Russian Federation on the territory of the *Baikonur* cosmodrome and in the city of Leninsk (including salary payments to the industrial, clerical and military personnel) shall be made by the Russian Federation through the Central Bank of Russia and its field offices, located in the city of Leninsk and on the territory of the *Baikonur* cosmodrome, according to the existing terms and procedures followed by the banks of the Russian Federation. A field office of the Central Bank of Russia can provide services to other juridical persons of the Russian Federation and the Republic of Kazakhstan only if it has a special permission of the National Bank of the Republic of Kazakhstan.

2. Transactions between residents and non-residents on the territory of the *Baikonur* cosmodrome and in the city of Leninsk shall be made in national currency of the Republic of Kazakhstan. National currency of the Republic of Kazakhstan shall be the only legal tender in cash transactions on the territory of the *Baikonur* cosmodrome. Exchange of Kazakhstan tenge and Russian roubles by the juridical persons of the Russian Federation, on the territory of the *Baikonur* cosmodrome and the city of Leninsk, shall follow the procedures currently in force at the Stock Exchanges of the Russian Federation and the Republic of Kazakhstan. The Russian physical persons can exchange currency through the offices of the National Bank of the Republic of Kazakhstan or through the field offices of the Central Bank of Russia.

ARTICLE 6

In order to create economic basis for the functioning of the *Baikonur* complex, the Republic of Kazakhstan shall convert all real property on the territory of the complex for the use by the Russian Federation and transfer all movable property into possession of the Russian Federation within two months of entering into force of this agreement.

The Russian Federation shall pay for the use and possession of this property as a part of rent fee for 1994 fiscal year from the moment of the signing of the lease agreement, following the procedure approved by the Governments of the Parties.[2]

ARTICLE 7

This Agreement shall be for the term of twenty years, and shall enter into force on the date of final notice by the Parties to each other that all necessary inner governmental procedures have taken place.

This agreement shall be automatically extended for ten more years if neither Party gives a written notice indicating its desire to renounce this agreement not later than six months before its expiration date.

Disputes concerning the interpretation or application of certain provisions of this agreement shall be solved through negotiations. For resolution of disputes arising out of this agreement and for resolution of practical problems concerning the *Baikonur* cosmodrome, the Governments of the Parties shall create the Intergovernmental Commission presided by vice-presidents of the governments of the Russian Federation and the Republic of Kazakhstan.[3]

Signed in the Russian and Kazakh languages on March 28, 1994, in Moscow. Both copies have equal force.[4]

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[2] *See also* Agreement on the Lease of the Baikonur Complex, signed by the Russian Federation and the Republic of Kazakhstan, Sobr. Zakonod. RF, 1995, No. 77-FZ.

[3] *See also* Government of the Russian Federation Decree, Ross. Gazeta, Jan. 6, 1997, No. 10 (creating the Russian part of the Russian-Kazakh Intergovernmental Commission addressing the problems concerning the Baikonur cosmodrome).

[4] This agreement was ratified by the Russian Federation on October 24, 1994. *See* Sobr. Zakonod. RF, 1994, No. 28-FZ.

AGREEMENT BETWEEN THE RUSSIAN FEDERATION AND THE REPUBLIC OF KAZAKHSTAN ON THE COOPERATION IN THE EFFECTIVE USE OF THE BAIKONUR FACILITY JANUARY 9, 2004

(Unofficial Translation by Maria Bjornerud)

The Russian Federation and the Republic of Kazakhstan, hereinafter the Parties,

FOLLOWING the Declaration on the Everlasting Friendship and Cooperation Aiming into XXI Century between the Russian Federation and the Republic of Kazakhstan, signed on June 6, 1992;

REFINING the provisions of the Agreement between the Russian Federation and the Republic of Kazakhstan on the Fundamental Principles and Terms of Use of the Baikonur Facility, signed on March 28, 1994

AGREED as follows:

ARTICLE 1

The purpose of this agreement is to develop a mutually beneficial cooperation between the Parties through a joint activity in furtherance of the effective utilization of the Baikonur facility for the benefit of the Russian Federation, the Republic of Kazakhstan, and for the fulfillment of their international obligations.

ARTICLE 2

The Parties recognize the importance of modernization of the Baikonur infrastructure and preservation of its historical heritage.

The Russian Federation shall assist the Republic of Kazakhstan and ensure its participation in the development and use of ecologically-safe rocket boosters, other joint space projects and programs, providing that the laws of the Russian Federation concerning the state secrets are being observed.

The Russian and Kazakhstan specialists shall participate in the implementation of joint projects, taking place on the Baikonur cosmodrome, on equal terms.

ARTICLE 3

The Parties recognize that it is necessary to improve ecological safety of rocket launching activities taking place over the territory of the Republic of Kazakhstan through:

- modernization of currently used, and development of new ecologically friendly rocket boosters, which will allow for the gradual reduction of launches, using rocket boosters with highly toxic components of the rocket fuel (amil, hepthil),from the Baikonur cosmodrome in the future;
- implementation of joint projects ensuring the ecological safety and resolving the environmental issues inherent to the space rocket activity.

ARTICLE 4

The Parties are developing and building a highly ecologically safe Baitarek rocket booster on the Baikonur cosmodrome. The new booster uses the Russian Angara rocket booster model, which will be tested by Russia at the Plesetsk cosmodrome.

ARTICLE 5

The Governments of the Parties shall work out the mechanism of implementation of the provisions of Articles 3 and 4 of this instrument, including financing, and shall make changes in the appropriate international instruments dealing with the Baikonur cosmodrome.

ARTICLE 6

The term of the lease of the Baikonur cosmodrome shall extend till 2050.

The Governments of the Parties shall make necessary changes to the Baikonur cosmodrome Lease Agreement, signed

by the governments of the Russian Federation and the Republic of Kazakhstan on December 10, 1994.

ARTICLE 7

This Agreement can be changed or modified by mutual consent of the Parties. This Agreement can be changed and modified by the protocols, which are to become parts of the agreement.

ARTICLE 8

Disputes over application of the provisions of this Agreement shall be resolved through consultations and negotiations between the Parties.

ARTICLE 9

This Agreement applies, in interim before its coming into force, upon the signature by the Parties. This Agreement comes into force upon the final written notification by the Parties of their implementation of all necessary intra-governmental procedures.

This Agreement can be terminated not earlier than twelve months after a written notification by one of the Parties.

The Agreement is signed in the Russian and Kazakh languages on January 9, 2004, in Astana. The texts in both languages are equally controlling.

MEMORANDUM ON FURTHER DEVELOPMENT OF COOPERATION BETWEEN THE RUSSIAN FEDERATION AND THE REPUBLIC OF KAZAKHSTAN IN ENSURING THE FUNCTIONING OF THE BAIKONUR COMPLEX

JANUARY 9, 2004

(Unofficial Translation by Maria Bjornerud)

The President of the Russian Federation and the President of the Republic of Kazakhstan,

FOLLOWING the provisions of the Agreement between the Russian Federation and the Republic of Kazakhstan on the Basic Principles and Terms of the Utilization of the Baikonur cosmodrome, signed on March 28, 1994, and other agreements providing legal basis for the cooperation involving the Baikonur complex;

CONFIRMING the deep interest of both States in increasing bilateral international cooperation in the utilization of the Baikonur cosmodrome for exploration and utilization of outer space;

EXPRESSING satisfaction with the results of the joint work in preservation and development of the infrastructure of the Baikonur complex under the terms of the lease agreement, and with the results of joint efforts in evaluation of the impact of the space rocket activity on the environment of the Republic of Kazakhstan,

ENTRUST the Governments of the Russian Federation and of the Republic of Kazakhstan within one year:

1. Make, mutually agreed upon, changes and amendments to the following bilateral agreements:

   The Baikonur Complex Lease Agreement, signed by the governments of the Russian Federation and the Republic of Kazakhstan on December 10, 1994; the Agreement on the Cooperation of the Law Enforcement Agencies in Preservation of the Constitutional Rights and Freedoms on the Territory of the Baikonur Complex, signed on October 4, 1994; The Agreement Concerning the Status of the City of Baikonur, its Executive Branch of Govern-

ment, Providing for the Increased Participation of the Executive Organs of the Republic of Kazakhstan in Administration of the City of Baikonur, signed by Russia and Kazakhstan on December 23, 1995; The Agreement on the Environment and the Exploitation of Natural Resources on the Territory of the Baikonur Complex Under the Terms of Lease Agreement, calling to bring them in compliance with the environmental laws of both states, signed on October 4, 1997.

2. Accelerate the resolution of issues concerning the cultivation of land parcels at the sites formerly used for launching of intercontinental ballistic rockets from the Leninsk testing facility and at the sites used for launching of space objects from Leninsk-1 located at the Baikonur cosmodrome.

3. Develop and coordinate the program dealing with the celebration of the 50th anniversary of Baikonur cosmodrome.

NOTING that the Republic of Kazakhstan shall take all necessary measures to join the Regime controlling space rocket technology.

The Presidents of the Russian Federation and of the Republic of Kazakhstan confirm their mutual understanding of all the issues concerning the effective functioning of the Baikonur complex, and highly appraise the steps taken towards cooperation in exploration and exploitation of the outer space.

Astana, January 9, 2004.

FIRST HAND ACCOUNT OF SELECTED LEGAL ISSUES FROM THE RECOVERY AND INVESTIGATION OF THE SPACE SHUTTLE *COLUMBIA*[1]

Donna M. Shafer[2] *and Amy Voigt LeConey*[3]

February 1, 2003 was a day of profound sadness for the National Aeronautics and Space Administration (NASA) and the nation. The loss of the Space Shuttle *Columbia* and its crew forced NASA to take a hard look not only at how it operated the Space Shuttle Program but also how it operated as an agency. In the aftermath, the goals were to find out what happened, why it happened, fix the problem, and safely fly again. The accident recovery and investigation created many legal issues of first impression that had to be, at times, addressed immediately and almost always very quickly. This article will focus on some of the issues faced by the NASA legal community. First, we will look at NASA's immediate response to the loss and how the recovery and investigation teams were put into place. From there, we will discuss some of the primary legal frameworks within which the recovery and investigation efforts were completed. Then, we cover methods used in the collection and control of the enormous amount of data involved in the aftermath of the accident. Next, we will look separately at the recovery and investigation phases and the unique legal questions raised by each. Finally, we will touch briefly on the claims that have arisen as a result of the accident, the search and recovery efforts that followed, as well as some lessons learned.

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[1] The views expressed in this article are the personal views of the authors and not necessarily the views of the National Aeronautics and Space Administration or the U.S. Government.

[2] Attorney-Advisor, NASA Lyndon B. Johnson Space Center; J.D., 1994, University of Houston Law Center. Served as the Legal Advisor to the *Columbia* Task Force.

[3] Attorney-Advisor, NASA Lyndon B. Johnson Space Center, J.D., 2000, Florida State University College of Law. Served as the Legal Advisor to the NASA Mishap Investigation Team at Barksdale Air Force Base, Louisiana.

Despite the extraordinary focus and perseverance of the personnel at NASA, this is not the first time that NASA has lost an Orbiter and its crew – the Space Shuttle *Challenger* was tragically lost seventy-three seconds after liftoff from the Kennedy Space Center in 1986. NASA learned and applied many lessons from that tragic day and the Shuttle was flying again in 1989. One thing that was evident at NASA on February 1, 2003, was a strong commitment and dedication amongst the employees within the Agency to the mission and goals of space exploration. It is that commitment and dedication which will carry the Agency through this recent tragedy and back to our mission to extend human presence across the solar system.[4]

I. INTRODUCTION

Before examining the legal questions raised by the accident, some background must be provided on *Columbia*'s mission and the nature of the accident itself.

NASA launched the 113th Space Shuttle mission, more commonly referred to as STS-107, on January 16, 2003. It was the twenty-eighth flight of the Space Shuttle *Columbia*, the very first Orbiter flown by NASA. Over the course of *Columbia*'s sixteen day mission, a wide variety of scientific experiments were completed in the areas of life science, physical science, space and earth science, and education. This mission was also historic in that the first Israeli astronaut, Ilan Ramon, was a crewmember. STS-107 was considered a dedicated science mission and *Columbia* was usually chosen to fly these missions because it was not equipped for International Space Station (ISS) missions due to its lack of a docking adaptor to mate with the ISS.[5] An Extended Duration Orbiter, or EDO, pallet was added to *Columbia* to extend the amount of time it could spend in space.[6]

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[4] On January 14, 2004, the President announced a new Vision for Space Exploration, starting with a human return to the moon by the year 2020. *See President Bush Offers New Vision For NASA*, NASA, *available at* http://www.nasa.gov/missions/solarsystem/bush_vision.html (Jan. 14, 2004).

[5] *See* NASA, COLUMBIA ACCIDENT INVESTIGATION BOARD REPORT 28 (Aug. 2003) [hereinafter CAIB Report].

[6] Typically, an Orbiter can operate in space about ten days. The addition of an EDO pallet allows missions to be extended up to sixteen days. The pallet carries cryo-

The *Columbia* Accident Investigation Board (CAIB) Report determined *Columbia* was ultimately destined to fail 81.7 seconds after liftoff. It was then that a piece of insulating foam separated from the left bipod ramp section of the External Tank and struck the leading edge of the left wing on the Reinforced Carbon-Carbon panel number eight, causing a breach in the Thermal Protection System of the Orbiter. During *Columbia*'s reentry to the Earth's atmosphere on February 1, superheated plasma penetrated the left wing through the breach in the insulation, which melted the aluminum structure of the wing. This weakening of the wing continued until increasing aerodynamic forces caused its failure and the eventual breakup of the Orbiter.[7] While this is cited as the physical cause of the accident, the CAIB found that there is an organizational culture within NASA that was as much a cause of the accident as the foam impact. The CAIB also pointed to other likely related causes including "the original compromises that were required to gain approval for the Shuttle, subsequent years of resource constraints, fluctuating priorities, schedule pressures, mischaracterization of the Shuttle as operational rather than developmental, and lack of an agreed national vision for human space flight."[8] The Board also cited as a major contributing factor to the accident a safety culture within NASA that rested too much on its past successes.

II. IMMEDIATE RESPONSE

A. International Space Station and Space Shuttle Mishap Interagency Investigation Board

One of the lessons NASA learned from *Challenger* was that there needed to be a contingency plan in place, not only an overall plan of what should be done, but also a plan to have an independent assessment of what happened. At NASA, activation of an investigation board is required for any event involving

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genic tanks filled with hydrogen and oxygen, which are used to power fuel cells, creating electricity and potable water needed to extend the mission.

[7] *See* CAIB REPORT, *supra* note 5, at 9.

[8] *See id.*

serious injury or loss of life, significant public interest, and other serious mishaps.[9] NASA Administrator, Sean O'Keefe, activated the International Space Station and Space Shuttle Mishap Interagency Investigation Board at 10:30 a.m., February 1, 2003, naming Admiral Harold W. Gehman Jr., U.S. Navy, (Ret.), as its Chairman.

This particular board renamed itself the CAIB and it brought together some of the nation's most experienced investigators and safety experts from aviation, naval nuclear propulsion, medical, scientific and academic fields to assist in finding the cause of the *Columbia* accident. The CAIB membership was divided into four groups: Group One – Management and Treatment of Materials; Group Two – Training, Operations, and Inflight Performance; Group Three – Engineering and Technical Analysis; and Group Four – Organization and Policy. Additional support to the CAIB included: representatives from the office of the NASA Inspector General, the *Columbia* Task Force,[10] Administrative Support, Travel Coordinators, representatives from the National Transportation Safety Board, a physician, a lawyer, Public Affairs personnel, representatives from the U.S. Department of Justice, and numerous individuals working under a support contract.

In order to maintain the integrity of the investigation and avoid even the appearance of a conflict of interest, it was of utmost importance to ensure that the CAIB operated independently from NASA. The CAIB was to conduct activities in accordance with policies and procedures that it had adopted; determine both the facts and the actual or probable cause of the mishap; use the existing NASA support structure of working groups as needed; activate any necessary new working groups; conduct inquiries, hearings, and tests; develop recommendations; and provide a final written report to be released immediately to the public.[11] To ensure the CAIB's financial independence, NASA

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[9] *See NASA Policy Directive 8621.1, NASA Mishap and Close Call Reporting, Investigating, and Recordkeeping Policy (NPG 8621.1).*

[10] *See infra* Section VI.E.1.

[11] *See* CAIB REPORT, *supra* note 5, at 232; *see also* CAIB Board Charter, *available at* http://www.caib.us (last visited April 6, 2004).

established a separate operating budget for the Board's activities.

B. Mishap Investigation Team

The purpose of the Space Shuttle Mishap Investigation Team (MIT) is to gather evidence for the board of investigation in the event of a Space Shuttle incident. This team is not put together to play any role in determining cause, but rather is tasked with the responsibility of gathering and preserving evidence to allow the CAIB to conduct its analysis and make a causal determination.[12] Membership of the MIT includes a Chair; a Site Investigation Group; an Eyewitnesses, Human Factors, Crew, and Environmental Group; a photographer; and a representative from the Department of Defense Manned Space Flight Support Office (DDMS).[13] Rapid Response Team (RRT) members from the Kennedy Space Center (KSC) as well as contractor support supplemented the MIT.

DDMS was chartered in 1959 to provide support to NASA in the initial human space flight effort. Today, it is the single point of contact to coordinate all Department of Defense (DoD) contingency support for human space flight programs. Specifically as it relates to the Space Shuttle Program, DDMS is responsible for astronaut rescue and recovery, contingency landing site support, medical support, coordination of airlift and sealift for contingency operations, and other activities required during a Shuttle emergency. If NASA has a request for any type of DoD support, it is given to DDMS for validation. DDMS then chooses the assets best able to fill NASA's request and tasks those assets through the appropriate command channels.

Every time a Shuttle Orbiter lands after a mission, there are teams of individuals that are tasked with immediately beginning to inspect and prepare the Orbiter for its next flight. The RRT is activated if the landing is not completely routine

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[12] *See* NASA SPACE TRANSPORTATION SYSTEM, SPACE SHUTTLE MISHAP INVESTIGATION TEAM FIELDBOOK, NSTS 37328, at §1.0.(1999).

[13] *Id.* at §2.0.

and the Orbiter lands somewhere other than KSC. The RRT is composed of technicians and engineers who are technical experts on the vehicle and its systems and is sent to wherever the Orbiter lands in order to prepare the vehicle to be returned to KSC. When *Columbia* never made it back to Florida, the members of the RRT had to be ready to assist the Shuttle MIT. Less than one hour after the accident, the Chair of the MIT met with a representative from DDMS to decide on a location to set up recovery operations near the accident site. NASA's only experience with a catastrophic Shuttle mishap was during a launch, so contingencies were in place primarily to meet the needs of a recovery operation based at KSC in Florida. However, *Columbia* caused employees to alter their perceptions and think on their feet – apply the lessons learned from *Challenger* in a radically different way. The location for recovery operations management needed to provide an adequate level of security for personnel and property and had to be equipped to fly in multiple types of aircraft from C-141 transport planes and KC-135s to T-38 jets and helicopters. There also needed to be adequate space to collect and protect the integrity of all debris that was recovered, at least temporarily. It was decided that Barksdale Air Force Base in Louisiana was geographically the best place for meeting all of NASA's needs. By the evening of February 1, 2003, the MIT was already at Barksdale Air Force Base and was organizing its efforts.

Most NASA investigation boards include a legal advisor to be available to consult on any number of issues that may arise.[14] However, the makeup of the MIT that formed the immediate response to the crash did not initially include legal support, but that did not last long. While the MIT was not in the business of investigation, in an accident of this magnitude legal issues were bound to come quickly in the process of evidence gathering and would need to be handled efficiently. On February 2, 2003 an attorney from the Johnson Space Center (JSC) in Houston, Texas, the NASA center geographically closest to the largest

[14] *See NASA Procedures and Guidelines 8621.1, NASA Procedures and Guidelines for Mishap Reporting, Investigating, and Recordkeeping*, §3.5 (*NPG 8621.1*).

debris location and the home of the Space Shuttle program, was sent to join the MIT in its work.

III. LEGAL FRAMEWORK

This section will describe some of the more important laws and legal frameworks within which NASA conducted activities related to the *Columbia* mishap. This framework is by no means all-inclusive.

A. Space Act

The National Aeronautics and Space Act of 1958 (Space Act)[15] created NASA to carry out U.S. policy that "activities in space should be devoted to peaceful purposes for the benefit of all mankind."[16] Section 2473 provides the functions of the Administration and is one of the most flexible pieces of legislation written for an agency in that it encompasses almost any situation. In the aftermath of the *Columbia* accident, authority to undertake many of the activities needed was contained in §2473(c)(3)-(6).

Section 2473(c)(3)[17]did not play a significant role in the recovery efforts due to the involvement of Federal Emergency Management Agency (FEMA), which will be discussed in more detail later in this article,[18] but was very important for investigation efforts. For example, when space was needed in Florida to try and recreate the Orbiter for analysis by the CAIB, as well as to find space for the CAIB and its staff to work, this authority was vital.

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[15] 42 U.S.C. §§ 2451-2465a (2003).

[16] 42 U.S.C. § 2452(a) (2003).

[17] 42 U.S.C. § 2473(c)(3) (2003) states in part:

In the performance of its functions, the Administration is authorized to acquire (by purchase, lease, condemnation, or otherwise), construct, improve, repair, and maintain laboratories, research and testing sites and facilities, aeronautical and space vehicles, quarters and related accommodations for employees and dependents of employees of the Administration, and such other real and personal property (including patents), or any interest therein, as the Administration deems necessary within and outside the continental United States.

[18] *See infra* Section V.A.

Section 2473(c)(4) allows NASA to accept gifts if those gifts are given without conditions attached as to how NASA can use such items.[19] Following the loss of *Columbia*, many individuals and companies wanted to help or provide some type of assistance. NASA was only able to accept those offers as long as NASA could decide how to use the gift.

Section 2473(c)(5) gave NASA the critical ability during the recovery operations to form agreements with agencies like FEMA as well as enter into agreements with some of the over 100 state and local agencies and individuals in Texas, Louisiana, New Mexico, Nevada, and Utah, to name a few, who assisted NASA in the search for debris.[20] Within the investigation, this authority enabled NASA to enter into lease agreements at JSC and KSC for office facilities for the CAIB,[21] as well as to equip those facilities with computers, phones, faxes, and other general office operating resources. Further, it was used in making initial preparations[22] for conducting investigative tests in support of the Board.

Section 2473(c)(6), in conjunction with support from DDMS and FEMA, allowed NASA to work out of Barksdale Air Force Base as well as to use assets from DoD such as helicopters and salvage divers from the U.S. Navy.[23] Assets from other agencies could be utilized also, such as aircraft from the Civil Air Patrol, the U.S. Air Force Auxiliary.

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[19] 42 U.S.C. § 2473(c)(4) (2003). In the performance of its functions, the Administration is authorized "to accept unconditional gifts or donations of services, money, or property, real, personal, or mixed, tangible or intangible".

[20] 42 U.S.C. § 2473(c)(5) (2003) states in part:
[t]o enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of its work and on such terms as it may deem appropriate, with any agency or instrumentality of the United States, or with any State, territory, or possession, or with any political subdivision thereof, or with any person, firm, association, corporation, or educational institution.

[21] Due to numerous issues that arose, the CAIB did not utilize either of these facilities.

[22] As mentioned previously, NASA had set up a separate operating budget to establish financial independence of the CAIB. The total investigation costs were in excess of $150M (USD).

[23] 42 U.S.C. § 2473(c)(6) (2003) states in part, "[t]o use with their consent, the services, equipment, personnel, and facilities of Federal and other agencies with or without reimbursement, and on a similar basis to cooperate with other public or private agencies and instrumentalities in the use of services, equipment, and facilities..."

B. Freedom of Information Act

The Freedom of Information Act (FOIA)[24] was enacted in 1966 and generally provides that any person has the right to request access to Federal agency records or information. All agencies of the Executive Branch of the United States Government are required to disclose records upon receiving a written request, except for those records (or portions of them) that are protected from disclosure by any of the nine exemptions of the FOIA.[25] For any exemption asserted by the agency to the release of any requested information, there is an administrative appeal process available to the requestor.[26]

A FOIA request can be made for any agency record. This does not mean, however, that a Federal agency will disclose all records sought. As noted above, there are statutory exemptions that authorize the withholding of certain information, including information of a sensitive nature. When a Federal agency does withhold information, it ordinarily must specify which exemption of the FOIA permits the withholding. In addition, the FOIA does not require agencies to do research, to analyze data, to answer written questions, or to create records in order to respond to a request.

Requests for information under the FOIA increased significantly across the Agency as a result of the *Columbia* accident. Even though the CAIB and the Agency determined to proactively release as much information as possible, without in any way disrupting or jeopardizing the integrity of the investigation, the number of requests specifically related to the accident still totaled nearly 500.

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[24] 5 U.S.C. § 552 (2003).

[25] *See* 5 U.S.C. § 552(d) (2003). FOIA exemptions include: 1) classified documents; 2) internal personnel rules and policies; 3) information exempt under other laws; 4) confidential business information; 5) internal Government communications; 6) Personal Privacy; 7) law enforcement; 8) financial institutions; and 9) geological information.

[26] The NASA appeal process regulations can be found at 14 C.F.R. § 1206.605 (2003).

C. Privacy Act

The Privacy Act of 1974[27] is a companion to the FOIA. The Privacy Act regulates Federal Government agency recordkeeping and disclosure practices. It allows individuals to seek access to Federal agency records about themselves. The Act requires that personal information in agency files be accurate, complete, relevant, and timely. The individual who is the subject of a record may challenge the accuracy of information in the record. The Act requires that agencies obtain information directly from the subject of the record and any information gathered for one purpose cannot be used for another. As with the FOIA, the Privacy Act provides civil remedies for individuals whose rights may have been violated. To prevent agencies from keeping secret records, each Federal agency must publish a description of each system of records maintained by the agency that contains personal information. The Act also restricts the disclosure of personally identifiable information by Federal agencies.

Together with the FOIA, the Privacy Act permits disclosure of most personal files to the individual who is the subject of the files. The essential feature of both laws is that they make Federal agencies accountable for information disclosure policies and practices. If a record cannot be released, the requestor is entitled to be informed of the rationale for the denial and has a right to appeal the denial and challenge it in court. As a result of the procedural rights granted by the FOIA and the Privacy Act, the disclosure of Federal Government information cannot be controlled by arbitrary or unreviewable actions.

D. Export Control

Federal agencies and their contractors must comply with the two primary U.S. Government laws controlling exports, the Arms Export Control Act[28] and its implementing regulations, the International Traffic in Arms Regulations (ITAR),[29] and the

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[27] 5 U.S.C. § 552a, as amended (2003).
[28] 22 U.S.C. § 2778 (2003).
[29] 22 C.F.R. §§ 120.1-130.17 (2003).

Export Administration Regulations (EAR).[30] Lack of compliance can result in suspension of current or future licensing privileges and criminal, civil, or administrative enforcement action against both government officials and private contractors.

The Arms Export Control Act authorizes the President to control the export and import of defense articles and defense services. The President delegated authority to promulgate regulations with respect to exports of defense articles and defense services to the Secretary of State by Executive Order 11958, as amended. The items designated as defense articles and defense services constitute the United States Munitions List (USML) in the ITAR. In general, design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles (e.g. space launch vehicles, certain spacecraft, ground tracking systems and associated hardware and engineering units for these items) are on the USML and are controlled by the ITAR.

The EAR, administered by the Department of Commerce, covers what is commonly referred to as "dual use" items. For technical data it applies to all information in the United States that is not in the public domain[31] and is not under the jurisdiction of another Government agency.

The existing NASA export control process was utilized to facilitate any public releases of information by the CAIB. The Space Shuttle Program (SSP) Office Export Representative reviewed all NASA data turned over to the CAIB and made a written recommendation concerning the releasability of that information. It was important to sensitize individuals unfamiliar with NASA data to the fact that much of the Shuttle data is controlled by the ITAR. As the cognizant Agency, NASA had the authority to approve such data for public release.[32]

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[30] 15 C.F.R. §§ 730.1-774 Supplement No. 3 (2003).

[31] "Public domain" means information which is published and which is generally accessible or available to the public. 22 C.F.R. § 120.11.

[32] 22 C.F.R. § 125.4(b)(13).

E. Federal Advisory Committee Act

In 1972, the Federal Advisory Committee Act (FACA)[33] was enacted by Congress. Its purpose was to ensure that advice rendered to the Executive Branch by the various advisory committees, task forces, boards, and commissions formed over the years by Congress and the president, be both objective and accessible to the public. The Act not only formalized a process for establishing, operating, overseeing, and terminating these advisory bodies, but also created the Committee Management Secretariat, an organization whose task it is to monitor and report executive branch compliance with the Act. Through enactment of FACA, the U.S. Congress formally recognized the merits of seeking the advice and assistance of our nation's citizens.

Not long after the activation of the CAIB, consideration was given to the applicability of the Act. The formalities required by the Act were not compatible with the broadly defined, time intensive investigation or with the effective oversight of more than one hundred staff and thousands of debris searchers. For this, and a number of other practical considerations, all CAIB members who were not already employees or officers of the United States were employed as full-time Federal employees.[34] Even though the Act was not applicable to the CAIB's activities, the Board resolved to comply, to the maximum extent practicable, with its standards. The NASA Administrator established the Return to Flight Task Group,[35] consistent with FACA.

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[33] 5 U.S.C. apps. §§ 1-16 (2003).

[34] 5 U.S.C. app. § 3(2) provides that FACA does not apply to committees "comprised wholly of full-time officers or employees of the Federal Government."

[35] On June 13, 2003, NASA Administrator Sean O'Keefe, pursuant to FACA, appointed two veteran astronauts, Apollo commander Thomas P. Stafford and Space Shuttle commander Richard O. Covey, to lead a distinguished task force to assess the Agency's "Return to Flight" efforts and advise on the implementation plans in response to the CAIB recommendations contained in its final report.

The Task Group is performing an independent assessment of NASA's actions to implement the recommendations of the CAIB, as they relate to the safety and operational readiness of NASA's next Shuttle mission, STS-114. The Task Group functions solely as an advisory board and complies fully with the provisions of FACA. The crew of STS-114 includes: Commander Eileen Collins, Pilot James Kelly, and Mission Specialists Stephen Robinson, Soichi Noguchi, Charles Camarda, Wendy Lawrence, and Andrew Thomas. The major focus of their mission will be testing and evaluating new Space Shuttle flight safety, which includes new inspection and repair techniques, but

F. Stafford Act

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act)[36] was drafted "to provide an orderly and continuing means of assistance by the Federal Government to state and local governments in carrying out their responsibilities to alleviate the suffering and damage which result from ... disasters."[37] The duties under this Act have been carried out by many different agencies over the years, but today they provide the missions and functions of FEMA. Under this Act, FEMA is provided a whole array of powers to help state and local officials prepare for and respond to emergencies. Some powers that were particularly useful in the *Columbia* disaster response included the ability to lease and take immediate possession of facilities from which to carry out emergency response activities; the ability to buy and distribute materials and equipment (everything from cell phones to office supplies); and the power to task any Federal agency to assist in response activity through the provision of personnel, services, or equipment, and reimburse those agencies for their assistance.

IV. INFORMATION

A. Collection/Archival

With any investigation quickly comes the compilation of data and the CAIB soon came to realize that the sheer volume of available data involved with the technically complex Space Shuttle could quite easily overwhelm them if not properly cataloged. As a result, the U.S. Department of Justice (DOJ) was enlisted to assist with the collection and control of the data for the CAIB.[38] Configuration management between the CAIB and NASA was accomplished through the *Columbia* Task Force

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will also include delivering supplies to the ISS. The anticipated launch date is either January or March 2005. *See* http://spaceflight.nasa.gov/shuttle/index.html.

[36] 42 U.S.C. §§ 5121-5206 (2003).

[37] 42 U.S.C. § 5121(b) (2003).

[38] The U.S. Department of Justice, Office of Litigation Support, was brought in due to their vast experience in collecting and controlling evidence for the U.S. Attorneys conducting litigation on behalf of the U.S. Government.

(CTF).[39] Processes and procedures were adopted by the CTF to track the data being provided to the CAIB by NASA and DOJ assisted with the control of the CAIB data. A records schedule[40] was created to specify the legal disposition of the records associated with the *Columbia* accident investigation because the data provided to and created by the CAIB are Government records. Access restrictions to these records were specified in correspondence between the chairman of the Board, the NASA Administrator, and the Archivist of the United States, as well as on the Standard Form 258, *Agreement to Transfer Records to the National Archives of the United States*. The eight categories of CAIB records as well as the disposition of them are discussed below.

1. CAIB Document Database

The CAIB Document Database contains over 35,000 records created or received by the CAIB during its investigation. Records in the database include testing reports, reports and related records from the CAIB Independent Analysis Team, interim recommendations, independent assessment team reports, presentations, photographic images, drawings, and correspondence. Also included are substantive electronic mail messages that were created and received by, but are not necessarily limited to, the Board Members, Principal Investigators, and senior-level CAIB staff. This includes those messages that document procedures, opinions, advice and guidance, and other matters that relate to the work of the CAIB. These records are permanent Government records that transferred to the custody of the National Archives and Records Administration (NARA) following the completion of the work of the CAIB.

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[39] The CTF served as the formal interface between NASA and the CAIB. Section VI.E., *infra*, provides additional information on the CTF.

[40] General Records Schedules are issued by the Archivist of the United States to provide disposal authorization for temporary administrative records common to several or all agencies of the Federal Government. They include records relating to civilian personnel, fiscal accounting, procurement, communications, printing, and other common functions, and certain non-textual records.

2. CTF Document Database

The *Columbia* Task Force (CTF) Document Database contains approximately 45,000 records that were requested by the Board, scanned into NASA's Process Based Mission Assurance (PBMA) database at JSC, and then retrieved by the Board. Generally, these are the records that the Board requested, reviewed, and utilized during its investigation into the *Columbia* accident. They included CAIB requests for information from NASA, reports and presentations, hardware release and debris test approval forms, images, drawings and links to files that were too large to be stored in either CTF or CAIB databases. It is important to note that there is minimal duplication between the CTF and CAIB databases. These are permanent Government records that transferred to the custody of NARA following the completion of the work of the CAIB.

3. Interview Records

Witness testimonies in the format of audio recordings, electronic transcripts, and interview notes were created and controlled by the CAIB. In order to allay fears that can prevent individuals from revealing damaging or even embarrassing information, the Board decided to grant confidentiality to individuals who were interviewed individually by Board members. The Board's grant of confidentiality was consistent with longstanding practice in investigating aircraft accidents. Confidential statements made to air crash safety investigators have been found privileged with respect to pretrial discovery.[41] The Supreme Court has also recognized the privilege as exempting such statements from disclosure under FOIA.[42] Protecting the witness statements from disclosure under FOIA did not prevent an accounting of personal responsibility for the cause of the accident, but merely meant that any accounting must arise from a separate investigation.[43] Also included in these records are the

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[41] *See* Machin v. Zukert, 316 F.2d 336, 340 (D.C. Cir. 1963) *cert. denied*, 375 U.S. 896 (1963).

[42] *See* United States v. Weber Aircraft Corp et al., 465 U.S. 792, 798 (1984).

[43] *See* CAIB REPORT, *supra* note 5, Appendix A, at 233.

copies of the written statements that were made by the staff of NASA's Mission Control Center and other NASA staff and contractors immediately following the *Columbia* accident. All of the approximately 280 interviews and written statements are permanent Government records that transferred to the custody of NARA following the completion of the work of the CAIB.[44]

4. Interim and Final Report Records

Volume I of the CAIB's final report was released in August 2003. The remaining five volumes were all released in October 2003. Volumes II-VI contain supporting documentation and were released with a Board statement that the conclusions and recommendations are not necessarily reflective of the views of the CAIB but are included for the record. An electronic and a paper copy (one each) are permanent Government records that transferred to the custody of NARA following the completion of the work of the CAIB.

In completing the investigation, the CAIB created working files and notes. These were temporary records and were to be destroyed or deleted upon verification that the information was contained in the final report, or upon the completion of the work of the CAIB, whichever was later.

5. Public Affairs Records

The public affairs records include: audio-visual and textual formats on compact discs (CDs and DVDs) and on VHS that contain still photographs with captions, video recordings of United States Senate briefings, lectures, conferences, press conferences, transcripts of public hearings, captioned copies of all digital photographs taken by CAIB Public Affairs, and a computer-animated presentation of the Shuttle damage. These are per-

[44] NARA pre-accessioned these records for archival purposes at the end of the work of the CAIB. Legal custody will transfer at the end of the term of the 109th Congress in 2006. To preserve the effectiveness of the privilege for future aircraft accident investigations, the Archivist of the U.S. acceded to the CAIB's request to restrict access to the statements for a period of fifty years.

manent Government records that transferred to the custody of NARA following the completion of the work of the CAIB.

6. Public Comment Records

Over 3,500 electronic and paper records were received from the public and science experts. These records were divided into two groups and each had different dispositions.

The first group consisted of electronic mail messages received by the CAIB via its website, scanned images of letters received via surface mail, and electronic transcripts of telephone communications with the public. These are permanent Government records and were transferred to the custody of NARA following the completion of the work of the CAIB.

The second group was made up of original textual correspondence received via surface mail, textual notes and transcripts of telephone communications with the public, and paper printouts made for reference purposes from the Public Comment Database. These documents were temporary records and were destroyed or deleted upon verification by the CAIB that the information was contained in the Public Comment Database.

7. CAIB Web Content and Web Management records

The CAIB maintained a web site that contained information about the activities of the Board and its members. Included in this set of records are electronic and paper copies of the CAIB's web pages, associated documentation, web site policy and planning files, records created during the implementation of the web site, electronic copies of inputs to the site, web site page content files and code (HTML-encoded pages), electronic images that the end user of the site sees (outputs), web site use and control reports (logs and statistical compilations, web site map), web site screen printouts (archives), system documentation, web design records, web site change control records, web site migration records, and system commercial off the shelf configuration software. These were all temporary records and were destroyed or deleted upon completion of the CAIB's work.

8. Electronic Mail and Word Processing System Copies

The CAIB produced electronic copies of records that were created on electronic mail and word processing systems and were used solely to generate a record-keeping copy of a record. These electronic records were temporary and were deleted after recordkeeping copies were produced.

B. Recovery Data Management

In the midst of coordinating search teams and locating debris, large amounts of documentation and data were created to describe the processes and procedures used by agencies in the recovery operation. Maps were generated to track the reporting and locating of debris. Status reports were created to appraise agency headquarters of resources used and progress made. There needed to be a way to collect, catalog, and archive all this data necessary to assist in the investigation. NASA had initiated a Data and Records Handling Working Group that developed a process for the impoundment of data related to STS-107 in order to preserve evidence related to the accident. Any data created during the course of recovery and investigation was specifically included in this process. Implementation of this policy within the recovery operation was logistically complex on a couple of different levels.

The first level was geography. The recovery operation initiated at Barksdale, but expanded quickly into Texas field offices in Lufkin, Carswell, Palestine, Nacogdoches, and Hemphill, as well as the Office of Emergency Preparedness in Louisiana, and multiple makeshift offices in several Western states where debris sightings were reported. The challenge was disseminating the guidelines to the necessary people and then explaining them in such a way as to allow for effective implementation at each specific recovery site. This was very different than simply impounding files in an office. As the search efforts progressed and narrowed, beginning at the end of February when Carswell then Barksdale consolidated into Lufkin, the necessity to begin securing data became critical. Data, once secured at these facilities, could not always be impounded right away because it was still being used, but it had to be at a mini-

mum collected, cataloged, and boxed up for the move. This consolidation of records made things a bit easier in May when the Lufkin office was shut down and remaining operations were shifted to the *Columbia* Recovery Office at the Johnson Space Center. FEMA and NASA took the lead in ensuring that all data related to operations at various field offices were backed up, saved, and moved to the appropriate location for use and eventual impoundment.

The second level was interagency coordination. The policy that was developed by NASA was relatively easy to implement by and within NASA. However, there were substantial amounts of data generated by FEMA, the EPA, the FBI, the Texas Forest Service, and many others that also needed to be impounded to preserve as evidence for the investigation. To address this issue, representatives of all the affected agencies gathered together to form their own data working group to decide what data needed to be saved, how best to retrieve information from computers and files, and who would have responsibility for ensuring this activity was completed. After much effort, this interagency coordination group was able to come to resolution on these matters and all data covered by the guidelines were saved for the investigation and later archival purposes.

C. Dissemination

1. Freedom of Information Act (FOIA)

At JSC there were nearly 200 FOIA requests submitted and processed as a result of the accident and nearly half of those came in before the month of February had come to an end.[45] The existing NASA FOIA process was utilized to respond to the incoming requests. NASA legal counsel and NASA FOIA Officers formed a team and met daily to discuss the incoming FOIA requests as well as the most expeditious manner to handle the large volume of requests. The FOIA team worked with the *Columbia* Task Force (CTF) and the *Columbia* Accident Investiga-

[45] As stated previously, there were nearly 500 FOIA requests across the Agency as a result of the accident.

tion Board (CAIB) legal advisors to facilitate responses to any requests addressed to both the CAIB and NASA. The *Columbia* Accident Rapid Reaction Team (CARRT)[46] was created to facilitate FOIA responses in a consistent manner across the Agency. In coordination with the CAIB, they provided authority for release of any *Columbia* related records by NASA. This team approach enabled well-coordinated FOIA responses.

The general rules on records releasability during the investigation were that pre-accident records would be released, waiving any deliberative process privilege.[47] However, due to the ongoing investigation, post-accident records were generally withheld in reliance on this deliberative process FOIA exemption. Information protected by other non-discretionary FOIA exemptions was withheld, such as personal privacy, national security, and company proprietary information. Although NASA and the CAIB were independently responsible for records release determinations, the CARRT notified the CAIB of all approved pending NASA releases and the CAIB, in turn, notified NASA of planned sensitive releases.

2. Payload Information

Under normal circumstances, the payloads flown on STS-107 would have been returned to the appropriate party; e.g., principal investigators of scientific experiments. However, due to the *Columbia* accident, NASA impounded all recovered Shuttle material as part of the investigation and this included the payloads. The mission included thirty science facilities in the *SPACEHAB* module and six Freestar experiment facilities, which together supported over eighty scientific investigations. More than 2,200 recovered pieces of debris were identified as payload items. For many reasons, NASA wanted to preclude the use of recovered STS-107 payload material for purposes that would be inconsistent with their originally intended scientific purposes. Of particular concern to NASA was the use or sale of

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[46] *See infra* Section VI.E.3.

[47] *See* 5 U.S.C. § 552(b)(5) (2003).

payload hardware as memorabilia to those who would exploit the STS-107 accident.

NASA did not initially release any recovered hardware except for science recovery purposes. STS-107 payload customers could submit a Test Approval Release (TAR) Form to get temporary access to the recovered hardware related to their specific payload. The STS-107 CAIB Impounded Hardware and Debris [and Data] TAR was utilized for any internal as well as external releases. The TARs required approval from NASA as well as the CAIB. This process worked well and ensured that no releases were made which would in any way compromise the investigation. Additional coordination was necessary for external releases (e.g., to payload customers) resulting in a longer period of time for release approval.

To facilitate the investigation, NASA preferred that any payload customers who conducted science recovery operations do so at KSC, but some exceptions where made to send items to other NASA Centers with the understanding that the hardware would be returned to the Reusable Launch Vehicle Hangar Facility, which was being used as a "reconstruction" site, and remain there until completion of the investigation. For science recovery operations not conducted at KSC, the unique payload TARs was presented to the NASA Accident Investigation Team (NAIT)[48] and, if approved, sent to the CAIB for final approval.

V. RECOVERY

A. Federal Emergency Management Agency

As the media played images of the *Columbia* vehicle breaking up over the skies of the western and southwestern United States, it became clear that the debris, upon impact, would likely cause damage to people, livestock, and property. President Bush chose to exercise his authority to declare a state of emergency in Texas almost immediately to allow for Federal assistance to be used to help the state of Texas in responding to

[48] *See infra* Section VI.E.4 for a discussion of the NAIT.

the disaster.[49] The President can exercise this Stafford Act authority "when he determines that an emergency exists for which the primary responsibility for response rests with the United States." [50] The agency tasked to actually provide this Federal assistance is FEMA.[51] Once an emergency is declared, FEMA has the broad power to direct the resources, personnel, and equipment of any Federal agency to assist state and local emergency management authorities in saving lives, protecting property, and averting further threats of harm.[52] On February 1, 2003, when the President made this declaration, a Federal Coordinating Officer was assigned and a team was sent to meet with NASA to begin response activities. FEMA has very few full-time employees; with most of its support personnel being called in only after a disaster has occurred.

It was soon discovered that debris had landed not only in East Texas, but also in parts of Louisiana, and emergency assistance was needed there as well. However, FEMA can only enter a state if an emergency has been declared. Accordingly, President Bush amended his emergency declaration on February 6th to allow FEMA to provide Federal assistance in Louisiana and any other state that it determined was impacted by the *Columbia* accident.[53] Because of the ground track that the Orbiter covered as it came in for its landing approach, there was the possibility that more states west of Texas could also be affected. In fact, within the first week, there were reports of debris being found in 29 states and three foreign countries.[54] This was ad-

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[49] *See* President George W. Bush, *Memorandum for the Director of FEMA*, *available at* http://www.whitehouse.gov/news/releases/2003/02/20030201-8.html (Feb. 1, 2003).

[50] 42 U.S.C. § 5191(b) (2003).

[51] *See* 42 U.S.C. § 5195(b) (2003).

[52] *See* 42 U.S.C. § 5192 (2003).

[53] *See* Office of the White House Press Secretary, *Emergency Declaration on Shuttle Columbia*, *available at* http://www.whitehouse.gov/news/releases/2003/02/20030206-18.html (Feb. 6, 2003).

[54] NASA received debris reports from the following three foreign countries: Jamaica, Canada, and Grand Bahama. There were also two reports of debris in the Gulf of Mexico itself. All of these reports were closed through telephone calls to the reporting party and digital pictures sent to the MIT via e-mail. Shuttle technicians were able to rule out from the pictures that the reported material was Shuttle debris and no further action was taken. As a result, no treaty issues were identified.

mittedly the largest single response action that FEMA had ever helped undertake.[55]

B. FEMA/NASA Coordination

While the Space Shuttle and the U.S. space program were the province of NASA, the ability to command resources and react quickly to a potential threat to public safety belonged to FEMA. Throughout the recovery operation, both of these agencies worked as partners and equal leaders of one of the largest emergency response operations in our nation's history. The primary search corridor in Texas and Louisiana alone was 10 miles wide by 240 miles long. NASA supervised the search for Shuttle material and FEMA coordinated the response and recovery operations. Whereas NASA's goal was to find the Orbiter and figure out why the accident occurred, FEMA's goal was to help the states respond to an emergency situation and protect its citizens from harm. These goals and the staff chosen to implement them complemented each other extremely well.

Within Texas and Louisiana, events happened very quickly. NASA had begun to set up operations at Barksdale Air Force Base and FEMA arrived soon after to assist. NASA had already made arrangements with the Air Force for utilization of a supply building, along with hangar space, from which to work. Within a day, FEMA had set up computers and telephone lines in the supply building to enable teams to begin tracking down where the debris landed.

FEMA was also already in contact with the Governor of Texas and was coordinating search and response activities with the Texas Department of Emergency Management under a FEMA-State agreement.[56] A hotline number was established and routed through the JSC Emergency Operations Center and searchers began receiving debris calls from all over the country.

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[55] As of May 5, 2003, ground, water, and air searches combined covered more than 2.28 million acres and approximately 25,000 personnel took part in the recovery operation. *See* FEMA, *Recap of the Search for Columbia Shuttle Material*, *available at* http://www.fema.gov/news/newsrelease.fema?id=2808 (May 5, 2003) [hereinafter *Recap*].

[56] The authority for FEMA to enter into these agreements can be found at 44 C.F.R. § 206.44 (2003).

As it was seen that the majority of reports received during the first couple of days were concentrated in the Lufkin/Nacogdoches/Hemphill area, the NASA MIT and FEMA decided a field office needed to be located closer to coordinate the search. So representatives from NASA and FEMA were dispatched to Lufkin, Texas where FEMA used its authority to set up operations in the Lufkin Civic Center.

FEMA also began entering into mission assignment agreements with various Federal agencies to help with the recovery of debris. One example of this was with the Environmental Protection Agency (EPA). FEMA tasked EPA to help NASA and other state and local agencies with the collection and transport of debris consistent with environmental regulations. The Orbiter vehicle and its payloads contained some hazardous materials, hypergolic fuels, and explosive bolts, which had to be handled in accordance with EPA regulations regarding the transportation of hazardous materials.[57] NASA immediately sent out press releases asking citizens who found any debris not to handle it and to call the authorities immediately because of its hazardous nature. This raised one of the first pressing legal issues to be dealt with – the transportation of potentially hazardous debris across state lines without violating EPA regulations. Tied to this was whether there were any problems with storing this material at the base, possibly exposing the Air Force to liability under the Resource Conservation and Recovery Act (RCRA).[58] If debris was found in Texas, it was tagged and logged into a database by the EPA and sent to the main collection hangar at Barksdale. The Air Force was aware of this concern as well and took steps to work with EPA to address it. It was eventually determined by EPA that debris could be moved from Texas to Louisiana without incurring any penalties under RCRA since both states were within the declared emergency site.[59]

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[57] *See* 49 C.F.R. §§ 397.1-397.225 (2003).

[58] *See* 42 U.S.C. §§ 6901-6908a (2003).

[59] *See* Zachary Berman, *The Legal Cleanup: Lawyers Consider Issues Stemming from Crash of Space Shuttle Columbia*, 89 A.B.A. J 19,19-20, (2003).

Once the President extended the emergency declaration to cover Louisiana and any other state where debris was found, FEMA entered into a FEMA-State agreement with the Governor of Louisiana and established a line of communication with the Louisiana Office of Emergency Preparedness to facilitate the recovery of debris. These agreements with the states allowed FEMA to enter a state, provide assistance, and access public/private land in order to accomplish its work. The agreements also provided the U.S. Government a waiver of liability for damages resulting from the work done under the request of the state along with indemnity for the U.S. Government against any claims arising from such work.

After about two weeks, it became apparent that search teams and recovery operations needed a more permanent place to operate the Texas search effort. FEMA took the lead in leasing space in the Bank of America building in Lufkin and in a weekend moved the entire Texas search operation from its initial base in the Lufkin Civic Center. The Texas operation was unique in that this was the state where the majority of debris was recovered and, by far, had the largest amount of state and local agencies with which to coordinate. At one count, approximately 130 different agencies were involved.[60]

Meanwhile, more debris reports were coming in daily from twenty-eight states outside of Texas and three foreign countries. Because debris had been found in Louisiana, FEMA could use state resources to assist NASA there, but until debris had been located in another state, FEMA had no authority to enter a state and act.[61] However, NASA had the primary responsibility to follow up on all the debris reports received and it was critical to the investigation to find as much of the Orbiter as possible. This effort was handled out of Barksdale Air Force Base for the first month and then eventually was transferred to the Lufkin field office when all operations were moved there. Closing many of the debris reports was as simple as a phone call to the person

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[60] *See, Recap, supra* note 54.

[61] *See* Office of the White House Press Secretary, *Emergency Declaration on Shuttle Columbia, available at* http://www.whitehouse.gov/news/releases/2003/02/20030206-18.html (Feb. 6, 2003).

who made the sighting and requesting they send a picture of the alleged piece of debris for one of the NASA engineers to review. This was especially true for reports in states that were far from the ground track of the Orbiter vehicle. But for those states in the West who reported debris, NASA was very interested in confirming any sightings because pieces that fell earlier from the Orbiter would provide the CAIB more information about how the Shuttle broke apart and why. NASA did not have the resources and capability to undertake large ground searches in states like New Mexico, Nevada, Utah, Arizona, and California, which would require not only support from large numbers of state police and emergency management personnel to form search teams, but also the assets to airlift teams to isolated areas to search for and collect debris. In addition, assets would be needed to move teams into search areas on the ground, office space would be needed for the teams to coordinate their efforts and a central collection site would need to be created for any debris found. NASA and FEMA, therefore, joined together under a mission assignment agreement wherein FEMA directed NASA to locate, identify, secure, and transport materials from the Orbiter vehicle in any states where debris was located. While operating under a FEMA mission assignment in the Western states, NASA utilized FEMA's connections with the various state departments of emergency management to coordinate search parties, made up of people from firefighters to prison inmates. If material was found, then FEMA could go in under the authority of the February 6th emergency declaration and provide assistance, as needed.

The seamless nature of operations between FEMA and NASA as co-leaders of this operation was truly a model for interagency cooperation in a time of crisis.

C. The Search

1. Chain of Command

One of the critical issues during the recovery effort was maintaining a clear chain of command to lead the NASA operation in the field. While this might not seem like a strictly legal

issue, the legal advisor noted that management confusion could lead to a multitude of problems and a legal advisor's role is not only to react to a situation, but also to be able to think strategically to assist the manager in carrying out his or her duties.

The recovery operations began at Barksdale Air Force Base, where the MIT leadership worked. The field offices set up by the MIT and FEMA were driven by the concentrations of reported debris sightings and actual debris sightings. Within the first few weeks, field offices were set up around Texas in Lufkin, Carswell Air Force Base outside Dallas, Nacogdoches, Hemphill, and Palestine. In addition, field teams searched in Louisiana out of the Department of Emergency Management offices in Baton Rouge, and in Western states such as Nevada, Utah, New Mexico, Arizona, and California, many times using the local law enforcement offices as a base of operations. Lufkin was designated the main Disaster Field Office (DFO) by FEMA for its operations since that was where the Texas debris search was coordinated from, whereas NASA's MIT leadership remained in Barksdale and orchestrated all other search efforts from there. NASA assigned representatives from the MIT to the Lufkin DFO to work closely with FEMA in aiding the Texas communities in the recovery and response efforts. Before February had come to a close, there was some confusion within NASA about who within the Agency was leading the recovery effort and from where. Although the MIT had been designated to be in charge of recovery, geography caused delays in decision-making and personnel often looked to whoever was conveniently located, rather than contacting the designated MIT management, in order to quickly get the job done.

By March, a hangar was set up at KSC, with the assistance of the National Transportation Safety Board, to receive debris and the intermediate collection point at Barksdale was no longer necessary. So this problem solved itself in the beginning of March when the Barksdale operation was consolidated with the DFO in Lufkin and managers could then interface directly.

2. Theft of Debris

Another big issue that was confronted involved the theft of debris. Shuttle material had fallen over an extensive area and while many citizens who found debris called the local authorities or called the Debris Reporting Hotline to report it, there were some people who apparently thought they would rather have a souvenir from a historic event, either for their own personal use or to make some money from it by selling it on the Internet. In an attempt to curb this, the U.S. Attorneys for the Southern and Eastern Districts of Texas issued a one-day moratorium from prosecution for anyone who had Shuttle debris and had not reported it or had not turned it in to the authorities.[62] Outside of the moratorium, the Department of Justice had authority to prosecute individuals for theft of Government property under 18 U.S.C. § 641, an offense punishable by up to ten years in prison and fines up to $250,000.

During the moratorium there were quite a few calls from individuals to turn property in to NASA. Interestingly, some of those calls came from people not with debris from *Columbia*, but from *Challenger*, wanting to know if the moratorium also applied to them. They were told it applied and were advised to return the Government property in their possession immediately. Other calls were from well-intentioned citizens who had found debris, picked it up, but then feared being accused of tampering with evidence for picking up the debris in the first place, so they held onto it. When the moratorium was announced, the debris they had picked up was quickly turned in to the authorities without incident. All calls received were followed up on and closed out by either the NASA Inspector General's Office or the Department of Justice. The likelihood that all debris found was actually turned in to NASA is small. Even after the moratorium was over, Federal, state, and local officials received reports about debris that had been stolen. However,

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[62] *See* Press Release, U.S. Department of Justice, U.S. Attorney Eastern District of Texas, First Indictments in Shuttle Debris Recovery, Limited Prosecution Moratorium Announced, *available at* http://www.usdoj.gov/usao/txs/releases/February2003/030205-columbiamoratorium.htm (Feb. 5, 2003).

this moratorium announced by the Department of Justice proved to be an effective step in assisting the recovery efforts.

3. Volunteers

When tragedy struck NASA, many private groups and individuals were eager to volunteer their time and energy to help with the search in any way they could. These volunteers were not asked to help by NASA, but took it upon themselves to act. An illustration of this spirit of good will was a local light flyers club in east Texas that wanted to use their machines, which strongly resembled flying go carts with a hang gliding-like sail on top, to fly over areas of east Texas to see if they could locate any debris on the ground. Despite their best of intentions, these types of volunteers created a potential liability for NASA in conducting the search.

If one of these volunteers were to be injured while searching for debris, a claim against NASA could be filed under the argument that but for the Space Shuttle breaking apart, they would not have been out looking for debris and would not have been injured. These volunteers signed no waiver of liability against the U.S. Government before they undertook the search in the woods, so what is to preclude them from filing a claim? Under negligence law, there was no duty that NASA owed these volunteers. NASA did not ask them to participate in the search. Often times, NASA was not even consulted prior to many volunteers going out to help with the search. At the time of the recovery things happened very quickly and it was imperative that managers and others directing search efforts be made aware that volunteer help should not be accepted unless there was a real need for that support and, if possible, a waiver of liability could be obtained. It is important to note that most of the searchers involved were not volunteers in the sense described above.

4. Unconditional Gifts

Aside from people around the country willing to volunteer their time, NASA received many offers of support from businesses that wanted to donate equipment to help with the search

efforts. Section 2473(c)(4) of the Space Act, as mentioned earlier, allows NASA to accept gifts or donations as long as they are unconditional and NASA may use them in any manner it chooses.[63] Using this authority and appropriate documentation, NASA was able to provide supplies and equipment to FEMA, EPA, and other state and local agencies like cameras from Nikon to use for debris recordation and mapping software from Microsoft to use in plotting where debris was reported and/or located, which allowed recovery management to make more informed decisions about where to use its limited resources to search. There was also the ever-present issue of morale among the recovery workers many of whom were away from home and working long hours. NASA recognized this need when it accepted freezers full of pints of Blue Bell Ice Cream, which were placed at the command centers in Barksdale, Lufkin, and Carswell.

5. Helicopter Crash

Searching for debris out in the woods and swampy areas of east Texas and Louisiana and the rocky desert areas of Nevada, Utah, and other Western states was no easy task for the search crews, both on the ground and in the air. That truth hit home for everyone on the afternoon of March 27, 2003, when a helicopter crashed into the Angelina National Forest in San Augustine County, Texas while searching for debris, killing two people and injuring three others.[64] The two workers who died were the pilot from a private company in Arizona and a Texas Forest Service employee. The three injured workers from the U.S. Forest Service, NASA, and United Space Alliance,[65] were helped from the wreckage by a local fisherman and his nephew.[66]

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[63] *See supra* Section III.A.

[64] *See* Megan Olecki, *Shuttle search chopper crashes; two die, three injured*, THE DAILY SENTINEL, Mar. 28, 2003, available at http://www.dailysentinel.com/news/newsfd/auto/feed/news/2003/03/28/1048831061.00353.7595.5240.html.

[65] United Space Alliance is the current NASA prime Shuttle contractor.

[66] *See Air searches for Shuttle debris suspended*, THE DAILY SENTINEL, Mar. 28, 2003, available at http://www.dailysentinel.com/news/newsfd/auto/feed/news/2003/03/28/1048874006.00353.8709.5347.html (last visited May 4, 2004).

From that day, all air search operations were discontinued until an investigation could be completed as to the cause of the accident and ensure that any similar incidents in the future would be prevented. Discontinuing air search operations was a significant blow to the speed of the recovery efforts. From the beginning of the recovery operation through March 27th, aircrews throughout east Texas and Louisiana had searched approximately 1.3 million acres looking for debris and had discovered over 900 pieces of debris.[67] The stand down of aircrews lasted until April 9, 2003.

D. Debris Management

As of this writing, approximately 82,500 individual pieces of debris have been located, representing about forty percent of the Orbiter's dry weight.[68] A challenge for the recovery operation was how to track the debris after it was found. A piece of debris, once it was found, would be tagged with a GPS location and sent to a building where it was initially gathered with other pieces of debris to be later driven to a hangar at Barksdale Air Force Base. Once at Barksdale, the debris was frequently identified with its location on the Orbiter and packaged to be shipped to the reconstruction hangar at KSC. This appeared to be a straight-forward process, except that there was no one database that had been pre-developed to be used for this work. Even if there had been, there were so many agencies initially picking up debris and tracking it themselves, that the overlapping data became unmanageable. Several of the agencies that had their own debris tracking databases – such as the EPA, Texas Forest Service, NASA, and the FBI – got together and agreed that one unified database to track material would be best. The next question was which database should be used as a foundation and how could several different databases with different numbering systems for the debris and organization for

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[67] *See* Louisiana Office of Emergency Preparedness, *Columbia Shuttle Recovery Helicopter Air Operations Resume*, *available at* http://www.ohsep.louisiana.gov/news related/ShuttleRecoveryHelioOpsResume.htm (Apr. 9, 2003).

[68] *See*, *Recap*, *supra* note 54.

the various fields of information be consolidated into a meaningful system useful to everyone.

Eventually, the concept was developed for the Shuttle Interagency Debris Database (SIDD), which used the EPA database as a foundation. Within this system, recovery workers were able to identify a piece of debris by a unique number. Information that could be found on a piece included: the latitude and longitude coordinates of where the debris was discovered; a picture of the piece if it was available; who reported the debris location; how it was received; where it was at any point along the route between the field operation and the reconstruction hangar; and where the piece eventually fit into the reconstruction grid at KSC. Any difficulties with this system were addressed real time as SIDD was being developed. By the time formal recovery operations were completed in May, SIDD was still not perfect. However, the ability to gather and track this information was critical not only to the success of the recovery operation, but for the investigation as well.

E. Exit Strategies

Agencies could not stay in the field for an indeterminate amount of time in the hopes that 100 percent of the Orbiter would be found. No one had the financial or personnel resources to undertake such a task and the geography was such that this was a nearly impossible task. As the number of debris reports that remained open dwindled, FEMA and NASA together decided on an exit strategy for each of the twenty-nine states and three countries that were contacted about a debris sighting. The purpose of an exit strategy was to inform state and local officials that all debris reports made in their state, county, or city had been closed, and that operations in their locality were ending, but if any additional debris was found, there was still a way to contact NASA and receive the necessary response action.

Early in these discussions, it became clear that one exit strategy was being developed at Barksdale whereas another exit strategy was being developed in Lufkin in parallel, but only applicable to the counties in Texas where search workers oper-

ated.[69] Once this was discovered by the group in Barksdale, a meeting was called with personnel in Lufkin to decide how best to coordinate this effort. It was acknowledged that activities undertaken in Texas and Louisiana were more extensive than in any of the other states or countries because all of the debris located was actually found there, and so an exit strategy in Texas and Louisiana would need to be more involved than in the rest of the country. A third interested party, JSC, was also brought into the discussion because once field operations ceased, JSC would be where any long-term recovery response effort would come from.

Utilizing FEMA's expertise and connections with each locality's emergency management officials, two separate exit strategy procedures were developed and disseminated, with the input of all parties taken into consideration. One procedure covered Texas and Louisiana and the other procedure applied to all states other than Texas and Louisiana. The primary difference with the strategies was in the types of claims that would be received by NASA and/or FEMA. Since no debris had been located outside of Texas and Louisiana, there was no foreseen potential for property damage claims to come from these areas. However, reimbursement for assistance provided in the search was a possibility anywhere there was a search effort and information was provided to contact the appropriate NASA legal office to make a claim. Other information that was provided in these procedures was whom local authorities should contact if suspected debris was found, where to send pictures and a description so identification could be made, and where suspected debris should be sent.

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[69] This was another activity that highlighted issues in communication and the chain of command mentioned in Section V.C.1, *infra*.

VI. INVESTIGATION

A. CAIB

1. Facilities

Upon learning that the CAIB would primarily work from offices at or near JSC, the JSC Center Operations Directorate began checking on available space. To maintain its independence, the CAIB determined that its personnel should not work out of offices physically located on JSC property, therefore, JSC leased additional space for the CAIB in Nassau Bay, Texas. However, the CAIB decided a facility located near the JSC and formerly utilized under the prime Shuttle contract by the Space Shuttle Program Office for conferences would best suit their needs. This permitted the CAIB to have easy access to JSC, but also facilitated the independence of the CAIB from NASA. KSC leased additional space for the CAIB to work out of while they were in Florida, however, this facility proved to be physically too remote from the work the CAIB needed to complete and it proved easier for them to occasionally utilize conference rooms in the KSC Headquarters building for interviews or other investigative matters that required more space.

2. Resources/Logistics

Initially the CAIB's resource needs were met through the existing NASA procurement system. This included facility preparations for the CAIB's use. Phones, faxes, computers, and office supplies were provided under a NASA contract with United Space Alliance. NASA also initially issued travel orders to physically get the Board members to Houston and to/from the many other NASA facilities and recovery/investigation sites visited. Once the CAIB was able to put into place a support contractor, through a General Services Administration supervised bidding process, it took over these responsibilities. Valador, Inc. was selected to provide the CAIB's administrative and technical support. Valador arranged to provide for the CAIB support staff, technical experts, support for public hearings and press

conferences, maintenance of the public-input database, and the publication of the final reports.

3. Guidelines

Guidelines were created to cover some of the areas needing to be addressed by the CAIB. Two of these areas were witness interviews and handling FOIA requests. To ensure consistency in interviews and interviewing techniques and documentation, guidelines for conducting witness interviews were created. The CAIB also established a process to handle incoming FOIA requests received by the Board to ensure consistency with the existing NASA FOIA process and to ensure the integrity of the appeals process.

Witness interview guidelines were created to assist CAIB members with the completion of interviews. The guidelines were developed to define the purpose of conducting interviews and provide: guidance for what to do prior to conducting an interview; interview techniques; protection of witness statements to promote full and complete disclosures of information by the interviewees;[70] how to conclude interviews, and a witness worksheet to obtain information to be able to contact witnesses to obtain additional information.

On April 14, 2003, NASA Administrator Sean O'Keefe, to help ensure the independence of the CAIB and appropriate responses to FOIA requests, agreed with Admiral Gehman that FOIA determinations regarding the release of CAIB generated records should be delegated to the Board.[71] Thereafter, the CAIB was to process initial and final determinations in a manner consistent with NASA FOIA regulations[72] and that FOIA requests to the Board for NASA records would be promptly forwarded to NASA Headquarters for Agency initial and final determinations regarding releasability.

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[70] *See NPG 8621.1.*

[71] FOIA letter from NASA to CAIB (Apr. 14, 2003) (on file with author).

[72] 14 C.F.R. §§ 1206.100-1206.900 (2003).

B. CAIB Witnesses

1. Public Hearings

The CAIB was aware of the public's interest in its activities and it recognized its responsibility for objectively, promptly, and efficiently completing the investigation. The CAIB took steps to increase public input and awareness by opening certain of its activities to the public consistent with conducting an efficient safety investigation. Public hearings were arranged during the fact-gathering phase of the investigation. The CAIB also maintained a toll free number providing an opportunity for the public to give information directly to the CAIB. In addition, the CAIB maintained a publicly accessible web site containing information concerning the Board and its activities. Witnesses who had technical, organizational or other insights of particular interest to the public were scheduled to appear before the CAIB at the public hearings. NASA employees and employees of NASA contractors who could provide insight into the SSP, the flight of STS-107, and/or the investigation into the loss of *Columbia* were also scheduled to appear.

2. Individual Interviews

The CAIB had a principal focus on identifying and correcting threats to the safe flight of the Space Shuttle and this made full and complete disclosure about every aspect of the accident of utmost importance. Individuals may have a tendency to be reluctant to disclose embarrassing or damaging information and, to assure that this did not happen, the Board decided to grant confidentiality to the witnesses who were interviewed. The *Columbia* Task Force Legal Advisor, who coordinated with legal representatives across NASA and contractor companies, facilitated witness interview schedules. Generally, a Board member conducted most of the interviews with another Group representative present in a private setting. When more than one CAIB Group desired to interview a particular individual, the Groups would coordinate and conduct the interview together to ensure minimal disruption to the interviewee's schedule.

The CAIB decided to tape record interviews with witnesses and have the tapes transcribed following the interview. The method selected of conducting interviews turned out to be the most resource intensive and least accurate manner to complete the interviews. The poor recording quality resulted in a considerable amount of erroneous information in the written transcripts which, in turn, resulted in a highly labor intensive review process for interviewees who attempted to reconstruct the interview. The lesson learned was that if transcripts are intended to be official records and will be later relied upon as accurate, court reporters should be utilized.

C. Intellectual Property issues

Other unique legal situations related to intellectual property rights and procurements of individually owned property arose as a result of the Space Shuttle *Columbia* accident.

1. Help from sky-watchers

The Shuttle flew just north of San Francisco around 5:50 a.m. Pacific Standard Time and broke up over eastern Texas around 8:00 a.m. Central Standard Time. Any imagery, especially video, taken of *Columbia's* path along reentry could have aided the CAIB in determining the cause of the accident. Therefore, media and private citizens who had video or still images of *Columbia's* entry path were encouraged to send it to investigators. To allay concerns, NASA made assurances that the videotapes and photos would be returned upon request and that the materials would not be released to the media without the submitter's permission. As a result of the request, photos and videos came pouring in from all across the United States. Some of those images sent in by the public became essential pieces of information used in discovering the cause of the accident.

Because NASA and the CAIB sought to keep the public informed as the investigation progressed, they released images obtained from media and the public as quickly as possible. For the CAIB or NASA to be able to publicly utilize the images, permission from the author was obtained. One example is a reentry debris shedding video. In order for the CAIB to show

the video to Congress, verbal agreement was obtained from the author. Prior to releasing the video to the House Science Committee and to the media, a written release was also obtained. With a limited exception, this process went smoothly and individuals who were contacted were more than willing to provide any assistance they could.

2. Procurement of cameras from individuals

The Imagery Analysis Team utilized video and still imagery to time sequence the debris shedding and conclude all of the subsequent trajectory work. Once all the useful information from those images was obtained, the next task of this Team was to acquire the cameras that took the images as the settings and lenses also contained vital clues in determining the cause of the accident. The CTF Legal Advisor was asked by the Team to expedite procuring all the cameras and worked with the JSC Procurement Office to do so. NASA procured nearly twenty video cameras, approximately ten still cameras, and a telescope, which were all used by twenty-seven photographers. Most of the individuals contacted were more than willing to provide whatever assistance they could, including selling their personal cameras to the Government. The rationale behind the procurement of the cameras was the Team would need to literally break them down to obtain the information they needed. A list of individuals was provided to the JSC Procurement Office and they were able to determine the fair market value of the cameras and worked with the individual owners to ensure that the property the Government needed to assist it in determining the cause of the accident could be replaced with new property of like value. There was an overwhelming willingness on the part of most of these individuals to go through the inconvenience of sending their personal cameras to NASA when they realized they had something that could help determine the cause of the accident.

D. Teams

This section will describe some of the teams created as a result of the *Columbia* accident in which the NASA legal community participated. This listing is by no means all-inclusive.

1. Columbia Task Force (CTF)

Within seventy-two hours of activation of the CAIB, the CTF was selected, recommended to, and approved by the CAIB Chairman and appointed by the NASA Administrator. The CAIB established the charter for the CTF including: service as the formal interface between the CAIB and NASA; establishing appropriate processes and procedures to assure the CAIB controlled every aspect of the NASA part of the investigation; monitoring, collecting, documenting, filing, and making immediately available to the CAIB all data and analyses generated by NASA; assuring full and timely cooperation by NASA personnel and any persons or entities under contract to NASA; and assisting the CAIB in making factual information available to the public in a timely and orderly manner while assuring the integrity of the investigation by not releasing any pre-decisional information.

The Task Force was set up in mirror image of the CAIB. A CTF lead for each of the CAIB Groups was assigned and those leads assembled the teams necessary to respond to any requests from the Board. The CTF also included a Configuration Management Team whose responsibilities included tracking each CAIB request from the moment it was made until the data, interview, or testing was satisfactorily provided.[73] The CAIB initiated more than 600 Requests for Action or Information during the *Columbia* investigation. In addition to legal counsel, the CTF also included representatives from Safety, Medical, Procurement, Public Affairs, Configuration Management, and Information Technology areas. The Task Force met early each morning so the Chairman and Leads would be available to the Board when they began their workday. It should be noted that most everyone involved with any aspect of supporting the investigation worked very long hours, typically seven days a week.

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[73] The CAIB member who submitted the request either noted by signature that the response was satisfactory or resubmitted the request for further action.

2. Columbia Families First (CFF)

To ensure that NASA does everything it can to assist the *Columbia* astronauts' families in an expeditious manner, the CFF working group was created. This Team includes very senior level NASA officials along with active participation of the astronaut corps at JSC. The senior level participation ensures that any issues can be addressed by individuals who understand the entire scope of available Agency resources. The sole purpose of this group is to ensure the complete and comprehensive coordination of all NASA's actions on behalf of the families of the Space Shuttle *Columbia* crew. Their focus related to survivor benefits, memorials, honors, and other associated legislative issues. The CFF continues to meet and address issues as of this writing.

3. Columbia Accident Rapid Reaction Team (CARRT)

To address an Agency desire to rapidly, accurately, and uniformly respond to requests for information about *Columbia*, the CARRT was established. The CARRT was granted authority to redirect Agency priorities and resources regarding *Columbia* records dissemination. The existence of the CARRT also assured consistency across the Agency in the application of regulations and statutes concerning dissemination of information. As with most *Columbia* teams, the CARRT met daily until the volume of FOIA and other *Columbia* related data requests subsided.

4. NASA Accident Investigation Team (NAIT)

By mid-March of 2003, the NASA working group supporting the CAIB was reorganized appointing NASA leadership made up of "Senior Agency Officials who were not involved in the SSP Office during the [Flight Readiness Review] Process, nor during the *Columbia* STS-107 Mission."[74] This came about because the

[74] *See* NASA Letter from Sean O'Keefe to Admiral Gehman, March 6, 2003, *available at* http://spaceflight.nasa.gov/shuttle/archives/sts-107/investigation/Gehman_letter_030603.pdf (last visited May 5, 2004).

CAIB requested that personnel who were involved with either the preparation or the operation of *Columbia* return to their regular duties to prevent an actual or perceived conflict of interest. This transition was completed in a manner that minimized impact to existing teams and processes. Although senior SSP Office officials no longer led the NASA effort, their knowledge, experience and continued involvement were key to the success of the investigation. The NAIT was structured more like the CAIB, including a designated Group One - Materials; Group Two - Operations; and Group Three - Engineering.

The NAIT utilized "fault trees" to graphically represent every conceivable sequence of events that could cause a system to fail. As a result of the investigation, over 3,000 individual elements were examined. This was done so every potential chain of causation could be diagrammed and every subsystem that was not a precipitating cause could be eliminated from consideration.

VII. CLAIMS

The claims that NASA has dealt with since February 2003 have been of a completely different character than those experienced after *Challenger*. The *Challenger* accident occurred off of the coast of the United States over the Atlantic Ocean. The potential for damage for third parties was minimal and the number of agencies involved in the recovery was very small compared to the *Columbia* recovery. This section will discuss FEMA's Public Assistance program and the Space Act, authorities used by FEMA and NASA to address the variety of claims that arose as a result of recovery efforts, and the number of claims that have been reviewed as of the writing of this article.

A. Public Assistance

Within Texas and Louisiana, where FEMA had authority to enter and act, FEMA implemented and managed its Public Assistance program, which awarded grants to assist State and local government agencies as well as some nonprofit entities with the response to and recovery from the *Columbia* accident. Specifically, FEMA may award grant monies for assistance with

debris removal and implementation of emergency restoration of infrastructure.[75] In order to be eligible for the program, four main criteria needed to be met. First, an entity must be an eligible applicant. Four types of entities are eligible applicants:

-State government agencies;

-Local governments;

-Indian Tribes or authorized tribal organizations; or

-Private nonprofit organizations or institutions that own or operate facilities that provide certain services otherwise performed by a government facility.

These applicants must also be located within an area of a state that FEMA had designated was part of the emergency response area.[76] Second, the facility that is the subject of the public assistance request must be eligible. Examples of eligible facilities include roads, airports, schools, utilities, and buildings owned by the applicant.[77] Third, the work must be eligible. The type of work that would be eligible is mentioned above, but this work must be required as a direct result of the declared event, completed within the declared emergency response area, and it must be the legal responsibility of the applicant at the time of the emergency.[78] Finally, the cost of the work done must be eligible in that the costs are reasonable and necessary to accomplish the work; comply with Federal, state, and local requirements for procurement; and do not include insurance proceeds, salvage values, and other credits. One notable cost that is not eligible is the straight time pay and benefits[79] of employees of an eligible applicant.[80]

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[75] *See Public Assistance Guide*, FEMA 322, at 23-33, *available at* http://www.fema.gov/rrr/pa/padocs.shtm (*PA Guide*).

[76] *See* 44 C.F.R. §§ 206.228, 250-253 (2003); *see also PA Guide*, *supra* note 74, at 9-15.

[77] *See* 44 C.F.R. §§ 206.228, 250-253 (2003); *see also PA Guide*, *supra* note 74, at 16-22.

[78] *See* 44 C.F.R. §§ 206.228, 250-253 (2003); *see also PA Guide*, *supra* note 74, at 23-25.

[79] This was an issue that was raised by many of the state and local law enforcement and other agencies, not just in Texas and Louisiana, whose employees were taken away

Administration of this program is the joint effort of FEMA and the state and local officials in an emergency area. FEMA manages the program, approves grants, and provides technical assistance to the state and applicants. The state is responsible for educating potential applicants on the grants process, working with FEMA to manage the program, and implementing and monitoring the grants awarded. Local officials identify the damage, provide all necessary information to FEMA to approve the grants, and manage the projects funded by the grants.[81] As a result of the response to *Columbia*, FEMA has projected reimbursable payments within Texas and Louisiana totaling $10.5 million. FEMA worked very closely with NASA to try and meet the needs of anyone and everyone who provided support or who suffered damage as a result of recovery efforts. However, the parameters of the Public Assistance program were such that many groups were not eligible for FEMA support, so they turned to NASA.

B. NASA Reimbursement Claims

There were many state and local agencies across the country along with nonprofit organizations, local businesses, and concerned individuals who provided their time, services, facilities, and equipment to aid NASA in the search and recovery of debris. These groups were not harmed or damaged in the usual sense by the accident, but expended much of their resources allocated for the year in order to help NASA complete its recovery mission. They, therefore, needed to be reimbursed for their unanticipated use of resources to be able to operate during the remainder of the year. NASA did not have a preexisting process in place to provide funds to entities that provided support in a recovery situation, like FEMA did in its Public Assistance program. Accordingly, a process was developed to triage claims for

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from their regular duties to work long hours in support of the search effort. After internal analysis of NASA's authority, it was determined that these expenses could be reimbursed by NASA, as mentioned in Section VII.B., *infra*, with appropriate documentation.

[80] *See* 44 C.F.R. §§ 206.228, 250-253; *see also PA Guide*, supra note 74, at 33-36.

[81] *See PA Guide*, *supra* note 74, at 3.

reimbursement as they came in, document that the activity undertaken was authorized and necessary to carry out the recovery mission of NASA, and pay claimants for the services rendered to assist NASA. In addition, there was also the mission assignment agreement between NASA and FEMA to cover those costs incurred for activities in the western search areas that FEMA did not have the authority to pay. Using its Space Act authority[82] and its agreement with FEMA, NASA was able to review 70 requests for reimbursement from various entities and provide compensation totaling approximately $1,239,830.[83]

C. NASA Property Damage Claims

The Orbiter broke apart over populated areas of the United States, so it was to be expected that there would be damage caused to people's property by falling debris. Despite the huge footprint of the debris field, fortunately no one on the ground was injured or killed as a direct result of falling debris. However, NASA received numerous of reports of debris injuring cattle, horses, and deer. As the recovery efforts progressed, reports were received of damage to private roads, fences, and other property as a result of search teams coming through the area.

A few of the early claims received came under the Federal Tort Claims Act.[84] However, this authority focuses on the causation of the damage, which was a murky question at that time. In many instances, it was clear that the damage asserted in a claim was as a result of Shuttle debris and the Shuttle debris is clearly Government property. Eventually, it was determined that a better authority to use to handle these types of claims was NASA's Space Act authority.[85] Claims could be validated if it was shown that actual debris was located at the site where the damage was reported.[86] As of the writing of this article, and

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[82] *See* 42 U.S.C. § 2473(c)(5)-(6) (2003).

[83] This claim number is based on a NASA internal spreadsheet created to track the closure of claims as they arrived (unpublished spreadsheet, on file with authors) [hereinafter NASA Spreadsheet].

[84] 28 U.S.C. § 2672 (2003).

[85] *See* 42 U.S.C. § 2473(c)(11) (2003).

[86] In order to accomplish this, NASA contracted with a private insurance assessment firm to inspect damage allegedly caused from debris or recovery activities and to

using the authority under the Space Act, NASA has reviewed 153 property damage claims and has provided compensation totaling $89,407.[87]

D. SPACEHAB

NASA occasionally offers Space Shuttle flight opportunities in support of research in the fields of materials science/processing, biological research, and fluid dynamics. To provide flight opportunities for research missions, NASA obtained pressurized habitable modules with integration services from the private sector to augment the present Orbiter mid-deck capabilities. SPACEHAB entered into a contract with NASA to provide a Research Double Module (RDM) payload carrier with end-to-end payload and mission management as well as integration and operations services for STS-107. Under the contract, SPACEHAB was allowed to market and contract with international partners as well as the non-NASA sector for its portion of the module resources. In addition, NASA agreed to utilize, either directly for a full complement of NASA-provided payloads, or in combination with the contractor in a payload sharing arrangement, the full volumetric and/or mass capabilities of the SPACEHAB module, to the extent allowable by center of gravity and ascent performance considerations.

As of the writing of this article, SPACEHAB has made a claim under its NASA contract for $87,712,927 for the loss of their module in the Space Shuttle *Columbia* accident.[88]

E. Official Flight Kit and Personal Preference Kit

The Official Flight Kit (OFK) on a particular Shuttle flight enables mementos to be flown. There are regulations in place that outline the limitations and necessary approvals of using

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provide its recommendations to NASA in order that a determination of payment could be made.

[87] NASA Spreadsheet, *supra* note 83.

[88] Letter from SPACEHAB to NASA JSC, RE: Contract No. NAS9-97199; Request for Payment (Dec. 17, 2003) (letter on file with authors) (this letter accompanied SPACEHAB's formal claim documentation to NASA for the loss of SPACEHAB's Research Double Module under Contract No. NAS9-97199)

this authority.[89] A container approximately two cubic feet in size is reserved for carrying official mementos. Mementos are flown as a courtesy and not as an entitlement and no personal items are to be carried in this container. Additionally, there are regulations in place that govern the Personal Preference Kit (PPK) which permits astronauts to carry personal items for use as mementos on Shuttle flights.[90] The contents of each PPK are limited to twenty separate items with a total weight of 1.5 pounds. The NASA regulations also cover the preflight packing and storing of OFK and PPK items as well as their post-flight disposition.[91] Most importantly, the regulations establish who bears the responsibility for those items if they are lost or stolen. The Agency is not responsible for the loss or theft, or damage to items carried in the OFK or PPKs. For example, if an astronaut chooses to fly jewelry for a friend as part of his or her PPK, he or she could potentially be taking on personal responsibility for anything that might happen to that item during flight. Following *Columbia*, the Agency was contacted by an insurance company that wished to verify that specific jewelry was on-board STS-107. NASA could confirm that information, but if a claim for reimbursement were to be made, the Agency would not be in a position to do anything additional with respect to OFK and PPK items.

VIII. FINAL THOUGHTS: LESSONS LEARNED

As a result of the accident recovery and investigation processes, NASA gained valuable insight as to how to respond to a major space flight accident. Even though NASA understood fairly early on the cause of the *Challenger* accident, it was not proactive in getting information out to the public. Following *Columbia*, the lengthy investigation into the cause of the accident was conducted in an open, thorough, and timely manner, and records were released as quickly as possible. Another major difference in the Agency's response to the two accidents is the

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[89] *See* 14 C.F.R. § 1214.603 (2003).
[90] *See* 14 C.F.R. § 1214.604 (2003).
[91] *See* 14 C.F.R. §§ 1214.605-606 (2003).

resources the Agency is expending in doing all that can be done to assist the *Columbia* families. Astronauts worked closely with each family and served as a vital connection to ensure needs were met. The CFF group, largely due to the senior level of the participants, is also able to expeditiously address issues as they occur. Additionally, deploying attorneys to the field and including them in *Columbia* teams worked extremely well to help anticipate and address legal matters in a proactive, rather than reactive, fashion.[92]

Areas that can be improved upon include: documentation of authority for the payment of claims; understanding how to obtain complete and accurate witness statements; maintaining a clear chain of command to lead operations in the field; the ability to gather and track large volumes of information; and reviewing our internal guidance on existing regulations such as those on the Official Flight Kit and Personal Preference Kits.[93]

Being an integral part of the *Columbia* teams as they were formed enabled us to provide proactive legal advice to our clients. Active involvement of attorneys who are experts in specific legal areas added invaluable efficiencies to the accident recovery and investigation. Attorneys who are familiar with FOIA, its exemptions, as well as the Agency's ability to make discretionary releases of information enabled the widest and most timely dissemination of information to the public. Attorney experts in the flexibilities of the Space Act assured continued smooth recovery and investigation operations. These flexibilities also enabled the Agency to pay, not only for the damage caused to individual property on the ground, but also for the time of individuals who so willingly assisted in the recovery efforts. Vigorous attorney involvement from the beginning enabled the legal issues to be identified and addressed as they arose. NASA scientists, researchers, engineers, astronauts, and others served an essential role in the debris recovery, testing, and *Shuttle* reconstruction operations and they continue their

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[92] Initial thoughts from the team leaders we each worked with were "why do I need a lawyer on my team" and by the completion of our work, those sentiments were changed to "I wonder why I thought I didn't need a lawyer."

[93] 14 C.F.R. §§ 1214.603-604.

highly visible and important work so it can safely fly again. The work performed by NASA attorneys, while less visible to the public, was no less important. The NASA legal team's knowledge and expertise of the Space Act, FOIA, Privacy Act, Export Administration Regulations, International Traffic in Arms Regulations, FACA, and Stafford Act, allowed for expeditious recognition and resolution of the legal issues which otherwise might have encumbered progress. NASA has an exceptional team of attorneys in place and through this process all have learned that having team members who will immediately recognize and react to legal issues is a vast improvement in the way NASA does business.

On a more personal level, it appears to us that NASA employees are taking the CAIB's findings to heart when following the *Columbia* tragedy, the Mission Operations Directorate at the Johnson Space Center, created a tribute to several NASA missions. Those missions include: *Apollo 1*, *Challenger* (STS-51L), *Columbia* (STS-107) and *Apollo XIII*. On the tribute, below the images of the mission patches, are some of the words that are foundations of Mission Operations for the Mission Control Center in Houston – "...to always be aware that suddenly and unexpectedly we may find ourselves in a role where our performance has ultimate consequences." On an individual level each of us is accountable to do our jobs to the very best of our ability; to stand up and be heard. We feel we owe it to our Country, to ourselves, and most importantly, to our colleagues who bravely take risks, so we can all live better lives.

CRIMINAL JURISDICTION ON THE *INTERNATIONAL SPACE STATION*

Hans P. Sinha[1]

INTRODUCTION

It has been a mere one hundred and one year span since Konstantin Tsiolkovsky published his essay *Exploration of Cosmic Space with Reactive Devices.*[2] If Tsiolkvosky's work is viewed as the conceptual dawn of the space age, then humankind has now reached a point where the establishment of settlements in space is fast becoming a reality.[3] Men and women have been living in space since 1973 when the three crews of Skylab spent twenty-eight, fifty-nine and eighty four days respectively on board the *Skylab* space station,[4] followed by cos-

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[2] GLENN H. REYNOLDS & ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY 1 (2nd ed. 1998), citing to Konstantin Tsiolkovksy, *Exploration of Cosmic Space with Reactive Devices* (1903). It has also been less than three quarters of a century since the Czech jurist Vladimir Mandl in 1932 joined space and law, coining the phrase "space law" in his article *Space Law: A Problem of Space Travel. See* George Paul Sloup, *Legal Aspects of Large Space Structures: Factors Leading to the Development of the Jurisprudence of "Astrolaw"*, PROCEEDINGS OF THE TWENTY-SEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 270, 272 (1984).

[3] The relative speed with which space law is developing can be seen in that only a mere "[t]en years and six days after man first reached outer space, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the Space Treaty) entered into force on 10 October 1967." BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW 641 (Clarendon Press Oxford 1997).

[4] *See* NASA, *Skylab Operations Summary, at* http://www-pao.ksc.nasa.gov/kscpao/history/skylab/skylab-operations.htm (last visited Apr. 19, 2004). After the final crew departed Skylab, it remained unoccupied until its re-entry into the Earth's atmosphere and disintegrated over Australia and the Indian Ocean in July of 1979. *See* Marcia S. Smith, *Space Station*, CRS ISSUE BRIEF FOR CONGRESS, IB93017, May 15,2003, at 3, *at* http://www.ncseonline.org/NLE/CRSreport/Science/st-58.cfm?&CFID=14270192&CFTOKEN=51477963 (last visited May 20, 2004) [hereinafter CRS ISSUE BRIEF FOR CONGRESS].

monauts living aboard the *MIR* space station.[5] A truly international assembly of humans are now living in the *International Space Station (ISS).*[6]

It seems clear that humanity has reached the reality of men and women living for extended periods of time in space,[7] whether as members of national or international missions. Regardless of the character of these missions, those charged with creating their parameters, will have to consider Justice Brennan's prediction - "[W]e'll soon have to grapple with the question: what law should govern, not only the relationship between Earth (particularly the United States) and space societies but, perhaps more importantly, what law should govern within space societies themselves and among space inhabitants who will people space communities..."[8] Human nature being what it is, of particular interest is what criminal law will guide and judge the behavior of humankind in space?[9] In short, what is the criminal jurisdiction in space?

The concept of criminal jurisdiction in space is not new.[10] In fact, a mere sixteen months after Justice Brennan asked the above question during the bicentennial year of the United States Constitution,[11] twelve nations joined in an international

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[5] The first elements of the MIR station were launched on February 20, 1986. *See* Russian Space Agency, *MIR Station, at* http://liftoff.msfc.nasa.gov/rsa/mir.html (last visited Apr. 19, 2004). Crews lived aboard the *MIR* from 1986-2000 (one cosmonaut remaining aboard for fourteen months). On March 23, 2001, Russia deorbited the *MIR* station into the Pacific Ocean. CRS ISSUE BRIEF, *supra* note 4, at 10-11.

[6] The most recent crew for the International Space Station, Expedition 9, launched from the Baikonur Cosmodrome in Kazakhstan on April 18, 2004. As a testament to the international aspect of the International Space Station, the three crew members of Expedition 9 consist of one American astronaut, one Russian Cosmonaut, and one European Space Agency astronaut. *See* NASA, *Expedition 9 Launches*, at http://www.nasa.gov/vision/space/livinginspace/Expedition_9_Mission_Page_1.html (last visited Apr. 19, 2004).

[7] "No humans will live in space itself but rather will live in the machines (i.e., space stations, etc.) which provide an artificial environment for human life." Sloup, *supra* note 2, at 271.

[8] Justice William J. Brennan, Jr., Address at the American Law Institute Annual Dinner (May 21, 1987), as cited to in Reynolds, *supra* note 2, at 398.

[9] Civil disputes such as contracts, negligence, liability, torts, etc., also guide human nature. This article, however, focuses solely on criminal jurisdiction in space.

[10] *See*, for example, Stephen Gorove, *Criminal Jurisdiction in Outer Space*, 6 INT'L LAW 313 (1972).

[11] Reynolds, *supra* note 2, at 398.

treaty which among other things, created the first true framework for criminal jurisdiction in space.[12] This framework, found in Article 22 of the 1988 Intergovernmental Agreement on Space Station Cooperation (1988 IGA),[13] was replaced in 1998 with a widely viewed "improved" version.[14] Today, Article 22 of the 1998 IGA[15] stands as both the last and the premier example of international cooperation in formulating the parameters of criminal jurisdiction in space. Article 22, to use a phrase fittingly made famous by an astronaut, represents a true "giant leap for mankind" in terms of criminal jurisdiction in space.[16] Whatever legal framework is eventually adopted for future space settlements, whether on celestial bodies, or in space stations, the criminal jurisdiction will certainly be influenced by, if not patterned on, the principles agreed upon in Article 22 of the 1998 IGA. These parameters, however, do not exist in a vacuum. An examination of Article 22 as a legal framework for criminal jurisdiction in space, must meld fundamental treaties pertaining to space, international law, municipal laws, as well

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[12] Agreement Among the Government of the United States of America, Governments of Member States of the European Space Agency, the Government of Japan, and the Government of Canada on Cooperation in the Detailed Design, Development, Operation, and Utilization of the Permanently Manned Civil Space Station, Sept. 29, 1988, *available at* 1992 WL 466295 [hereinafter 1988 IGA]. The members of the European Space Agency at the time of the signing of the 1988 IGA were: Belgium, Denmark, France, Germany, Great Britain, Italy, the Netherlands, Norway and Spain.

[13] 1988 IGA, *supra* note 12, at art. 22.

[14] Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, *available at* 2001 WL 679938, (entered into force Mar. 27, 2001) [hereinafter 1998 IGA]. *See also* Stacy J. Ratner, Note, *Establishing the Extraterrestrial: Criminal Jurisdiction and the International Space Station*, 22 B. C. INT'L & COMP. L. REV. 323, 324 (1999), noting that article 22 of the 1998 IGA represented a "return to a more customary understanding of international criminal jurisdiction" as opposed to article 22 of the 1988 IGA which "represented a disturbing innovation" in terms of the criminal jurisdiction. The members of the European Space Agency at the time of the signing of the1998 IGA were: Belgium, Denmark, France, Germany, Great Britain, Italy, the Netherlands, Norway, Spain, Sweden, and Switzerland.

[15] 1998 IGA, *supra* note 14, at art. 22.

[16] "That's one small step for [a] man, one giant leap for mankind", Neil Armstrong upon becoming the first man to set foot on the Moon on July 20, 1969. BARTLETT'S FAMILIAR QUOTATIONS 824 (17th ed. Justin Kaplan ed., Little, Brown and Company 2002).

as inter-agency codes governing the conduct of humankind in space.

CRIMINAL JURISDICTION VS. CRIMINAL LAW

Criminal jurisdiction in the context of space, can be defined as the competence of a state to prescribe and apply policy with respect to particular events defined as criminal by the state in question, and occurring in outer space.[17] Defining where outer space begins and thus where the sovereign territory of nations over their airspace ends, is a matter of ongoing debate.[18] Regardless of where the border between airspace and outer space is designated, when discussing criminal jurisdiction in outer space, two useful distinctions must be made. The first is the distinction between criminal jurisdiction and criminal laws. Criminal jurisdiction pertains to the ability of a nation to extend or exert its sovereign powers over a territory, or in the case of space, to extend such an assertion beyond its Earthbound territory into space and space objects.[19] This ability of a nation to

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[17] George Paul Sloup, *Legal Regime of International Space Flight: Criminal Jurisdiction and Command Authority Aboard the Space Shuttle/Spacelab*, PROCEEDINGS OF THE TWENTY-FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 148 (1978) (adopting and paraphrasing Sloup's definition of criminal jurisdiction in space).

[18] *See* Cheng, *supra* note 3, at 81-82 (noting that "a general practice has grown up among States interpreting airspace as meaning space in which navigation by conventional aircraft is possible and outer space as space where artificial satellites are able to orbit, thus bringing the frontier down to approximately 50 miles (80 km), with a possible margin of 25 miles (40 km) either way...") & n.35 (discussing ten various views on where territorial airspace should end and outer space begin.).

[19] The exertion of national sovereignty, and thus by extension criminal jurisdiction, into space is limited by treaty. *See* Article II of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, art. II, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force on Oct. 10, 1967) [hereinafter Outer Space Treaty] holding that "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." *See also* article 11(2) of the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 1363 U.N.T.S. 22, *reprinted in* 18 I.L.M. 1434 (1979) [hereinafter Moon Treaty]. The exertion of criminal jurisdiction on a nation's space objects can be governed by that nation's laws. *See,* e.g., 18 U.S.C. § 7(6) and discussion *infra*, Section NATIONAL EXERTION OF CRIMINAL JURISDICTION INTO SPACE: THE UNITED STATES. The exertion of criminal jurisdiction on international space objects such as the International Space Station, is governed by inter-governmental agreements. *See e.g.*, 1998 IGA, *supra* note 14.

"make its law applicable to the activities, relations, or status of persons," is generally referred to as jurisdiction to prescribe.[20] On Earth this ability by a nation to exert its sovereignty over a territory has traditionally included the assertion of its criminal code or laws. Thus, for example, in the context of flight, subsequent to a federal court decision holding that the United States lacked jurisdiction to criminally prosecute a defendant for acts occurring on an aircraft over the high seas,[21] the United States Congress in 1951 amended the reach of the United States' Special Maritime and Territorial Jurisdiction to include aircraft.[22] The reach of American criminal jurisdiction was again amended in 1981 in order to specifically include acts which might occur on "space vehicles."[23]

The ability of a nation to exert its criminal jurisdiction over a territory, however, does not by necessity, also mean the appli-

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[20] RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES, § 401(a) (1987) [hereinafter RESTATEMENT]. In comparison, note the jurisdiction to adjudicate, i.e. a nation subjecting a person or thing to the process of its courts, and the jurisdiction to enforce, i.e. a nation compelling compliance with its laws. *Id.* § 401(b), (c).

[21] *See* United States v. Cordova, 89 F.Supp 298, 304 (D.C. N.Y 1950) holding that an assault on board an American owned aircraft flying from Puerto Rico to New York, while over the high seas, fell outside of American criminal jurisdiction. The court found that an aircraft did not fall within the meaning of "vessel," and that the term "the high seas" did not include the air space above such high seas, both jurisdictional requirements of then 18 U.S.C. § 451. *Id.* at 302, 303 respectively (now 18 U.S.C. § 7). The court, interestingly, found Cordova guilty, but arrested its judgment noting the lack of federal jurisdiction. *Id.* at 304. *See also* Karen Robbins, Comment, *The Extension of United States Criminal Jurisdiction to Outer Space*, 23 Santa Clara L. Rev. 627, 645 n.91 (1983).

[22] 18 U.S.C. § 7(5). Paragraph 5 broadened the special maritime and territorial jurisdiction of the United States to include "Any aircraft belonging in whole or in part to the United States, or any citizen thereof, or to any corporation created by or under the laws of the United States, or any State, Territory, district, or possession thereof, while such aircraft is in flight over the high seas, or over any other waters within the admiralty and maritime jurisdiction of the United States and out of the jurisdiction of any particular State."

[23] 18 U.S.C. § 7(6). Paragraph 6 reads - "Any vehicle used or designed for flight or navigation in space and on the registry of the United States pursuant to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies and the Convention on Registration of Objects Launched into Outer Space, while that vehicle is in flight, which is from the moment when all external doors are closed on Earth following embarkation until the moment when one such door is opened on Earth for disembarkation or in the case of a forced landing, until the competent authorities take over the responsibility for the vehicle and for persons and property aboard."

cation of its municipal[24] criminal laws over acts occurring in that territory. While by practice and tradition this has been the case, it is important to recognize that it must not be so. In other words, the mere fact that the *ISS* Partners have agreed on a framework for exerting their criminal jurisdiction over acts which might occur on the *ISS*,[25] does not mean that those acts have to be judged according to each Partner's municipal criminal code. The Partners, or the Earth community as a whole, could have enacted a separate criminal code for outer space. Indeed, calls for such a space code have been put forth in the past.[26] While this article does not address the creation of such a separate code, it should be noted that there is scholarship which suggests the existence of biological differences which will affect humans in space[27] - thus possibly justifying a separate criminal code for space, as well as precedent on Earth for the creation of

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[24] "Municipal law governs relations between persons within the jurisdiction of the state, as well as, relations between those persons and the state." JAMES R. FOX, DICTIONARY OF INTERNATIONAL AND COMPARATIVE LAW 293 (Dobbs Ferry, N.Y., Oceana Publications 1992). In this context, municipal law refers to national domestic law as opposed to international law.

[25] *See* 1998 IGA, *supra* note 14, at art. 22.

[26] *See, e.g.,* Hamilton DeSaussure & Peter Haanappel, *Determination of Applicable Law to Living and Working in Space*, PROCEEDINGS OF THE TWENTY-FIFTH COLLOQUIUM ON THE LAW OF OUTER SPACE, 223, 227 (1982), arguing that once space travels begins in earnest, "[r]ather than transpose, en masse, the criminal laws of any particular earthbound state to a totally different regime, new substantive rules, which are both compatible with a developing space order and which are universally followed without regard to launching state or other national jurisdiction, will be imperative." *See also The Magna Carta of Space*, adopted by the Inter-American Bar Association on February 3, 1961. William A. Hyman, MAGNA CARTA OF SPACE 304A (1966). While the proposed Magna Carta of Space is not a criminal code per se, it is certainly consistent with the notion that the unique nature of space warrants the adoption of special legal regimes for outer space.

[27] See generally George S. Robinson, *Astronauts and a Unique Jurisprudence: A Treaty for Mankind*, 7 HASTINGS INT'L & COMP. L. REV. 483 (1984). Robinson makes the argument that humans living in space stations "are significantly affected by the ambient life-support technology and alien physical characteristics of space," eventually exhibiting sufficient "altered biological characteristics and consequent behavior patterns," to not only term such humans *Homo alterios*, but also justify the "creation of distinctly dissimilar principles of social order and [...] legal regimes." *Id.* at 485-486, & n.7. *See also* George S. Robinson & Harold M. White, Jr., *Biojuridics*, *in* ENVOYS OF MANKIND: A DECLARATION OF FIRST PRINCIPLES FOR THE GOVERNANCE OF SPACE SOCIETIES, ch. 12 (Smithsonian Institution Press 1986), and Sloup, *supra* note 1, at 271.

novel criminal codes.[28] The circumstances may thus be ripening for a serious effort to establish a criminal code for outer space to go with the exertion of Earth bound sovereigns extending their criminal jurisdiction into outer space.[29]

CRIMINAL AUTHORITY VS. COMMAND AUTHORITY

Whether or not a separate criminal code for outer space is devised, the second distinction to be aware of while discussing the current state of criminal jurisdiction in space, is the difference between criminal authority and command authority. Criminal authority is the authority or ability to punish acts occurring in space as a result of the exertion or extension of a nation's criminal jurisdiction into outer space. The acts which are to be punished pursuant to this authority, have to be criminal in nature. Currently, in the absence of a criminal code for outer space, whether such an act is a criminal offense or not would, pursuant to the nation's jurisdiction to adjudicate,[30] be determined by the municipal courts of the nation which exerted criminal jurisdiction. Such courts would look toward that nation's municipal criminal codes in order to make that determination. Command authority, on the other hand, enables the correction or punishment of behavior for offenses which while they may also be criminal in nature, relate to mission safety and institutional regulations.[31]

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[28] *See,e.g., Rome Statute of the International Criminal Court*, U.N. Doc. A/CONF.183/9 (1998), *also at* 37 I.L.M. 999 (1998).

[29] *But see* Mary B. McCord, Note & Comment, *Responding to the Space Station Agreement: The Extension of U.S. Law into Space*, 77 GEO. L. J. 1933, 1949 (1989) (noting that while at a 1986 workshop conducted by the Office of Technology Assessment, lawyers from NASA, the European Space Agency (ESA), Germany, Japan and Canada, as well as legal experts from academia, agreed that "laws we take for granted on earth may be inapplicable in space," the panel also agreed that "the U.S. should not attempt to fashion a space code to cover all space station activities", and that "no uniform space code should be adopted." Citing to U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, *SPACE STATIONS AND THE LAW: SELECTED LEGAL ISSUES – BACKGROUND PAPER* 30-32 (Aug. 1986) [hereinafter OFFICE OF TECHNOLOGY ASSESSMENT]. It is particularly interesting to note that the panel specifically included "criminal activity" in the category "laws we take for granted on earth....[which] ...may not be available in space". OFFICE OF TECHNOLOGY ASSESSMENT, *id.* at 53.

[30] RESTATEMENT, *supra* note 20, § 401(b), at 232.

[31] Sloup, *supra* note 17, at 148.

The clearest example of the application of command authority in the context of space, is the Crew Code of Conduct called for by Article 11 of the 1998 IGA.[32] The Crew Code of Conduct has been formalized and published as a United States Federal Regulation.[33] Conduct may fall under the purview of either criminal jurisdiction, command authority, or both. In fact, it is specifically noted that the Crew Code of Conduct and its disciplinary policy "shall not limit the application of Article 22 of the IGA."[34] Although depending upon the conduct in question, criminal jurisdiction and command authority may, but do not always, overlap, a significant procedural difference in the context of space travel is that while criminal jurisdiction will be exercised upon the offender's return to Earth, command authority will be exerted in a contemporaneous manner while the offender remains in space.[35]

PRINCIPLES OF JURISDICTION: INTERNATIONAL LAW

The community of nations has agreed that activities in space shall be carried out in accordance with international law.[36] In fact, it is without dispute that "[t]he activities of nations in outer space are governed by international law."[37] As such, any exertion of criminal jurisdiction into space, including on board

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[32] 1998 IGA, *supra* note 14, at art. 11. Subsection 2 of Article 11 of the 1998 IGA reads,

The Code of Conduct for the Space Station crew will be developed and approved by all the Partners in accordance with the individual Partner's internal procedures, and in accordance with the MOUs. A Partner must have approved the Code of Conduct before it provides Space Station crew. Each Partner, in exercising its right to provide crew, shall ensure that its crew members observe the Code of Conduct.

"MOUs" refer to the Memorandum of Understanding agreements entered into between the respective space agencies of the Partners to the International Space Station. *Id.* at art. 4(1).

[33] *See* 14 C.F.R. § 1214.

[34] 14 C.F.R. § 1214.403(B).

[35] Sloup, *supra* note 17, at 148.

[36] *See* Outer Space Treaty, *supra* note 19, at art. III ("States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding." (Emphasis added.)

[37] Reynolds, *supra* note 2, at 25.

the *ISS*, has to comport with international law.[38] In other words, in order for a nation on Earth to be able to legitimately exert its criminal jurisdiction over activities in space, it has to do so pursuant to a jurisdictional principle recognized by international law.[39] The international community has recognized five such principles of jurisdiction: territorial, nationality, protective, passive personality, and universal.

Territorial

The territorial principle of jurisdiction is closely intertwined with the notion of sovereignty of a nation state. The Treaty of Westphalia of 1648, which ended the Thirty Year War, ensured the adoption of absolute sovereignty over a distinct territory as a fundamental principle of the nation-state system.[40] The territorial principle in essence holds that a "state has jurisdiction to prescribe law with respect to....conduct that, wholly or in substantial part, takes place within its territory."[41] Jurisdiction based upon the territoriality principle "is by far the most common basis for the exercise of jurisdiction to prescribe, and it has generally been free from controversy."[42] The territoriality prin-

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[38] The Partner States of the International Space Station recognized this. Article 2, section 1, of the 1998 IGA, as did the same article of the 1988 IGA, mandates, that "[t]he Space Station shall be developed, operated, and utilized in accordance with international law, including the Outer Space Treaty, the Rescue Agreement, the Liability Convention, and the Registration Convention." 1988 IGA, *supra* note 12, at art. 2, and 1998 IGA, *supra* note 14, at art. 2.

[39] *See also International Co-operation in the peaceful uses of outer space*, U.N.G.A. Res. 1721 (Dec. 20, 1961), *available at* http://www.oosa.unvienna.org/SpaceLaw/gares/html/gares_16_1721.html (last visited May 12, 2004) ("*Commends* to States for their guidance in the exploration and use of outer space the following principles: (a) International law, including the Chapter of the United Nations, applies to outer space and celestial bodies," and *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space,* U.N.G.A. Res. 1962, 1280th plen. mtg. (Dec. 13, 1963) *available at* http://www.oosa.unvienna.org/SpaceLaw/lpostxt.htm (last visited May 12, 2004) ("*Solemnly declares* that...[t]he activities of States in the exploration and use of outer space shall be carried out in accordance with international law....". *See also* Cheng, *supra* note 3, at 71, 151-153.

[40] In addition to territory and sovereignty, "a known and loyal population, and a government capable of acting independently both at home and abroad" are generally considered as essential attributes of a state. MARK W. JANIS, AN INTRODUCTION TO INTERNATIONAL LAW 318 (Aspen Publishers 4th ed. 2003).

[41] RESTATEMENT, *supra* note 20, § 402 (1)(a), at 237.

[42] *Id.* §402(1)(a), comment C, at 238-239.

ciple can be divided into two types: ordinary / subjective and objective / substantial effects. As the name implies, "ordinary" territoriality is just that, a situation where jurisdiction exists based upon all or nearly all events related to an offense having taken place within a nation's territory.[43] The objective or substantial effects principle is closely related, but permits the finding of jurisdiction based upon acts which occur partly outside and partly inside a nation, or which have a substantial effect inside a nation.[44]

In the context of space, short of someone during an extravehicular excursion somehow occasioning an event inside a space station, it is difficult to envision the sole application of the objective territorial principle as a basis for a nation exerting its criminal jurisdiction. The ordinary or subjective notion of territorial principle, on the other hand, is and will be directly applicable to space flight in light of space vehicles and space stations being considered part of a nation's territory. As one scholar has noted, "[s]ubjective territorial jurisdiction exists where acts are initiated in or, as is often the case, nearly all the events relevant to a particular case occur within the territorial confines of a State or on vessels, aircraft, spacecraft, or space stations subject to its 'flag' jurisdiction."[45] "Flag" jurisdiction derives from the treatment of ships as the sovereign territories of the nation whose flag they fly.[46] This notion of territorial jurisdiction has been adopted and extended by the community of nations into space through a system of registration of space objects.[47]

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[43] *See generally* JORDAN J. PAUST, INTERNATIONAL LAW AS LAW OF THE UNITED STATES 417 (Carolina Academic Press 2d ed. 2003). (Emphasis added.)

[44] *Id.*

[45] *Id.* at 417 (emphasis added).

[46] *Id.* at 427, n.17, citing Lauritzen v. Larsen, 345 U.S. 571 (1953), for the proposition that "a flag vessel is the equivalent of flag territory." Justice Jackson, writing for the Court in *Lauritzen*, noted that "the law of the flag supersedes the territorial principle, even for purposes of criminal jurisdiction of personnel of a merchant ship, because it 'is deemed to be a part of the territory of that sovereignty [whose flag it flies], and not to lose that character when in navigable waters within the territorial limits of another sovereignty.'" *Id.* at 929, citing from United States v. Flores, 289 U.S. 137, 155-156. (1933).

[47] *See* Outer Space Treaty, *supra* note 19, at art. VIII. *See also* Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, art. II, 28 U.S.T. 695

Nationality

Under the nationality principle, a nation can exercise jurisdiction over a person based upon that person's nationality.[48] Simply put, under the principle of nationality, "[a] state has jurisdiction over crimes committed by its nationals abroad."[49] The United States has traditionally limited its exertion on the basis of the nationality of the offender to a relatively few offenses.[50] Civil law countries, on the other hand, do use the nationality principle as a basis for exerting jurisdiction over nationals abroad. France, for example, uses the nationality principle to not only extend civil jurisdiction over its own nationals for acts having occurred abroad, but also over foreign nationals who have incurred an obligation to a French national abroad.[51] The nationality principle can also be used to extend criminal jurisdiction over nationals for acts occurring outside of a nation.[52] In the context of space, the 1998 IGA, as did the 1988 IGA, ac-

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[hereinafter Registration Convention]; 1988 IGA, *supra* note 12, at art. 5; and 1998 IGA, *supra* note 14, at art. 5.

[48] VALERIE EPPS, INTERNATIONAL LAW 117 (Carolina Academic Press 2d ed. 2001).

[49] Michael Akehurst, *Jurisdiction in International Law*, 46 BRITISH YEAR BOOK OF INTERNATIONAL LAW 1, 152-60, 163-66 (1972-73), *in* INTERNATIONAL LAW ANTHOLOGY 185 (Anthony D'Amato ed., Anderson Publishing Co. 1994).

[50] Treason (18 U.S.C. §§ 2381-2420), Selective Service registration requirement (50 U.S.C. appx. §§ 451-473), and international taxation (*see, e.g.*, Michael J. Graetz & Michael M. O'Hear, *The "Original Intent" of U.S. International Taxation*, 46 DUKE L.J. 1021 (1997)), are examples of traditional exertions of United States of offenses to its nationals abroad. The Foreign Corrupt Practices Act (15 U.S.C. §§ 78a-78mm), as well as the criminalization of sex offenses with minors abroad (18 U.S.C. §§ 2421-2427) are examples of more modern United States exertion of criminal jurisdiction over its nationals under the nationality principle.

[51] Article 14 of the French Civil Code which extends French jurisdiction over aliens who have contracted with French nationals abroad is widely viewed as an example of an "exorbitant" basis for jurisdiction. Art. 14 reads: "An alien, even if not residing in France may be summoned before French courts for the fulfillment of obligations contracted by him in France towards a French person; he may be summoned before the court in France for obligations contracted by him in a foreign country towards a French person." *See* RUDOLPH B. SCHLESINGER ET AL., COMPARATIVE LAW: CASES-TEXT-MATERIALS 422 (6th ed. 1998).

[52] India is an example of a nation which extends her criminal jurisdiction over her nationals abroad through the nationality principle. *See* INDIAN PEN. CODE § 4 (3rd ed. Raju, 1965) *cited in* EPPS, *supra* note 48, at 118.

knowledges and references the nationality principle as a means to extend the jurisdictional reach of the *ISS* Partners.[53]

Protective

The protective principle of jurisdiction permits a nation to punish certain acts committed abroad which threaten the integrity of the nation's governmental functions. Pursuant to this principle "a state has jurisdiction to prescribe law with respect to....certain conduct outside its territory by persons not its nationals that is directed against the security of the state or against a limited class of other state interests."[54] Traditionally, criminal offenses which fell under the protective principle of jurisdiction were espionage, counterfeiting, falsification of official documents, perjury before consular offices, and conspiracy to violate immigration or customs laws.[55] The protective principle can also be used as a means to exert criminal jurisdiction over terrorist acts against United States citizens abroad when demands are made upon the government of the United States, or the security of the United States is otherwise threatened.[56] The protective principle was not directly cited to as a means for exerting criminal jurisdiction into space in either the 1988 or the 1998 IGA. An argument can, however, be made that the special jurisdiction which was granted to the United States pursuant to Article 22 of the 1988 IGA, was founded upon the protective principle.[57]

Passive Personality

Under the passive personality principle of jurisdiction, a nation may "apply law - particularly criminal law - to an act

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[53] The language of Article 5(2) - "Pursuant to Article VIII of the Outer Space Treaty and Article II of the Registration Convention, each Partner shall retain jurisdiction and control over the elements it registers in accordance with paragraph 1 above and over personnel in or on the Space Station who are its nationals" - remained unchanged in the 1988 and the 1998 IGAs. 1988 IGA, *supra* note 12, at art. 5(2), and 1998 IGA, *supra* note 14, at art. 5(2) (emphasis added).

[54] RESTATEMENT, *supra* note 20, § 402(3), at 237-238.

[55] *Id.* at comment (f), 240.

[56] PAUST, *supra* note 43, at 420.

[57] *See* discussion *infra* page 115.

committed outside its territory by a person not its national where the victim of the act is its national."[58] Although traditionally rejected in English speaking nations,[59] the passive personality principle "is increasingly accepted as applied to terrorists and other organized attacks on a state's nationals by reason of their nationality, or to assassination of a state's diplomatic representative or other official."[60] The 1988 IGA did not rely upon the passive personality principle as a basis for criminal jurisdiction on board the *ISS*. The 1998 IGA arguably does.[61]

Universal

The final traditional means of prescribing jurisdiction is the universality principle. Traditionally the universality principle has been used against people who as a result of their actions, are considered *hostis humani generis*, enemies of humankind. Historically, people engaged in piracy fell into this category.[62] Today, slave trade, genocide, and war crimes have arguably reached the level of being "universal crimes."[63] Under the universality principle of jurisdiction, every state is considered to have jurisdiction over such persons.[64] Recently certain categories of human rights violations can be argued to have been added to this category of *hostis humani generis*.[65] The successful prosecution of Adolph Eichmann by the state of Israel in 1962 is generally seen as an exercise of the universality principle.[66] In

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[58] RESTATEMENT, *supra* note 20, § 402, comment (g), at 240.

[59] Akehurst, *supra* note 49, at 186.

[60] RESTATEMENT, *supra* note 20, § 402, comment (g), at 240.

[61] *See* 1998 IGA, *supra* note 14, at art. 22 § 2, and *infra* page 117.

[62] PAUST, *supra* note 43, at 421-422.

[63] EPPS, *supra* note 48, at 123. See also RESTATEMENT, *supra* note 20, at § 404 (listing "piracy, slave trade, attacks on or hijacking aircraft, genocide, war crimes, and certain acts of terrorism" as offenses falling under the Universal Jurisdiction umbrella. *Id*, at 254.

[64] JANIS, *supra* note 40, at 325.

[65] *Id.*

[66] Attorney General of the Government of Israel v. Eichmann, 16 P. D. 2033 (1962) (in Hebrew, translated by the Ministry of Justice of Israel), reprinted in 36 INT'L REP. at 277 (E. Lauterpacht ed. 1968), and excerpted in EPPS, *supra* note 48, at 123 n.16. *But see* RESTATEMENT, *supra* note 20, § 404, reporter's notes, at 256, noting that no prosecution has been undertaken where the universal principle of jurisdiction was the sole basis

light of the community of nations agreeing that space is to be explored for the "benefit of all peoples" and for "peaceful purposes,"[67] it is unlikely that an occasion will arise where a nation will be justified in invoking the universality principle in space. Surely humankind will not permit piracy, slavery, or violations of human rights to occur in space.

Treaties

Treaties concluded between nations in furtherance of an orderly exploration of space also provide parameters guiding the exertion of criminal jurisdiction into space, including on board space objects such as the *ISS*. Included among the five fundamental such treaties,[68] are two articles which have a particular bearing on the issue of criminal jurisdiction in space: Article VIII of the Treaty on Principles Governing the Activities of States on the Moon and Other Celestial Bodies (Outer Space Treaty)[69] and Article II of the Convention on Registration of Objects Launched into Outer Space (Registration Convention)[70]. Article VIII of the Outer Space Treaty provides in part that "[a] State Party to the Treaty 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 or on a celestial body,"[71] Article II of the Registration Convention provides in part that "[w]hen a space object is launched into Earth orbit or beyond, the launching State shall register the space object by means of an entry in an appropriate registry which it shall maintain."[72] Finally, and also pertinent to an examination of criminal jurisdiction in space, is the prohibition of

for jurisdiction, including the *Eichmann* case wherein "Israel relied on universal jurisdiction as well as other bases."

[67] Outer Space Treaty, *supra* note 19, at Preamble.

[68] *Id.*; Registration Convention, *supra* note 47; Moon Treaty, *supra* note 19; Convention on the International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 197; and Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570.

[69] *See* Outer Space Treaty, *supra* note 19.

[70] *See* Registration Convention, *supra* note 47.

[71] Outer Space Treaty, *supra* note 19, at art. VIII.

[72] Registration Convention, *supra* note 47, at art. II.

"national appropriation by claim of sovereignty" of outer space.[73] However criminal jurisdiction is to be exerted in space in general, and on board the *ISS* in particular, it has to comport with the registration requirement of the Outer Space Treaty and the Registration Convention, and it cannot be done in a way which would also encompass a national appropriation of space.

NATIONAL EXERTION OF CRIMINAL JURISDICTION INTO SPACE: THE UNITED STATES

The exertion of criminal jurisdiction into space by the United States parallels both the international legal principles permitting such exertion, and the framework of such exertion created by the *ISS* agreements. The United States has sought to exert its criminal jurisdiction in space in two ways. The first consisted of an amendment to the United States Special Maritime and Territorial Jurisdiction to specifically ensure that activities which might occur on a space vehicle would be covered by United States criminal jurisdiction.[74] The second involved a two decade long process evolving through two multilateral treaties which established an international framework, including the United States, of criminal jurisdiction on board the *ISS*. Both of these endeavors have to be viewed in the context of the international law principles and the treaties discussed above which established general principles of jurisdiction in space.

18 U.S.C. § 7(6) - "ROCKETING TOWARDS MARS"[75]

Section 7 of Title 18 of the United States Code provides the special maritime and territorial jurisdiction of the United States.[76] As a whole, section 7 "extends the jurisdiction of the federal criminal laws to areas where American citizens and property need protection, yet no other government effectively

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[73] Outer Space Treaty, *supra* note 19, at art. II.

[74] 18 U.S.C. § 7(6).

[75] "Rocketing towards Mars" is the term used by the Ninth Circuit Court of Appeals to describe sub-section 6 of 18 U.S.C. § 7. *See* United States v. Corey, 232 F.3d 1166, 1171 (9th Cir. 2000). Note that except for a one line description by the Ninth Circuit in *Corey*, no Federal court has had an occasion to interpret 18 U.S.C. § 7(6).

[76] *See* 18 U.S.C. § 7.

safeguards those interests."[77] The extension of criminal jurisdiction has expanded both as the republic acquired new possessions,[78] as well as in order to keep abreast of technological advances.[79] The most recent example of technology dictating an expansion of the special territorial jurisdiction occurred when Congress in 1981 added subsection 6 to 18 U.S.C. 7, in order to include within the special and maritime jurisdiction of the United States:

> Any vehicle used or designed for flight or navigation in space and on the registry of the United States pursuant to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies and the Convention on Registration of Objects Launched into Outer Space, while that vehicle is in flight, which is from the moment when all external doors are closed on Earth following embarkation until the moment when one such door is opened on Earth for disembarkation or in the case of a forced landing, until the competent authorities take over the responsibility for the vehicle and for persons and property aboard.[80]

Although the plain language of subsection 6 makes it inapplicable to any offenses occurring on board the *ISS*,[81] it clearly extends United States federal criminal law to any offenses which may occur on board the *Shuttle* traveling to or from the *ISS*. Similarly, any future Moon or Mars missions using United States spacecraft will likewise fall under subsection 6. While subsection 6 has been criticized from a pure legislative drafting view point,[82] the current language of subsection 6 does raise a

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[77] Corey, *supra* note 75, at 1171.

[78] *Id.* at 1174.

[79] *See, e.g.* Cordova, *supra* note 21.

[80] 18 U.S.C. § 7(6).

[81] *See* OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 29, at 28 (noting that "since space stations will have attributes which differ from those of space transportation vehicles —e.g., their size, complexity, multinational nature, duration in orbit, etc. ---- they might be considered to fall outside the general provisions of paragraph 6 which seem more applicable to shuttle-type vehicles.").

[82] *See* Robbins, *supra* note 21, at 646 n. 92 (criticizing the use of the "door test" as being impractical as to when federal jurisdiction begins and ends, as well as the "jurisdictional gap" as a result of criminal jurisdiction being limited to offenses occurring

potential unresolved issue in relation to the *ISS* – what effect will the opening of an external door of the space shuttle during docking with the *ISS* have upon the exertion of United States criminal jurisdiction on board the *Shuttle*? Plain statutory interpretation suggest that Congress intended for United States criminal jurisdiction to remain on board the *Shuttle* from the closing of the external door on Earth prior to launch until the opening of the external door on Earth after landing. Whether this door has been opened between these two events, in space or a celestial body not subject to territorial claims of jurisdiction, or while docked to a celestial body subject to and governed by an international framework of criminal jurisdiction, should not change this outcome. Nor should the enactment of 18 U.S.C. 7(6) preclude the exertion of another nation's criminal jurisdiction over an offense on board a United States space vehicle based upon the nationality or passive personality bases of jurisdiction.[83] As a whole, 18 U.S.C. 7(6), contrary to criticism, is an appropriate limited exertion of United States criminal jurisdiction into space, extending criminal jurisdiction where appropriate, i.e. United States space vehicles, yet also being careful not to exert such jurisdiction where prohibited by Treaties, i.e. space or celestial bodies.

1988 AND 1998 IGAS - CRIMINAL JURISDICTION ON THE INTERNATIONAL SPACE STATION

On September 29, 1988, the concept of criminal jurisdiction in space, beyond the limited confines of a space vehicle "rocketing towards Mars", moved from academia to reality. On that date, twelve governments joined in signing the *Agreement Among Governments of the United States of America, Governments of Member States of the European Space Agency, the Government of Japan, and the Government of Canada on Cooperation in the Detailed Design, Development, Operation, and Utili-*

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inside the space vehicle, speculating that "[s]pace walks and planetary exploration could be prime arenas for criminal conduct since crimes committed there may be beyond the observation of witnesses." (sic)

[83] *See* Corey, *supra* note 75, at 1179 ("Concurrent jurisdiction is well-recognized in international law.").

zation of the Permanently Manned Civil Space Station .[84] The governments joining as partners in this unprecedented endeavor were the United States of America, Japan, Canada, as well as nine European governments: Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain and Great Britain. The European governments were all members of the European Space Agency, and for the purposes of the 1988 IGA were referred to as "the European Partner."[85] The 1988 IGA was superseded by the 1998 *Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America on Cooperation in the Detailed Design, Development, Operation, and Utilization of the Permanently Manned Civil Space Station.*[86] Joining the original *ISS* partnership were Russia, as well as two new ESA members, Sweden and Switzerland.[87]

Both the 1988 IGA and the 1998 IGA were multilateral agreements among nations. Under United States law these Agreements are not treaties requiring the advice and consent of the United States Senate,[88] but rather multilateral government

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[84] 1988 IGA, *supra* note 12.

[85] *See* 1988 IGA, *supra* note 12, Preamble. Note that Article 25 of the 1988 IGA governs entry into force of the Agreement, and that subsection 3(b) specifically governs the entry into force of the IGA for the individual European Partner States.

[86] *See* 1998 IGA, *supra* note 14. Note that while the 1998 IGA does not contain any language specifically mandating that such treaty supersedes the 1988 IGA, the relevant language from the MOUs does. *See, e.g., Preamble* to Memorandum of Understanding Between the National Aeronautics and Space Administration of the United States of America and the European Space Agency Concerning the Cooperation on the Civil International Space Station, Jan. 29, 1998, *available at* ftp://ftp.hq.nasa.gov/pub/pao/reports/1998/nasa_esa.html (last visited May 12, 2004) [hereinafter MOU U.S.-ESA]. Similarly, under established principles of International Law, a treaty among same parties will supersede a prior treaty on the same subject and among the same parties. *See generally*, Article 59, *Termination or Suspension of the Operation of a Treaty Implied by Conclusion of a Later Treaty*, Vienna Convention on the Law of Treaties, May 23, 1969, 1155 U.N.T.S. 331, *reprinted in* 8 I.L.M. 679 (1969) (entered into force January 27, 1988) [hereinafter Vienna Convention].

[87] *See* 1998 IGA, *supra* note 14.

[88] U.S. CONST. art. II, § 2 (provides that the President "shall have Power, by and with the Advice and Consent of the Senate, to make Treaties, provided two-thirds of the Senators present concur.") *See also* RESTATEMENT, *supra* note 20, § 303, at 159.

level executive agreements.[89] In practical terms, this is a distinction without a difference. Under international law a "treaty" is defined to include "international agreements concluded between States in written form and governed by international law"[90] Similarly, "[e]very international agreement in force is binding upon the parties to it and must be performed by them in good faith."[91] The fact that the IGA may thus not be designated a treaty under United States law, does not in any way belittle its legality, binding nature, or historical significance.

The over all objective of both the 1988 and the 1998 IGAs was to "establish a long-term international cooperative framework among the Partners, on the basis of genuine partnership, on the development, operation, and utilization of a permanently manned civil Space Station for peaceful purposes, in accordance with international law."[92] The implementation of the IGA was to be effected in accordance with relevant provisions of the respective IGAs.[93] In addition, Memoranda of Understanding among the respective Partners' Cooperating Agencies were to provide the technical framework "concerning the detailed design, development, operation, and utilization of the Space Station."[94] This concept remained throughout the 1998 IGA.[95] In

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[89] The IGA would arguably fall into the specific United States designation of a "congressional-executive agreement." *See* McCord, *supra* note 29, at 1948. Whether the current 1998 IGA is classified as a "congressional-executive," or a "sole executive" agreement, the binding effect upon the United States and the other signatories to the agreement does not change. *See* also CRS ISSUE BRIEF, *supra* note 4, at 10 – "The IGA is considered a treaty in all the countries [i.e. Partner states to the 1998 IGA] except the United States and must be ratified by those governments (in the United States it is considered an Executive Agreement)."

[90] Vienna Convention, *supra* note 86.

[91] RESTATEMENT, *supra* note 20, § 321, at 190. This doctrine of *pacta sunt servanda* is "perhaps the most important principle of international law." *Id.* at comment (a). *See also* Vienna Convention, *supra* note 86.

[92] 1988 IGA, *supra* note 12, at art. 1; and 1998 IGA, *supra* note 14, at art. 2.

[93] 1988 IGA, *supra* note 12, at art. 4; and 1998 IGA, *supra* note 14, at art. 4.

[94] *See* 1988 IGA, *supra* note 12, at art. 4, §1 and 2., *supra* note 10. The Cooperating Agencies for the respective 1988 IGA Partners were the National Aeronautics and Space Administration (NASA) for the United States), the European Space Agency (ESA) for the European Governments, the Ministry of State for Science and Technology (MOSST) for Canada, and Science and Technology Agency of Japan (STA) for Japan. *See* art.4, 1988 IGA. Art. 4 of the 1988 IGA did not name the Japanese Cooperating Agency. The STA was subsequently so designated. *See* Memorandum of Understanding Between NASA and the Government of Japan on the Cooperation in the Detailed Design, Devel-

relation to criminal jurisdiction in space, the historical significance of the 1988 and the 1998 IGAs was the creation of an initial and applied framework for criminal jurisdiction in space. This framework was found within Article 22 of the respective IGAs.

THE ADDITION OF RUSSIA – TOWARDS A MORE EQUAL PARTNERSHIP ON THE INTERNATIONAL SPACE STATION

The 1988 and the 1998 IGAs, with the exception of Article 22, are substantially similar. The main difference in the language of the two Agreements came about as a result of Russia joining the *ISS*.[96] Russia brought to the partnership experience in human spaceflight as well as experience from human long-term habitat in the Soviet space station *Mir*.[97] With the addition of Russia the United States was no longer the only dominant Partner in the *ISS*.[98] The *ISS*, as intended by the 1988 IGA, went from being "'a U. S. core Space Station' with elements produced by the other Partners around such a core Station"[99] to an "integrated international Space Station,"[100] albeit one where the United States still was "entitled to exercise a leading role in terms of management and coordination."[101] The record of in-

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opment, Operation and Utilization of the Permanently Manned Civil Space Station, signed on March 14, 1989, as referenced in the Preamble of subsequent Memorandum of Understanding Between the National Aeronautics and Space Administration of the United States of America and the Government of Japan Concerning Cooperation on the Civil International Space Station, Feb. 24, 1998, *available at* ftp://ftp.hq.nasa.gov/pub/pao/reports/1998/nasa_japan.html [hereinafter MOU US-Japan].

[95] 1998 IGA, *supra* note 14, at art. 4, §§ 1, 2. The cooperating agency for Russia is the Russian Space Agency (RSA). *Id.* at art. 4, §1.

[96] Ratner, *supra* note 14, at 334 (noting that the addition of Russia to the international Partners was "critical.")

[97] Rochus Moenter, *The International Space Station: Legal Framework and Current Status*, 64 J. AIR L. & COM. 1033, 1034 (1999) (noting that at the time "Russia had the longest experience and was most accomplished in the area of human space flights and long term operation of the Russian space station Mir.") *Id. See also supra*, note 5.

[98] *See also infra*, n. 124.

[99] Moenter. *supra* note 97, at 1048 (quoting from article 1, §2, 1988 IGA, *supra* note 12).

[100] 1998 IGA, *supra* note 14, at art. 1, §2. *See also* Moenter, *supra* note 97.

[101] Moenter, *supra* note 97.

terim agreements between the United States and Russia,[102] as well as Congressional debates[103] and other official documents,[104] make it clear that the addition of Russia as a Partner to the *ISS* was greatly anticipated and inspired much hope. Interestingly, however, while it was envisioned that some of the articles of the 1988 IGA would have to be changed, the *ISS* Partners in 1994 specifically predicted that Article 22 would not be among those articles.[105]

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[102] *See generally* U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, U.S. – RUSSIAN COOPERATION IN SPACE (April 1995) [hereinafter ASSESSMENT] and specifically agreements listed therein, including: Agreement Between the United States of America and the Russian Federation Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, June 17, 1992, *available at* http://www.jaxa.jp/jda/library/space-law/chapter_4/4-2-2-6_e.html (last visited May 21, 2004), and ASSESSEMENT, app. A, at 185; Protocol to the Implementing Agreement Between the National Aeronautics and Space Administration of the United States of America and the Russian Space Agency of the Russian Federation on Human Space Flight Cooperation of October 5, 1992, Dec. 16, 1993, U.S.-Russia, *available at* 1993 WL 590472 and ASSESSEMENT, app. A2, at 90; and Interim Agreement Between the National Aeronautics and Space Administration of the United States of America and the Russian Space Agency for the Conduct of Activities Leading to Russian Partnership in the Detailed Design, Development, Operation and Utilization of the Permanently Manned Civil Space Station, signed by Goldin and Koptev on June 23, 1994, (hereinafter Interim Agreement Between NASA and RSA, June 23, 1994.), ASSESSEMENT, app, at 93.

[103] *See* COMM. ON SCIENCE, INTERNATIONAL SPACE STATION AUTHORIZATION ACT OF 1995, H.R. REP. NO. 104-210, at 4 (1995) [hereinafter COMM. ON SCIENCE REPORT] (report from the Committee on Science accompanying recommendation for passage of bill, July 28, 1995, page 4 noting the anticipated "significant participation by the Russian Space Agency.") *See also id.* at 15 (discussing the "singular importance" of expanding the original partnership to include Russia.).

[104] *See* Daniel S. Goldin, Administrator, National Aeronautics and Space Administration, Statement on the Cooperative Agreement Between the United States and Russia on Space, Aeronautics and Science, (Sept. 2, 1993) (speaking of "a new direction for space flight," and "a new era of peace and cooperation among nations" as resulting from "a truly international space program.") (on file with author and Editor-In-Chief of the *Journal of Space Law*).

[105] See paper entitled *"Changes in the Legal Framework to Include Russia as Partner"* adopted by the *ISS* Partners and the Government of the Russian Federation at an intergovernmental meeting on March 18, 1994, acknowledging that changes to the 1988 IGA would have to be made as a result of Russia becoming a Partner, but also noting that the current partners listed Article 22 and criminal jurisdiction among a list of articles of the 1988 IGA which were not envisioned to need amending. Paper, *Changes in the Space Station Legal Framework to Include Russia as a Partner*, at 2. [hereinafter Paper] (Copy on file with author and Editor-In-Chief of the *Journal of Space Law*). Such Paper is referenced to in the Interim Agreement Between the National Aeronautics and Space Administration of the United States of America and the Russian Space Agency for the Conduct of Activities Leading to Russian Partnership in the Detailed Design, Devel-

Contrary to these predictions, Article 22 of the 1988 IGA did in fact receive a substantial overhaul. Part of this change can be explained by the fact that Article 22 of the 1988 IGA arguably was a poor attempt at fashioning a lasting framework for international criminal jurisdiction in space. The 1988 language of Article 22 gave the United States an unfair advantage in so far as criminal jurisdiction went on board the *ISS*.[106] A general change from the 1988 IGA Article 22 language could thus be seen as being inevitable due to the addition of an equally experienced Partner.[107]

A second reason for at least one of the major changes to the language of Article 22 between the 1988 and the 1998 IGAs, was likely that while extradition treaties did exist between the United States and the other Partners, no extradition treaty existed between the United States and Russia.[108] Regardless of the reasons behind this dramatic revision of Article 22 in the 1988 and the 1998 IGAs, in light of these two articles being the only international treaty attempts at actually establishing an applied framework for criminal jurisdiction in space, a close and comparative review of both agreements as a whole, and article 22 in particular, is warranted.

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opment, Operation and Utilization of the Permanently Manned Civil Space Station. *See* ASSESSEMENT, supra note 102, app. A3, at 94.

[106] *See, e.g.* Ratner, *supra* note 14, at 331 (terming the criminal jurisdictional grant to the United States as "unfounded in any standard of international jurisdiction," and terming it a "dangerous precedent.").

[107] On December 17, 1993, the Russian Federation accepted the December 6, 1993 invitation to join the *ISS* Partnership. Cross training of Astronauts and Cosmonauts began in 1994 with Cosmonaut Serge Krikalev becoming the first Russian to fly on board the Space Shuttle and Astronaut Norman Thagard becoming the first American to launch from Baikonur, Kazachstan aboard a Russian Soyuz TM crew vehicle and dock with the Russian space station Mir where he stayed for ninety days. *See* COMM. ON SCIENCE REPORT, *supra* note 103, at 5. NASA and the Russian Space Agency (RSA) reached an ad referendum agreement on a MOU in 1996 making "Russia a full partner in the sharing of *ISS* accommodations, resources, responsibilities and costs." Moenter, *supra* note 97, p. 1034.

[108] *See* discussion pertaining to Article 22, § 3 of the 1998 IGA, *infra* p. 129. Note that the qualifying term "likely" is used because no definitive background papers or similar travaux préparatoires expanding upon the reason for the addition of Section 3 to Article 22 of of the 1998 IGA have as of this date been found by the author. (Author's note.)

ARTICLE 5. 1988 AND 1998 IGA - GENERAL JURISDICTIONAL FRAMEWORK

Both the 1988 and the 1998 IGAs contain a general jurisdictional article. Article 5 - "Registration; Jurisdiction and Control", link a Partner's ability to exert its jurisdiction over individuals on board the *ISS* to registration and nationality. The language of Article 5 was not changed between 1988 and 1998,[109] and reads:

> 1. In accordance with Article II of the Registration Convention, each Partner shall register as space objects the flight elements listed in the Annex which it provides, the European Partners having delegated this responsibility to ESA, acting in its name and on its behalf.
>
> 2. Pursuant to Article VIII of the Outer Space Treaty and Article II of the Registration Convention, each Partner shall retain jurisdiction and control over the elements it registers in accordance with paragraph 1 above and over personnel in or on the Space Station who are its nationals. The exercise of such jurisdiction and control shall be subject to any relevant provisions of this Agreement, the MOU's, and implementing arrangements, including relevant procedural mechanism established therein.[110]

Article 5 of the IGAs provides the general jurisdictional framework for the *ISS*. This general jurisdictional framework relies upon two recognized principles of jurisdiction: territoriality and nationality. The territoriality principle is invoked by a partner registering its flight element in accordance with the Article II of the Registration Convention.[111] As is now the custom in spaceflight jurisdiction, a nation which registers a space object pursuant to the Registration Convention, can then, pursuant to Article VIII of the Outer Space Treaty,[112] retain jurisdic-

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[109] Indeed, the Partners during their March 18, 1994 meeting did not envision the need for any changes to Article 5 as a result of Russia joining the *ISS*. See Paper, *supra* note 105, at 2.

[110] 1988 IGA, *supra* note 12, at art. 5; and 1998 IGA, *supra* note 14, at art. 5.

[111] Registration Convention, *supra* note 47, at art. II.

[112] Outer Space Treaty, *supra* note 19, at art. VIII.

tion over such object, or in the case of the *ISS*, flight element.[113] Article 5 of the IGAs is thus very much in comport with established space law in so far as jurisdiction goes.

In addition to the application of the territoriality principle of jurisdiction, Article 5 also provides a jurisdictional foundation based upon the nationality principle. Section 2 of Article 5 is written in the conjunctive, holding that "each Partner shall retain jurisdiction and control over the elements it registers in accordance with paragraph 1 above and over personnel in or on the Space Station who are its nationals."[114] A Partner may thus retain jurisdiction over not only acts occurring in or on one of its flight elements, but also over acts committed by personnel who are its nationals.[115]

The exercise of both the territorial and the nationality principles of jurisdiction in Article 5 are subject to relevant provisions in the IGA, the MOUs, and implementing arrangements.[116] None of the 1998 MOUs modify Article 5.[117] Two relevant provisions of the IGA do, however, modify the jurisdictional provisions of Article 5. The first such provision is Article 21 which

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[113] Moenter, *supra* note 97, at 1045. *See also* McCord, *supra* note 29, at 1939.

[114] 1988 IGA, *supra* note 12, at art. 5, § 1; and 1999 IGA, *supra* note 14, at art. 5, § 1 (emphasis added).

[115] Note that the term "personnel" is not defined in either the 1988 or the 1998 IGAs. Presumably this was not an issue when either Agreement was drafted in that all people on board the *ISS* were at such times "official" members of missions. However, with the advent of "space tourists" visiting the *ISS*, a refinement of the word "personnel" may be necessary. (*See e.g.*, R. Thomas Rankin, Note, *Space Tourism: Fanny Packs, Ugly T-Shirts, and the Law in Outer Space*, 36 SUFFOLK U. L. REV. 695 (2003).) Presumably, the intent of the parties was to include anyone on board the *ISS*. In case of interpretation of the language of the IGA, the Vienna Convention on the Law of Treaties, specifically articles 31 – 33, would provide guidance. *See* Vienna Convention on the Law of Treaties, *supra* note 86.

[116] 1988 IGA, *supra* note 12, at art. 5, § 2; and and 1998 IGA, *supra* note 14, at art. 5, § 2.

[117] Art. 15 ("Cross-waiver of Liability; Exchange of Data and Goods; Treatment of Data and Goods in Transit; Customs and Immigration; Intellectual Property; Criminal Jurisdiction") of the Memoranda of Understanding all contain similar language, holding that "[t]he Parties note that with respect to .....criminal jurisdiction, the relevant provisions of the Intergovernmental Agreement apply." *See e.g.*, Memorandum of Understanding Between the National Aeronautics and Space Administration of the United States of America and the Russian Space Agency Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, art. 15, *available at* ftp://ftp.hq.nasa.gov/pub/pao/reports/1998/nasa_russian.html, (last visited May 20, 2004) [hereinafter MOU U.S.-Russ.]

provides the parameters of intellectual property on board the *ISS*.[118] The second IGA provision which does modify Article 5 is Article 22 - "Criminal Jurisdiction." Not only did Article 22 modify Article 5 in both the 1988 and the 1998 IGAs, but the language of the 1988 and the 1998 Articles 22 are also substantially different.

1988 IGA - ARTICLE 22 – ORIGINAL CRIMINAL JURISDICTION ON THE INTERNATIONAL SPACE STATION

Criminal jurisdiction on the *ISS*, as envisioned by the 1988 IGA, in essence fell into two categories: a traditional grant of jurisdiction applicable to all Partners based upon territoriality and nationality, and an extra-ordinary grant of jurisdiction applicable only to the United States. This extra-ordinary jurisdiction most resembled the protective principle of jurisdiction.

Section 1, Article 22. 1988 IGA - Traditional Jurisdiction: Territoriality and Nationality Principles

Article 22, section 1 of the 1988 IGA read in full:

> In view of the unique and unprecedented nature of this particular international cooperation in space:
>
> 1. The United States, the European Partner States, Japan, and Canada may exercise criminal jurisdiction over the flight elements they respectively provide and over personnel in or on any flight element who are their respective nationals, in accordance with Article 5(2).[119]

The basis of the jurisdiction granted pursuant to Section 1 of Article 22 does not modify the general jurisdictional basis provided for in Article 5. Criminal jurisdiction could be exercised by a Partner over acts occurring in or on their flight elements, or committed by their national. This conjunctive basis of

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[118] Art. 21 - "Intellectual Property." 1988 IGA, *supra* note 12; and 1998 IGA, *supra* note 14. The language of Article 21 remained the same in both the 1988 and the 1998 IGAs.

[119] 1988 IGA, *supra* note 12, at art. 22, § 1.

criminal jurisdiction comports both with Article 5 of the IGA, as well as traditional principles of jurisdiction. Extending criminal jurisdiction to acts occurring in or on a Partner's flight element, duly registered as per Article 5 of the IGA and Article II of the Registration Convention, simply transports the basic subjective territoriality principle of jurisdiction into space. Since all Partners adhered to this principle on Earth, and since it was applied equally among the Partners on the *ISS*, there can be little or no criticism of this portion of Article 22.

Similarly, providing criminal jurisdiction pursuant to the nationality principle, although not exercised to the same extent on Earth by all the various Partners, would be acceptable to all Partners. All Partners accepted and employed nationality as a principle of jurisdiction to various degrees on Earth, [120] and all had an interest in being able to exert control and supervision over their nationals on board the *ISS* regardless of what flight element such nationals may be in on any one given moment. Additionally, just as with the application of territoriality, nationality was applied to all Partners equally. All derived the same benefit and duties from the application of these two traditional principles of jurisdiction. As such, section 1 of Article 22 has uniformly received favorable commentaries.[121]

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[120] "The most fundamental principle of extraterritorial jurisdiction is nationality." JANIS, *supra* note 40, at 320. Although traditionally associated with Civil law jurisdictions, Janis notes that "[n]ationality jurisdiction may well become more significant in English law, long a bastion of territorial jurisdiction." *Id,* at 321. "Nationality is an accepted basis for jurisdiction in U.S. courts." *Id*, at 320. *See, for example*, Vermilya-Brown CO., v. Connell, 335 U.S. 377 (1948), noting that "[w]e have no doubt that Congress has power, in certain situations, to regulate the actions of our citizens outside the territorial jurisdiction of the United States whether or not the act punished occurred within the territory of a foreign government." *Id,* at 381. *See also* Blackmer v. United States, 284 U.S. 421 (1932), noting that "[t]he law of Nations does not prevent a State from exercising jurisdiction over its subjects travelling or residing abroad, since they remain under its personal supremacy." *Id*, at 438, n. 2, citing 1 OPPENHEIM, INTERNATIONAL LAW 281 (4th ed.,).

[121] Ratner, *supra* note 14, at 332 and accompanying text. *See also* McCord, *supra* note 29, at 1940 and accompanying text (implicitly approving of section 1 by expressing clear disapproval of section 2).

Section 2, Article 22. 1988 IGA - Extra-Ordinary Jurisdiction

If section 1 was met with approval, section 2 was universally disapproved or questioned.[122]

Section 2 read in its entirety:

> 2. In addition, the United States may exercise criminal jurisdiction over misconduct committed by a non-U.S. national in or on a non-U.S. element of the manned base or attached to the manned base which endangers the safety of the manned base or the crew members thereon; provided that, before proceeding to trial with such a prosecution, the United States:
>
> (a) shall consult with the Partner State whose national is the alleged perpetrator concerning the prosecutorial interests of both States; and
>
> (b) shall have either
>
> (1) received the concurrence of such Partner State in the continuation of the prosecution, or
>
> (2) if such concurrence is not forthcoming, failed to receive such assurances from such Partner State that it intends to prosecute its nationals on commensurate charges supported by the evidence.[123]

The dominance of the United States in relation to its *ISS* Partners in 1988 is made abundantly clear in section 2 of Article 22. The United States, without an explanation as to why or what international legal basis justified such language,[124] was

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[122] *Id.*

[123] 1988 IGA, *supra* note 12, at art. 22, § 2.

[124] One explanation for the dominance of the United States in the criminal jurisdiction granted the United States pursuant to section 2 of the Article 22 of the 1988 IGA, could simply be that it tracked the dominance of the United States in terms of technical expertise, construction and funding for the International Space Station. For example, while the non-US Partners in 1988 agreed to provide hardware at a then estimated cost of $8 billion dollars, the NASA estimated total budget for the *ISS* (then called *Freedom*) was $30 billion dollars. Not until the addition of Russia as a Partner, was the dominance of the United States compromised, if not in term of monetary contributions, certainly so in terms of technical expertise. For example, the *ISS* was now designed to orbit inclined at 51.6 degrees (as used by the Russian space program) as opposed to the

granted the ability to exert its criminal jurisdiction over any offense which the United States deemed to have endangered the safety of the station or the crew, regardless of where such offense may have occurred, and regardless of the nationality of the offender or the victim. While the language purported to insert limitations in the form of a consultation requirement with the offender's Partner State, this consultation requirement was drafted in such a way to be effectively meaningless. Although not made clear in the IGA, it could be argued that this extra-ordinary criminal jurisdiction most resembled the protective personality principle.

Section 2 gave the United States criminal jurisdiction over "misconduct committed by a non-U.S. national." This jurisdiction could be exerted even if the offense occurred in or on a "non-U.S. element." The United States, however, could only exert this jurisdiction if the conduct "endanger[ed] the safety of the manned base or the crew members thereon."[125] This purported limitation of this extra-ordinary jurisdiction to this category of offenses, was however, meaningless in that the definition of what endangers the safety of the base or of the crew, was left up to the Party exerting the jurisdiction, i.e. the United States. In the unforgiving environment of space, presumably any offense which would be criminal, could also be argued to endanger the safety of the station or of the crew. The fact that this supposed limitation was meaningless can additionally be seen in subsections (a) and (b).

Assuming that the United States had decided to exert its criminal jurisdiction over an alleged offender, subsection (a) mandated that the United States could not proceed to trial unless it had consulted with the Partner State of the offender.[126] This consultation should concern the "prosecutorial interests" of

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28.8 degree orbit planned by NASA. *See generally* CRS ISSUE BRIEF, *supra* note 4, at 4-5.

[125] 1988 IGA, *supra* note 12, at art. 22, § 2.

[126] Note that under the expressed language of this section - "proceeding to trial with such a prosecution," (as opposed to "proceeding with the trial), the United States could institute the prosecution, indict the offender, seek his or her extradition, and incarcerate the offender pre-trial. The only limitation was that the United States could not begin the actual trial, i.e. proceed to trial without consulting with the offender's partner state.

both States. Presumably it was envisioned that pursuant to such consultation, both nations could come to an agreement as to the proper course of the United States' desired prosecution.

Subsection (b), although seemingly providing an additional safeguard for the non-U.S. *ISS* Partners, also required the United States to receive the concurrence of the offender's Partner State, in essence approving the U.S. proposed prosecution of such Partner's national. If the Partner provided the concurrence, the United States could proceed with the prosecution.[127] If the consulted Party declined to concur, which could presumably have been based on many different reasons, including that such Party did not consider the offense to have endangered the safety of the base or of the crew, the U.S. could nevertheless proceed with the trial if the United States "failed to receive such assurances" that the consulted Partner intended to prosecute the offender "on commensurate charges supported by the evidence."[128] Not only is the language of the "concurrence" subsection written in the negative, i.e. the dispositive fact is not whether the consulted Party provided the assurance, something which is provable, but whether the United States received such assurances, something which is less provable absent reliance upon the party seeking to invoke the prosecution, even if the consulted Party did provide assurances it intended to prosecute its national, the final qualifying clause mandates that such prosecution be for

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[127] Note that this is consistent with traditional international law. In other words, if one nation seeks to criminally prosecute a national of another nation, it is up to the accused's nation to either object or agree to such a prosecution. If the nation objects, and the accused is within such nation's territory, extradition to the requesting nation, depending upon the nature of the objection, may be denied. If the accused is within the territory or control of the prosecuting state, the objecting state cannot stop the prosecution per se, but if international law has been or is being violated as a result of such prosecution, does have standing to bring a complaint to the International Court of Justice. *See, e.g.*, LaGrand Case (Germany v. USA), 2001 I.C.J. 104, 2001 WL 34402492 (June 27, 2001). The issue is decided on a state to state basis. The individual does not accrue a defense to the criminal prosecution in the prosecuting nation's courts. However, under the circumstances of the 1988 IGA, an individual could arguably have accrued an individual defense, arguing that the extra-ordinary jurisdiction granted the United States under § 2 of Article 22, was contrary to Article 2 of the 1988 IGA and to international law in that such extra-ordinary jurisdiction was not supported by any recognized jurisdictional principle in international law. *But see* discussion regarding arguable protective principle application to section 2, *infra* p. 115.

[128] 1988 IGA, supra note 12, at art. 22, § 2(b)(2).

"commensurate charges supported by the evidence."[129] This clause introduces the ambiguity of what constitutes "commensurate charges" and of which nation makes that determination.

The language of section 2 is wrought with ambiguities and uncertainty, making this extra-ordinary jurisdictional grant to only one of the original *ISS* Partners even more questionable. Even though the occurrence of criminal acts on board the *ISS* must have been viewed as a remote possibility in 1988 when the majority of *ISS* personnel were highly trained military or scientific persons, the Partners were clearly concerned with crimes being conducted on board the Space Station.[130]

Just as the language of section 2 is ambiguous, it is equally unclear from what international legal jurisdictional principle this extra-ordinary grant of United States criminal jurisdiction derives its basis. Section 2 clearly does not adhere to the territoriality principle nor the nationality principles. In fact, the United States is specifically permitted to exert its jurisdiction over offenses which occurred outside of its flight elements (territoriality principle), and over non U.S. nationals (nationality principle). Nor does section 2 invoke the passive personality principle, permitting the U.S. to exert its jurisdiction regardless of the nationality of the victim. Nor, can it be argued that "endangering the safety of the manned base or the crew members thereon" would transform such an offender into a *hostis humani generis*, thus invoking the universal principle of jurisdiction. Even if one were to argue that destroying an international space station would constitute a crime falling into the universally

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[129] *Id.* (emphasis added).

[130] John E. O'Brien, General Counsel, National Aeronautics and Space Administration, speaking in such capacity in 1987, and highlighting legal issues then facing the Space Station, noted that "we are faced with the fascinating range of criminal law issues, from serious criminal activities to simple misdemeanors." Reported in *The U.S./International Space Station: Aspects of Technology and Law*, 81 AM. SOC. INT'L PROC. 505, 508-510 (1987). Interestingly, O'Brien noted three possible solutions with regard to criminal jurisdiction over criminal offenses on board the *ISS*: jurisdiction in the state of the accused, with secondary jurisdiction in the state of the victim if original jurisdiction is waived by the accused; jurisdiction in the state with physical custody of the accused, also with certain possible secondary jurisdiction; and finally to simply ignore the subject in the IGA and "let the 'legal chips' fall where they may." *Id.* at 508-509. The extra-ordinary jurisdiction finally adopted by the 1988 IGA is, of course, none of these three.

condemned category,[131] the fact that only one Partner was granted the ability to exert such a jurisdiction flies directly in the face of the "universal" character of the universal principle of jurisdiction.[132]

One could, however, make the argument that the safety of the international space station, including United States components and crew, some of which certainly would be military officers with the rank of O-6 and above,[133] would constitute an attack which was directed against or threatened the integrity of the United States government.[134] Pursuant to such argument, the protective principle could be put forth as a foundation for this extra-ordinary grant of criminal jurisdiction to the United States by section 2 of Article 22 of the 1988 IGA.[135] Regardless of whether one accepts the protective principle as providing a jurisdictional basis for section 2 of Article 22 of the 1988 IGA or not, it does indeed stand as a questionable, if not dangerous precedent, in space law. Significantly, article 22 was completely redrafted in the 1998 IGA.

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[131] Absent the hijacking of the *ISS*, it is difficult to envision the application of universal jurisdiction to an offense occurring on the *ISS*. *See*, RESTATEMENT, *supra* note 20, § 404, at 255 for definition of "Universal Jurisdiction to Define and Punish Certain Offenses."

[132] Ratner, *supra* note 14, at 332-33 (rejecting nationality, territoriality, passive personality, protective and universal principles of jurisdiction in relation to § 2 of art. 22 of the 1988 IGA.) (emphasis added).

[133] Colonel in the United States Air Force, Army and Marine Corps. Captain in the United States Navy.

[134] McCord, *supra* note 29, at 1941 (arguing that "[t]he additional grant of criminal jurisdiction to the United States may derive from the protective principle of jurisdiction.").

[135] An additional argument for the protective principle would be that astronauts as per Article V of the 1967 Outer Space Treaty are to be regarded as "envoys of mankind." Attacks on a nation's envoys and diplomats can support the extension of criminal jurisdiction based upon the protective principle. *But see* Cheng, *supra* note 3, at 507 (for the proposition that the "envoy" language is merely a figure of speech and does not bestow upon the astronauts diplomatic protection). *See also* V. S. Vereshchetin, *Legal Status of International Space Crews*, PROCEEDINGS OF THE TWENTY-FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 164, 167 (noting that "[o]nly in the future, when flights to other planets become a reality, astronauts will represent mankind, Earthmen as a whole, and then this phrase of the Treaty will acquire its literal meaning.").

ARTICLE 22. 1998 IGA – CURRENT CRIMINAL JURISDICTION ON THE INTERNATIONAL SPACE STATION

Article 22 of the 1998 IGA, presents a framework for criminal jurisdiction in space which unlike its 1988 predecessor is and should be looked to as a building block for law in future space endeavors. Clearly the 1998 IGA reflects an arrangement where the Partners of the *ISS*, if not equal, are at least partners. The shift in thinking can even be seen in the change of the official name of the Agreement. Whereas the 1988 IGA listed the United States first, implicitly acknowledging the dominant role the United States was to play and receive pursuant to that Agreement, the 1998 Agreement lists the name of the Partners in alphabetical order.[136]

Section 1, Article 22. 1998 IGA - Nationality Principle

Section 1 of the 1998 Article 22 provides a simple and clear approach to criminal jurisdiction based upon the nationality principle. Section 1 reads in its entirety:

> In view of the unique and unprecedented nature of this particular international cooperation in space:
>
> 1. Canada, the European Partner States, Japan, Russia, and the United States may exercise criminal jurisdiction over personnel in or on any flight element who are their respective nationals.[137]

Unlike the equivalent 1988 section, section 1 of the 1998 IGA only provides for criminal jurisdiction based upon the nationality principle. It does not, as was the case in 1988, also

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[136] The official name of the 1998 IGA is: Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station. 1998 IGA, *supra* note 14.

[137] 1998 IGA, *supra* note 14, at art. 22, § 1 (note that "flight element" is not defined in either of the IGAs. The term is, however, used to indicate the various modules which each Partner is providing to the *ISS*. *See* 1998 IGA, *id*, at Annex, listing "Space Station Elements to be Provided by the Partners.")

adhere to the territorial principle.[138] Pursuant to the current jurisdictional framework of criminal jurisdiction in the *ISS*, each Partner may thus exercise criminal jurisdiction over its nationals regardless of on or in which flight element that national may commit an offense. This primary jurisdiction based on nationality is untempered. There are no consulting requirements or other limitations. Regardless of where on the *ISS* a Partner's national may commit an offense, that Partner has primary criminal jurisdiction over such national.

The absence of territoriality in the realm of criminal jurisdiction is especially interesting considering that Article 5 remained unchanged.[139] Thus, under the 1998 IGA, each partner "retain[s] jurisdiction and control over the elements it registers...and over personnel in or on the Space Station who are its nationals."[140] However, this general grant of jurisdiction, is subject to "any relevant provisions" of the IGA.[141] Viewed in this context, it becomes clear that section 1 of Article 22 does indeed temper Article 5's grant of general jurisdiction by removing the territorial principle of jurisdiction as a primary untempered jurisdiction, but only as it pertains to a Partner's exertion of its criminal jurisdiction. Interestingly, the *ISS* Partners, according to the general jurisdictional language of Article 5, read in conjunction with section 1 of article 22, can thus claim civil jurisdiction based upon territoriality, but criminal jurisdiction only based upon nationality.

Section 2, Article 22. 1998 IGA - Secondary Criminal Jurisdiction: Passive Personality and Territorial

The limitation of nationality of section 1 is, however, broadened by the language of section 2 which permits an affected Partner to exercise criminal jurisdiction over non-nationals under certain instances. Section 2 thus provides for concurrent jurisdiction between two or more Partner States, and estab-

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[138] 1988 IGA, *supra* note 12, at art. 22, §1.
[139] *See* discussion pertaining to Article 5, *supra*, p. 107.
[140] 1998 IGA, *supra* note 14, at art 5, § 2.
[141] *Id.*

lishes an equitable framework for deciding which of those Partners should exercise jurisdiction. In this regard, section 2 of Article 22 of the 1998 IGA is a clear and dramatic improvement over the unequal and ambiguous language of the 1988 Agreement. Section 2 reads in its entirety:

> 2. In a case involving misconduct on orbit that: (a) affects the life or safety of a national of another Partner State or (b) occurs in or on or causes damage to the flight element of another Partner State, the Partner State whose national is the alleged perpetrator shall, at the request of any affected Partner State, consult with such State concerning their respective prosecutorial interests. An affected Partner State may, following such consultation, exercise criminal jurisdiction over the alleged perpetrator provided that, within 90 days of the date of such consultation or within such other period as may be mutually agreed, the Partner State whose national is the alleged perpetrator either:
>
> (1) concurs in such exercise of criminal jurisdiction, or
>
> (2) fails to provide assurances that it will submit the case to its competent authorities for the purpose of prosecution.[142]

If indeed Article 22 of the IGA will be looked to as a guide for future frameworks of criminal jurisdiction in space, the superior drafting of section 2, bringing together several different concepts into one well-reasoned and well-balanced policy, will likely not go unnoticed.

Section 2 broadens the possible criminal jurisdiction on board the Space Station from nationality as per section 1 to include both the passive personality[143] and the territorial principles.[144] As with nationality, both these principles have been traditionally recognized and or used to various degrees by all of the

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[142] 1998 IGA, *supra* note 14, at art. 22, § 2.

[143] 1998 IGA, *supra* note 14, at art. 22, § 2 ("In a case involving misconduct on orbit that: (a) *affects the life or safety of a national of another Partner State...*") (emphasis added).

[144] 1998 IGA, *supra* note 14, at art. 22, § 2 ("In a case involving misconduct on orbit that:...(b) *occurs in or on or causes damage to the flight element of another Partner State...*") (emphasis added).

ISS Partners. Including both these principles as bases for criminal jurisdiction on board the *ISS* is thus both reflective of common sense and logic. Interestingly, the language establishing the territorial principle jurisdiction invokes both the subjective territorial principle and the objective territorial principle.[145]

In a case involving an offender from one Partner State, that Partner has primary criminal jurisdiction over its national.[146] As per section 2, however, that Partner, at the request of any affected Partner State, that is, a Partner State whose national was a victim of the alleged criminal conduct, or on whose flight element the offense occurred, must consult with the affected Partner as to their "respective prosecutorial interests."[147] The affected Partner may then exercise criminal jurisdiction over the alleged perpetrator provided that within 90 days from such consultation, or another time frame agreed upon, the Partner State whose national committed the offense, either agrees to the affected Partner exercising its jurisdiction, or fails to provide assurances that it will submit the offender to its proper authorities for the purpose of prosecution.[148]

This is a much improved method of allocating the actual exercise of criminal jurisdiction between the primary (nationality) and the secondary or affected (passive personality and territorial) Partner States. Instead of one Partner being able to override any other Partner's ability to exercise jurisdiction on board the *ISS*, all Partner States, when placed in the role of an "af-

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[145] *Id.* The subjective territorial principle is invoked by the "occurs in or on" language, while the objective territorial principle is invoked by the "or causes damages to the flight element of another Partner State."

[146] 1998 IGA, *supra* note 14, at art. 22, § 1.

[147] 1998 IGA, *supra* note 14, at art. 22, § 2 "...the Partner State whose national is the alleged perpetrator shall, at the request of any affected Partner State, consult with such State concerning their respective prosecutorial interest." (Emphasis added.) Note that such consultation is mandatory. While the extent of the consultation is not prescribed, it does not need to be. The Partners have not only an incentive to conduct their behavior in an appropriate way in order to maintain a working relationship in space, but also a duty under international law to adhere to the treaty in good faith. *See* discussion of *pacta sunt servanda* doctrine, *supra* note 91.

[148] 1998 IGA, *supra* note 14, at art. 22, § 2. Note all that is needed is the assurance the offender will be submitted to the proper authorities for the purpose of prosecution, not the assurance that the offender will actually be prosecuted. Presumably, and assuming good faith, the extent of the prosecution will have been discussed and or agreed upon during the required consultation of § 2.

fected Partner", will have an equal opportunity to decide which Partner has the greatest prosecutorial interest in proceeding with the prosecution. Although the Partner State whose national was the alleged offender is provided a veto right over any other affected Partner State exercising criminal jurisdiction over its national by declining to provide concurrence as per section (2)(a) and/or providing assurance it will submit the case to its competent authorities for the purpose of prosecution,[149] every Partner State is given the same and equal veto ability. Regardless of whether primary criminal jurisdiction should lie based upon the territoriality, nationality or passive personality principle, whatever basis is chosen pursuant to an international agreement among *Partners*, should be one founded upon equality and fairness. This is especially true when the unlikelihood of a true irresoluble dispute as to who should exercise criminal jurisdiction over a criminal offense which may occur on board the *ISS*, is balanced with the tensions which will eventually and invariably arise out of an inherently unequal application of criminal jurisdiction. While an unequal distribution of use of the various components of the *ISS* may be equitable and acceptable in relation to which Partner provides what percentage of the flight elements, an unequal allocation of something as fundamental to human society as the exertion of criminal jurisdiction is not.

An additional improvement of the 1998 language of Article 22, section 2, is that the ambiguous and unclear language of section 2 of article 22 of the 1988 IGA has been removed. Any international tribunal interpreting the language would not need to go beyond the actual language of the article. It is this clarity, as well as the equitable substance, which lends Article 22 of the 1998 IGA to adoption in future criminal space jurisdiction contexts.

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[149] Note that although the language joining subsections (1) and (2) of § 2 of art. 22 is disjunctive, i.e. "or," the action specified to be taken by the nationality Partner State is actually of a disjunctive/conjunctive nature. In other words, the nationality state either concurs in the affected Partner exercising criminal jurisdiction, in which case the nationality Partner State presumably fails to provide assurances as per subsection (2), or the nationality Partner State does not concur but also fails to provide a subsection (2) assurance of prosecution.

Section 3, Article 22. 1998 IGA - Extradition

In addition to revising sections 1 and 2 of Article 22, the drafters of the 1998 IGA, also added three additional sections. The first of these new sections deals exclusively with extradition. Section 3 of Article 22 of the 1998 IGA enables an *ISS* Partner which does not have an extradition treaty with another IGA Partner, to consider the IGA as the legal basis for an extradition request for misconduct occurring on the *ISS*. Section 3 reads in its entirety.

> 3. If a Partner State which makes extradition conditional on the existence of a treaty receives a request for extradition from another Partner State with which it has no extradition treaty, it may at its option consider this Agreement as the legal basis for extradition in respect of the alleged misconduct on orbit. Extradition shall be subject to the procedural provisions and the other conditions of the law of the requested Partner State.[150]

The ability of a Partner State to consider the IGA "as the legal basis for extradition,"[151] when it receives an extradition request "from another Partner State with which it has no extradition treaty,"[152] may in fact explain why this section was added to Article 22 in the 1998 IGA.[153] As early as 1987, prior to the signing of the 1988 IGA, the issue of "extradition treaties or lack thereof between nations represented on the space station" was recognized as one of the criminal law issues which the Partners would have to face.[154] The Partners chose not to address the issue of extradition in the 1988 IGA. However, with Russia emerging from the dissolution of the former USSR,[155] and joining

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[150] 1998 IGA, *supra* note 14, at art. 22, § 3.

[151] *Id.*

[152] *Id.*

[153] *But see* author's note *supra* note 108.

[154] O'Brien, *supra* note 130, at 508.

[155] The USSR was officially dissolved on December 8, 1991 when representatives from the Republic of Belarus, the Russian Federation, and the Ukraine (the original signatories to the Union Treaty of 1912 which created the USSR), "proclaimed the USSR 'as a subject of international law and a geopolitical reality no longer exists.'" George Miron, *Did the AMB Treaty of 1972 Remain in Force After the USSR Ceased to Exist in December 1991 and Did it Become a Treaty Between the United States and the Russian*

the *ISS*, the Partners presumably no longer could ignore the issue. If nothing else, Russia did not in 1998 and does not now, have an extradition treaty with the United States.[156] To provide a framework for criminal jurisdiction on the *ISS*, without providing for a means to actually implement prosecutions pursuant to such jurisdiction between the two dominant Partner States, would be pointless.

If the first part of Section 3 of Article 22 of the IGA took the law of extradition from the "world of horse and buggy and the steamship"[157] literally into the space age, then the second part of section 3 conditioning IGA based extraditions upon the "procedural provisions and the other conditions of the law of the requested Partner State,"[158]ensured that any anticipated ease of *ISS* extraditions would not be. Traditional issues such as one nation refusing to extradite their own nationals or other nations refusing to extradite to a nation which imposes certain punishments, still remain.[159] This is, however, no different than extradition on Earth. Interestingly, while Article 13 of the 1996 Russian Criminal Code does prohibit the extradition of Russian nationals for crimes they commit in a foreign country,[160] Article 15 of the Russian Constitution also provides that recognized principles of international law and international treaties are part of the Russian legal system, and that "[i]f an international treaty of the Russian Federation stipulates other rules than those

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Federation?", 17 AM. U. INT'L L. REV. 189, 211 (2002) (citing to Agreement Establishing the Commonwealth of Independent States, Dec. 8, 1991, 31 I.L.M. 143).

[156] CarrieLyn Donigan Guymon, *International Legal Mechanisms for Combating Transnational Organized Crime: The Need for a Multilateral Convention*, 18 BERKELEY J. INT'L L. 53, 84-85 (2000). Russia and the United States did, however, enter into a Mutual Legal Assistance Treaty in 2001, with Senate approval on December 19, 2001. *See* Thomas G. Snow, *The Investigation and Prosecution of White Collar Crime: International Challenges and the Legal Tools Available to Address Them*, 11 WM. & MARY BILL RTS. J. 209, 210, n.6 (2002).

[157] Guymon, *supra* note 156, at 81, quoting from a letter from former U. S. Attorney-General Benjamin R. Civiletti to Senator Edward Kennedy, and citing to Geoff Gilbert, Aspects of Extradition Law 21 (1991), noting that even countries which are party to extradition treaties "frequently refuse extradition requests on a variety of grounds." *Id.*

[158] 1998 IGA, *supra* note 14, at art. 22, § 3.

[159] Guymon, *supra* note 156, at 81

[160] *See* Larissa C. Earl, Note, *Loosening Organized Crime's Stranglehold on the Russian Economy: Current Efforts and Suggested Strategies*, 31 LAW & POL'Y INT'L BUS. 99, 116 (1999).

stipulated by law, the rules of the international treaty shall apply."[161] It thus seems that an extradition request from a Partner to Russia for a Russian national would in fact be honored.[162]

Sections 4 and 5, Article 22. 1998 IGA - Assistance and Crew Code of Conduct

In addition to section 3 dealing specifically with extraditions, section 4 of Article 22 also mandates that each Partner shall provide assistance to one other in connection with misconduct on-orbit.[163] Section 4 stands on its own, and does not specifically refer to any of the sections preceding it, nor the section following it. However, providing assistance in connection with misconduct on-orbit is clearly connected to both the exertion of criminal jurisdiction over conduct on board the *ISS*, including extradition, as well as maintaining order pursuant to the Crew Code of Conduct. In connection with the maintenance of order pursuant to command authority, section 5 makes it clear that Article 22 does not limit the authority or procedures for maintaining order on the *ISS* pursuant to the Code of Conduct, nor

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[161] *See* Michael J. Kelly, *Cheating Justice by Cheating Death: The Doctrinal Collision for Prosecuting Foreign Terrorists - Passage of Aut Dedere Aut Judicare Into Customary Law and Refusal to Extradite Based on the Death Penalty*, 20 ARIZ. J. INT'L & COMP. L. 491, 517 & n.151 (2003) (citing to KONST. RF §1, ch. 1, art. 15, pt. 4). Note also that the 2002 Russian Criminal Procedure Code, Article 2 –"Operation of the Criminal Procedure Law in Space," similarly mandates that "[p]roceedings on a criminal case on the territory of the Russian Federation, regardless of the place of committing the crime, shall be conducted in conformity with this Code, unless otherwise stipulated by an international treaty of the Russian Federation." *See* Leonard Orland, *A Russian Legal Revolution: The 2002 Criminal Procedure Code*, 18 CONN. J. INT'L L. 133, 161 (2002) (emphasis added).

[162] *See also generally* art. 1, §2 of the Law of the Russian Federation on Space Activity, holding that "[s]pace activity under the jurisdiction of Russian Federation shall also be regulated by other laws and normative acts of Russian Federation issued in accordance with the Constitution of Russian Federation and this law." LAW OF THE RUSSIAN FEDERATION, art. 1, §, "About Space Activity," unofficial translation, *at* http://www.oosa.unvienna.org/SpaceLaw/national/russian_federation/decree_5663-1_E.html.

[163] 1998 IGA, *supra* note 14, at art. 22, § 4 (reads in its entirety: "Each Partner State shall, subject to its national laws and regulations, afford the other Partners assistance in connection with alleged misconduct on orbit.").

that the Code of Conduct is intended to limit the application of Article 22.[164]

CREW CODE OF CONDUCT AND COMMAND AUTHORITY

While Article 22 of the 1998 IGA provides the framework for criminal jurisdiction on board the *ISS*, the Partners have also established a Crew Code of Conduct (CCOC). It provides, among other things, the parameters of the command authority on board the *ISS*.[165] Article 11 of the 1998 IGA calls for a code of conduct to be "developed and approved by all the Partners in accordance with the individual Partner's internal procedure, and in accordance with the MOUs."[166] Each of the MOUs recognizes Article 11 of the IGA, and notes that a "Space Station Code of Conduct will be developed by the Partners," and that such Code will, among other things "set forth disciplinary regulations....and provide the Space Station Commander appropriate authority and responsibility, on behalf of all the partners, to enforce safety procedures, physical and information security procedures and crew rescue procedures for the Space Station."[167]

The CCOC was approved on September 15, 2000 by the Multilateral Coordination Board.[168] In accordance with section 2

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[164] *Id.* at art. 22, § 5. § 5 reads in its entirety: "This Article is not intended to limit the authorities and procedures for the maintenance of order and the conduct of crew activities in or on the Space Station which shall be established in the Code of Conduct pursuant to Article 11, and the Code of Conduct is not intended to limit the application of this Article."

[165] The Crew Code of Conduct also extends to pre and post flight operations. *See* 14 C.F.R. § 1214.403(1)(B) - Scope and Content.

[166] 1998 IGA, *supra* note 14, at art. 11, § 2.

[167] MOU U.S.-Russ., *supra* note 117, at art. 11.9. *See also* MOU U.S.-Japan, *supra* note 94, at art. 11.8; MOU U.S.-ESA, *supra* note 86, at art. 11.8, and Memorandum of Understanding Between the National Aeronautics and Space Administration of the United States of America and the Canadian Space Agency Concerning Cooperation on the Civil International Space Station, art 11.8, *available at* ftp://ftp.hq.nasa.gov/pub/pao.reports.1998.nasa_csa.html, The pertinent language is identical in the above mentioned MOUs, with the exception that article 11.8 of the MOU U.S.-Japan substitutes "...crew rescue procedures in or on the Space Station" for "crew rescue procedures for the Space Station."

[168] The Multilateral Coordination Board (MCB) is "the highest level cooperative body established by the Memoranda of Understandings (MOUs) pertaining to the International Space Station." *See* A. Farand, *The Code of Conduct for International Space Station Crews*, EUROPEAN SPACE AGENCY (ESA) BULLETIN, Bulletin 105, at 64 (Feb. 2001),

of Article 11 of the 1998 IGA which requires each Partner to "ensure that its crew members observe the Code of Conduct,"[169] each Partner has taken steps to adopt the CCOC into a formal requirement. In the United States, the Code of Conduct has become part of an astronaut's terms and conditions of employment.[170] It is also published as a Federal Regulation,[171] the violation of which is subject to criminal penalty of a fine or imprisonment of not more than one year.[172] In this respect, the United States does indeed support the CCOC through the assertion of criminal jurisdiction on board a shuttle flight. The respective Partners have also adopted the CCOC by incorporating it into their astronaut / cosmonaut terms of employment.[173]

The CCOC establishes "a clear chain of command on-orbit,"[174] "set[s] forth disciplinary regulations,"[175] and defines the

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at esapub.esrin.esa.it/bulletin/bullet105/faran105.pdf. *See also* arts. 8.1 of each MOU for reference to establishment and duties of the MCB.

[169] 1998 IGA, *supra* note 14, at art. 11, § 2.

[170] Farand, *supra* note 168, at 68.

[171] 14 C.F.R. § 1214.403 – "Code of Conduct for the International Space Station Crew."

[172] *See* 14 C.F.R. § 1214.404 (providing that the subpart containing the Code of Conduct is a regulation within the meaning of 18 U.S.C. § 799, the violation of which can result in a fine or imprisonment of not more than one year).
See also 14 C.F.R. § 1214.704 which reads in its entirety:

> (a) All personnel on board a Space Shuttle flight are subject to the authority of the commander and shall conform to his/her orders and direction as authorized by this subpart.
>
> (b) This regulation is a regulation within the meaning of 18 U.S.C. 799, and whoever willfully violates, attempts to violate, or conspires to violate any provision of this subpart or any order or direction issued under this subpart shall be fined not more than $5,000 or imprisoned not more than 1 year, or both."

See also 18 U.S.C. § 799 which reads in its entirety:

> Whoever willfully shall violate, attempt to violate, or conspire to violate any regulation or order promulgated by the Administrator of the National Aeronautics and Space Administration for the protection or security of any laboratory, station, base or other facility, or part thereof, or any aircraft, missile, spacecraft, or similar vehicle, or part thereof, or other property or equipment in the custody of the Administration, or any real or personal property or equipment in the custody of any contractor under any contract with the Administration or any subcontractor of any such contractor, shall be fined under this title, or imprisoned not more than one year, or both.

[173] Farand, *supra* note 168.

[174] 14 C.F.R. § 1214.403(I)(B).

[175] *Id.*

responsibilities of the *ISS* crewmember,[176] as well as the authority and the responsibility of the *ISS* Commander.[177] It also specifically notes that the CCOC "shall not limit the application of Article 22 of the IGA."[178] Thus, while an offense against Article 22 could also constitute an infraction against the CCOC, the CCOC is clearly geared more towards ensuring that the *ISS* Commander has the appropriate and necessary authority to ensure the proper and successful completion of the mission, rather than to ensure a subsequent punishment pursuant to a Partner State's criminal code, as is the case with Article 22. The regulatory rather than punitory nature of the CCOC, is evidenced in both the CCOC's emphasis on crewmembers being able to "maintain a harmonious and cohesive relationship,"[179] as well as in a disciplinary policy which is "administrative in nature" in that it may "affect the flight assignments" of an *ISS* crewmember."[180] However, regardless of what punishment an offending crewmember may receive as a result of an infraction of the CCOC, the Cooperating Agency is not limited in its right to apply all relevant laws or regulations.[181]

In enforcing his or her command authority pursuant to the CCOC, the mission commander "shall have the authority to use any reasonable and necessary means to fulfill his or her responsibilities."[182] Whether this authorizes the commander to use force on board the *ISS*, was a matter of contention among the Partners during the development of the CCOC.[183] Some feared the inclusion of any language endorsing the use of force on board the *ISS*, while others argued a specific exclusion of such

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[176] 14 C.F.R. § 1214.403(II)(A).

[177] 14 C.F.R. § 1214.403(III)(A).

[178] 14. C.F.R. § 1214.403(I)(B).

[179] 14 C.F.R. § 1214.403(II)(B) - *General Rules of Conduct*, notes that "ISS Crewmembers' conduct shall be such as to maintain a harmonious and cohesive relationship among the ISS crewmembers and an appropriate level of mutual confidence and respect through an interactive, participative, and relationship-oriented approach which duly takes into account the international and multicultural nature of the crew and mission."

[180] 14 C.F.R. § 1214.403(IV). The disciplinary policy is developed by the Multilateral Crew Operations Panel and approved by the Multilateral Coordination Board.

[181] *Id.* Cooperating Agencies are the Partners respective space administration agencies.

[182] 14. C.F.R. § 1214.403 (III)(A)(2)(c).

[183] Farand, *supra* note 168, at 66.

language would preclude the use of any force on board the *ISS* in the future, including physical restraint.[184] The resulting language was part of a compromise which also included an interpretive statement in the minutes of the Multilateral Coordination Board that "[i]n cases where necessary to ensure the immediate safety of the Crew Members of the *ISS*, reasonable and necessary means may include physical force or restraint."[185] This was a proper compromise. If indeed the Partners visualized the potential need for the application of criminal jurisdiction on board the *ISS*, then surely the commander must also have the ability to use whatever means necessary, including force, to maintain order and a harmonious working relationship.

CONCLUSION

The reality of human nature is such that as humankind settles in space, whether on celestial objects such as the Moon or planets, or in space stations orbiting planets or traversing into the unknown, law and order must be maintained on board these settlements. How such order is maintained, and what law will be used to do so, will by necessity, and ideally by choice, be the result of careful thought, consideration, and negotiation. As the process begins for the formulation of criminal jurisdiction on board the next frontier in space, the negotiators blessed to be able to partake in the creation of these parameters, have before them two processes created ten years apart. The first, the criminal jurisdiction of the 1988 IGA, should be viewed as a step backwards not to be emulated. The second, the criminal jurisdiction of the 1998 IGA, should not only be emulated, but also acknowledged for what it is - a giant leap forward for humankind in terms of criminal jurisdiction in space.

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[184] *Id.* at 66-67.
[185] *Id.*

LIABILITY FOR GLOBAL NAVIGATION SATELLITE SERVICES: A COMPARATIVE ANALYSIS OF GPS AND *GALILEO*

Frans G. von der Dunk[*]

I. INTRODUCTION: GLOBAL NAVIGATION SATELLITE SERVICES AND LIABILITY

The law relating to global navigation satellite systems, (GNSS) is a novel and complex subject. As a result, this paper addresses a considerable number of issues from a new, as of yet untested legal perspective. It will also address a number of altogether new issues which, from a legal perspective, have been dealt with often in other areas of law.

Global navigation satellite systems are being used for a very rapidly growing plethora of applications and, thus, also cause a rapidly growing plethora of legal issues to arise. These range from general institutional and jurisdictional ones, to such concrete aspects as certification, security, intellectual property rights and data protection. These issues, moreover, firstly, interplay with each other; secondly, do so at various levels (international/global, to some extent European, that is European Community, and national); and thirdly, do so in a number of respects across a number of economic sectors, transport and non-transport.

To address relevant legal issues, this paper will lay out the essence of a global navigation satellite system, how it basically operates at an abstract and non-technical level, and then will chart specific legal ramifications onto this analysis.

The first economic sector to acknowledge the potential benefits of global navigation satellite systems (timing, positioning and navigation-related services) was indeed a transport sec-

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tor: aviation. In 1983 the International Civil Aviation Organisation (ICAO) established a Committee on Future Air Navigation Systems (FANS)[1] which *inter alia* was to identify possible benefits, risks and drawbacks of the use of global navigation satellite systems for aviation purposes, and came forward with recommendations for dealing with them properly.[2]

Concurrently, because of the high degree of safety-sensitivity in the aviation sector, it quickly became clear that one of the major issues would be that of liability: who pays for the damage in case an aircraft accident is ultimately caused by wrongful or absent navigation information at a critical point in flight operations?

For example, efforts have been made at least in writing to establish liability for such damage on the basis of the Convention on International Liability for Damage caused by Space Objects (Liability Convention)[3], as constituting "damage caused by [a] space object".[4] Others contended that air law would be the more appropriate place to establish liability – if any – as resting upon the providers of the relevant satellite signals, leading some to further conclude that indeed no such direct liability existed in the first place.[5]

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[1] See e.g. *in extenso* BOAKYE DANQUAH KOFI HENAKU, THE LAW ON GLOBAL AIR NAVIGATION BY SATELLITE: AN ANALYSIS OF LEGAL ASPECTS OF THE ICAO CNS/ATM SYSTEM, (AST Law Monographs, Leiden 1998).

[2] Later, the FANS-concept evolved into the more encompassing one of Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM), and *inter alia* a Legal Technical Expert Panel (LTEP) was established to make sure all relevant legal aspects were considered. Also, efforts were made in the ICAO Standards and Recommended Practices (SARPs) to accommodate the possible usage of GNSS.

[3] Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].

[4] *Id.* at art. II. *See also* Henaku, *supra* note 1, at 221.

[5] *See* Michael Milde, *Air Navigation and Safety: Institutional and Legal Problems of the Global Navigation Satellite System*, IV TEMAS DE AVIACIÓN COMERCIAL Y DERECHO AERONÁUTICO Y ESPACIAL 134-5 (2000). It may be noted here, that under Art. 20(2) of the Convention for the Unification of Certain Rules Relating to International Transportation by Air, Oct. 12, 1929, 49 Stat. 3014, 137 L.N.T.S. 11 [hereinafter Warsaw Convention], "negligent pilotage or negligence in the handling of the aircraft or in navigation", did relieve the carrier of liability. Whereas, under Art. X of the Protocol to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air Signed at Warsaw on Oct. 12, 1929, Oct. 28, 1955, 478 U.N.T.S. 371 [hereinafter Hague Protocol], this provision was not maintained.

Currently, there are two global navigation systems in existence: the U.S. Global Positioning System (GPS)[6] and the Russian GLONASS system[7]. The Russian constellation, for economic reasons, could not be replenished when consecutive satellites ended their operational life, therefore, the discussion on liability for global navigation satellite systems in the context of aviation has largely focused on GPS. In ICAO, for instance, many member states have expressed their hesitation to accept GPS as a structural component of air traffic services unless there would be some sort of international liability established for the provider(s) of system signals, specifically, the United States, preferably in the form of an international treaty.[8]

With the advent of *Galileo*, the third global navigation system due to be operational by 2008 or shortly thereafter[9], this discussion entered into a new phase, for two reasons. Firstly, the civil use of GPS in the context of safety-sensitive, highly-regulated and world-wide applications remains essentially confined to aviation. Other areas making substantive use of GPS are either not internationally and heavily regulated, such as maritime transport, or they concern non-professional areas such as private car-driving or yachting. By contrast, *Galileo* from the start was aimed at providing services to a number of other

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[6] GPS is a 24-satellite constellation fully operational as of 1994. The system, developed for military purposes and operated under the *aegis* of the Department of Defense, in addition to a Precise Positioning Service (PPS) only available to the military, offers a Standard Positioning Service (SPS) available to civil users such as commercial aviation. U.S. President Clinton in 1996 offered such use for a period of at least ten years free of charge by means of The White House Office of Science and Technology Policy National Security Council, *Fact Sheet U.S. Global Positioning System Policy*, Mar. 29, 1996.

[7] GLONASS was launched as a 24-Satellite system quite similar to GPS by the former Soviet Union, and became operational as of 1995. Equally developed by the military (space) forces, the GLONASS system is ultimately controlled by the Russian Ministry of Defence, and emits both civil and military (encoded) signals. *See* Decree of the Government of the Russian Federation, Sobr. Zakonod. RF, 1995, No. 237. *See generally, e.g.*, Patrick Salin, *Regulatory Aspects of Future satellite Air Navigation Systems (FANS) on ICAO's 50th Birthday*, 44 ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT 174-175 (1995).

[8] *See, e.g.*, Francis P. Schubert, *An International Convention on GNSS Liability: When Does Desirable Become Necessary?*, XXIV ANNALS OF AIR AND SPACE LAW 245 (1999); *See also* Milde, *supra* note 5, at 132.

[9] *See e.g., Transport and Telecommunications*, 2420th Council Mtg, Doc. 7282/02 (Presse 78), 19-21 (Mar. 25-26, 2002); Council Regulation 876/2002/EC on setting up the Galileo Joint Undertaking , 2002 O.J. (L 138/1).

transport applications such as high-speed trains or vessels as well as non-transport applications like time synchronisation, mobile phones, building, and banking. Secondly, in addition to free signals roughly similar to the free GPS Standard Positioning Signals (SPS) signals, *Galileo* will provide a few categories of signals namely services against payment for which it also will have to accept a certain liability.[10]

II. THE CONCEPT OF LIABILITY IN A GLOBAL NAVIGATION SATELLITE SYSTEM CONTEXT

When analysing liability for system signals and/or services that use those signals as crucial elements, on the one hand, global navigation systems do not and will not start operating in a legal or regulatory vacuum. On the other hand, most of existing law and regulation is non-global navigation satellite system-specific. In many cases, the advent of global navigation satellite systems on the scene merely adds another potential ultimate cause of damage to those already in existence such as traditional navigation errors, human errors, engine failure or *force majeure*, rather than leading to a fundamentally different, or separate legal paradigm.[11]

The legal environment within which GPS now and *Galileo* will soon operate actually comprises a wide range of separate and separately developed specific legal environments, none of which were developed principally with global navigation satellite systems in mind. Yet all of them potentially or actually impact upon global navigation satellite systems and its applications. This includes liability. Most of these environments are nationally defined. That is, they operate only within the territory of one particular state even if occasionally, as in air and space law, international regimes are superimposed. At the same

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[10] *Cf.* already GALILEO Mission Requirements Document Issue 5, E.C./ESA, Rev. 1.1 (Mar. 27, 2003); GALILEO Mission High Level Definition, E.C./ESA, Sept. 23, 2002; or extensively the "Recommendations and Conclusions" arising from Task I, *Legal and Institutional Issues*, of the GALILEI Study Cluster, DD-120, v. 2.1, July 24, 2003 [hereinafter Recommendations and Conclusions]. *See further infra* section 6, focusing on this issue.

[11] *Cf. also* Milde, *supra* note 5, at 134.

time, a global navigation satellite system is inherently global, and both GPS and *Galileo* address global markets.

In view of such complexity, it is helpful to briefly consider the concept of liability which is a term used in numerous national and international legal regimes.[12] In each case, however, it may be differently interpreted and applied with the consequence that, at the international level, quite often a large measure of confusion has arisen as to the scope, meaning and consequences in law of liability. Generally, "liability" is defined as a "condition of being responsible for a possible or actual loss, penalty, evil, expense or burden", and as "the state of being bound or obliged in law or justice to do, pay, or make good something".[13] In the context of *Galileo*, this definition has been elaborated as: "the accountability of a person or legal entity to compensate damage caused to another person or legal entity, in accordance with specified legal principles and rules and based upon specified sources of law."[14] Thus, liability depends upon a specific legal regime, which itself determines the boundaries of the particular liability regime at issue regarding where it applies, which persons or legal entities are involved, what type of liability is provided for, and how compensation is being dealt with.

From the perspective of seeing which liability regimes do or might apply to a GNSS and how they would apply, the fundamental threefold distinction between contractual liability, non-

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[12] *Cf. eg.*, the authors *Liability and Responsibility in Space Law: Misconception or Misconstruction?*, PROCEEDINGS OF THE THIRTY-FOURTH COLLOQUIUM ON THE LAW OF OUTER SPACE 363-71 (1992).

[13] BLACK'S LAW DICTIONARY 823 (5th ed. 1979); WEST'S LAW & COMMERCIAL DICTIONARY IN FIVE LANGUAGES: DEFINITIONS OF THE LEGAL AND COMMERCIAL TERMS AND PHRASES OF AMERICAN, ENGLISH AND CIVIL LAW JURISDICTIONS Vol. II, p. 47 (1983), referring to, respectively, Union Oil Co. of California v. Basalt Rock Co., 30 Cal. App.2d 317, 319 - 20 (1939), and Fidelity Coal Co. v. Diamond, 310 Ill. App. 387 (1941) [hereinafter WEST'S LAW & COMMERCIAL DICTIONARY].

[14] Recommendations and Conclusions, *supra* note 10, at 101. See also, Cooperation Agreement on a Civil Global Navigation Satellite System (GNSS) – Galileo Between the European Community and its Member States and the People's Republic of China, art. 2(i), Doc. Council of the EU 13324/03 (Oct. 30, 2003) (defines liability as: "the legal accountability of a person or legal entity to compensate for damage caused to another person or legal entity in accordance with specific legal principles and rules. This obligation may be prescribed in an agreement (contractual liability) or in a legal norm (non-contractual liability).").

contractual liability and product liability should also be noted. The key issue distinguishing the three types of liability focuses on the legal relationship between the claimant and the defendant.

"Contractual liability," for purposes of this paper, is defined as "the liability which arises from a contract or agreement," and thus fundamentally deals with liability as between parties to a contract regarding activities undertaken in relation to damage suffered in the context of the contract and its subject matter.[15] Contractual liability is essentially a term coming from national law, and, by way of common denominator is explicit, formalised and already in existence at the time the relevant accident leading to damage occurs. Hence, for the purpose of analysis here, it coincides in a principled sense with inter-party liability as it is often discussed on the public international level, where international treaties between states would essentially take the place of contracts. From a legal point of view, dealing with contractual liability is a matter of the freedom of parties to contract between themselves. This freedom may only be restricted by overriding public interests in contracts being generally fair, if indeed such public interests are expressed through law or other legally binding documents.

In view of the above definition of "contractual liability" non-contractual liability would then be liability for damage occurring outside a contractual relationship. This occurs where the person or entity suffering the damage is not formally or contractually related to the person or entity causing it, and is likely unaware of the possibility of damage occurring nor is able to take precautionary measures against it.[16] Thus, it equates at this level of abstraction with the tort liability[17] of national legal

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[15] BLACK'S LAW DICTIONARY, *supra* note 13, at 295, and WEST'S LAW & COMMERCIAL DICTIONARY, *supra* note 13, at Vol. I, p. 339, which define "contractual obligation" as "the obligation which arises from a contract or agreement." *See also* Recommendations and Conclusions, *supra* note 10, at 102.

[16] Recommendations and Conclusions, *supra* note 10, at 102.

[17] "Tort" is defined as, "a private or civil wrong or injury, other than breach of contract, for which the court will provide a remedy in the form of an action for damages". BLACK'S LAW DICTIONARY, *supra* note 13, at 1334; WEST'S LAW & COMMERCIAL DICTIONARY, *supra* note 13, at Vol. II, p. 660.

systems, respectively the third-party liability known in international law. Its common denominator would thus be that the legal relationship is implicit, not formalised and solely based on the fact that one party is the proven cause of the damage sustained by the other party.

As a consequence, protecting the interests of third parties through non-contractual liability regimes is a public matter, to be taken care of preferably by legislative means, since by definition entities cannot protect their interests by contract or otherwise. Hence, this is also the type of liability which a public legislative document on the international level is most often concerned with, although exceptions exist, such as most notably the Warsaw system on contractual liability in international air transport.[18] On the national level, this equates with the need for, preferably, a clear written law or statute, or in common law countries at least clear jurisprudence and customary law.

"Product liability" is defined as, "the legal liability of manufacturers and sellers to compensate buyers, users, and even bystanders, for damages or injuries suffered because of defects in goods purchased".[19] Thus, as also dealt with in the context of *Galileo*,[20] it is of a different nature; not imposing liability upon someone for activities undertaken and damage suffered as a consequence, but imposing it upon someone having manufactured and/or sold a product by which, in the course of using it, damage has been caused. In a sense this constitutes an indirect form of liability, as the occurrence which triggers liability claims may take place long after the manufacturer or seller – the entity to be held liable – has had any involvement with the product. The relevant legal relationship here is effectively created through the product concerned. Also, product liability, even if elements may have found their way into contracts for the sale of the product in the last resort is a matter of general public interests being preserved through the enunciation of explicit law.

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[18] *See* further *supra* note 5, *infra* note 48, and accompanying text.

[19] BLACK'S LAW DICTIONARY, *supra* note 13, at 1089, and WEST'S LAW & COMMERCIAL DICTIONARY, *supra* note 13, at Vol. II, p. 358.

[20] *See also* Recommendations and Conclusions, *supra* note 10, at 102.

III. GPS AND THE LEGAL/FUNCTIONAL MODEL

This section applies liability to the context of global navigation systems, particularly GPS as it is the first fully operational version.

To properly apply current liability concepts to GPS it is helpful to refer to the Legal/Functional Model (Model) for a global navigation satellite system and its activities which was developed for the European Commission.[21] It is based upon the fundamental categories of players and their ensuing legal relationships. In view of the definition of liability provided above, this Model should help in answering the salient overarching – but rather broad – question on liability issues in the context of GPS. That is, which legal entities would be held liable to compensate for damage caused to another legal entity in the context of GPS activities?

As a generic concept based upon the existence of the currently operational systems, GPS and GLONASS, the Model presumes three essential categories of satellite navigation functions are discernable. They are:

1. basic or primary signal provision,[22] which could hardly be labelled a "service provision" since existing basically of the provision only of signals-in-space carrying basic data;

2. augmented or secondary signal provision,[23] which sometimes could be, and is, labelled "service provision", since more than just the signal-in-space carrying basic data is provided; and

3. value-added service provision.

This threefold categorisation of activities leads to a fourfold functional categorisation of key actors in the context of a global navigation satellite system with three fundamental categories of legal relationships involved. (Figure 1, Appendix 1).[24] Figure 1

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[21] *Id.*

[22] *See e.g.*, Schubert, *supra* note 8, at 250-1; Henaku, *supra* note 1, at 171.

[23] *See e.g.*, Schubert, *supra* note 8, at 251-2; Henaku, *supra* note 1, at 172.

[24] Figure 1 is a reproduction *inter alia* of Figure 2, "The Functional Model of GNSS Signal and Service Provision", as contained in "Regulatory Issues" arising from Task I,

(Appendix 1) summarises the current situation with regard to GPS and GLONASS. GPS (and GLONASS) is a basic signal provider, with its SPS falling within the category of A. No barrier to access is in place, making it a clear open access-type signal available to three categories of players: the end-users, the value-added service providers and the augmentation providers. This, essentially at their own initiative: anyone with the right type of receiver can receive the signal without any service fee being required. (The GPS precise positional services (PPS) are not included in this Model, since they are encoded and made available only to a very limited group of users – basically the U.S. military and NATO allies.)

The major issue in particular for aviation in view of relevant ICAO requirements is that the SPS, in addition to the absence of high-level accuracy and continuity, lacks the level of integrity monitoring[25] necessary for serving as a stand-alone system for approach, landing and take-off operations of aircraft.

As to the augmentation providers, A is currently being picked up by three such satellite-based wide-area augmentation systems in experimental fashion: the European Geostationary Navigation Overlay System (EGNOS)[26] for Europe, the Wide Area Augmentation System (WAAS)[27] for the United States, and the Multi-Functional Transport Satellite-Based Augmentation System (MSAS)[28] for Japan and the surrounding region.[29] These

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Legal and Institutional Issues, of the GALILEI Study Cluster, DD-123, v. 1.1, 16 July 2002, 24. Whilst this document is only publicly available in v. 2.0, of 5 December 2002, where it has not been included, this Figure lies at the root of all relevant Figures also of Recommendations and Conclusions, *supra* note 10, at 102.

[25] "Integrity" refers to the trust a user can place in the correctness of the signals, and to his being warned if the signals are no longer within the bounds of such correctness as indicated by certain parameters.

[26] EGNOS stands for European Geo-stationary Navigation Overlay System, and is currently developed by the European Tripartite Group consisting of European Union as represented by the European Commission, the European Space Agency (ESA) and Eurocontrol, the European Organisation for the Safety of Air Navigation. *See e.g.*, Henaku, *supra* note 1, at 175-6.

[27] WAAS stands for Wide Area Augmentation System, and is currently developed by the U.S. Federal Aviation Administration (FAA). *See e.g.*, Henaku, *supra* note 1, at 174-5.

[28] MSAS stands for Multi-functional transport Satellite-based Augmentation System, and is currently developed by the Japanese government. *See e.g.*, Henaku, *supra* note 1 at 176.

systems make up for the lack of accuracy and integrity inherent in A that precludes any safety-sensitive usage, by augmenting A into becoming B: signals which do comply with the high levels required for aviation in most or even all phases of flight.[30]

In cases of safety-sensitive usage, value-added service providers would likely be forced by the governmental authorities under national or even international regulation to use B (instead of A); outside such situations, the use of B may be equally at the value-added service provider's, alternatively end-user's own initiative. Of course, aviation would be the clearest example of regulation-induced or -required usage of B.

Whilst indeed the augmentation providers mentioned in terms of operational requirements are very much focusing on aviation, as the most directly interested transport sector, already at present this does not preclude other users – such as for purposes of precision farming – from using EGNOS or WAAS signals. Certainly in principle, nothing prevents augmented signals, even if developed purely for aviation requirements from being of interest to other sectors, at least until access would become closed or controlled.

Finally, value-added service providers may use either A or B, depending upon their need and the costs involved, to incorporate them into value-added services C, such as navigation information, in general, perhaps on a commercial basis but certainly in the case of aviation essentially on a regulatory basis. Currently, to the extent that authorities are considering allowing or even requiring users to use system signals, that is, mainly within aviation, these will be incorporated into C as Air Traffic Services (ATS) and Air Traffic Control (ATC) services, in addition to being directly received and used by aircraft operators. In view of the large measure of orientation on aviation in current global navigation satellite system augmentation, at pre-

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[29] There are a few non satellite based augmentation systems that will not be discussed. However, examples include LORAN-C (Long-Range Navigation system) and D-GPS (Differential GPS).

[30] As discussed in particular in the context of ICAO, the ultimate ideal would be for GNSS to constitute "sole means" of navigation for all phases of flights, since it is then that in terms of necessary infrastructure and avionics the economic advantages of having a single global coherent and interoperable system become fully available.

sent, the aviation sector is the only sector where such value-added service providers already play an important role. Elsewhere, comprehensive, general and widespread provision of C is hardly at issue so far. It is for that reason also that air law enters into the equation, including the air law liability regimes. Because of the current focus of global navigation satellite systems on aviation, the effect of air law liability has a major impact "upstream" on the signal and service provision by both basic signal and augmentation providers. At the same time, this changes to the extent that system signals and services, either now or in the future, would be used in other sectors – in principle, however, in accordance with the same generic Model for global navigation satellite systems.

IV. GPS AND LIABILITY

The GNSS Legal/Functional Model (Figure 1, Appendix 1) already indicates the major issues for GPS as far as liability is concerned The arrows marked A, B and C, whilst representing categories of signals and services, now translate into the relevant legal relationships in terms of liability. In the case of A, such liability is unlikely to be qualified as contractual liability as previously defined since open access to those signals and the impossibility for the provider to monitor who receives and uses it would negate the existence of a contract. The term "contract" is used here in the widest possible sense: a bilateral agreement, in principle in writing, freely concluded between two parties containing mutual rights and obligations.[31] Thus, an agreement between two states or one state and a foreign private entity would also qualify as a "contract" under this definition, even if the public nature of one of the parties might cause important additional legal problems to arise. In spite of some arguments

[31] "Contract" is defined as, "an agreement between two or more persons which creates an obligation to do or not to do a particular thing", of which the "essentials are competent parties, subject matter, a legal consideration, mutuality of agreement, and mutuality of obligation". BLACK'S LAW DICTIONARY, *supra* note 13, at 291-92, and WEST'S LAW & COMMERCIAL DICTIONARY, *supra* note 13, at Vol. I, p. 338. Whereas, "contract" can also refer to "the writing which contains the agreement of parties, with the terms and conditions, and which serves as a proof of the obligation". *Id.*

that try to establish a "virtual" contract between the primary signal provider and all others,[32] most experts agree that the provision of these signals would not give rise to contractual liability.[33]

In the case of GPS, U.S. authorities have disclaimed the existence of anything similar to a "contract" or bilateral or multilateral international agreement, against efforts to construe a contractual relationship and hence any contractual-type of liability.[34] However, they do not deny in principle the possibility for liability claims under U.S. tort law.

In the case of B and C, there can be far less doubt that the provision of such signals and services even in the current case of GPS, would be a matter of contract. The successful efforts to involve the respective aviation authorities in developing WAAS and EGNOS would amount to a contract even if proper, formal contracts would not be signed.

At the same time, in terms of liability one should realise that, as concluded before,[35] contractual liability principally should be seen to refer to liability in case of damage caused by the one party to the contract to the other. All then depends upon the definition of "damage" in the legal liability regime applied to it. Does it include indirect damage? If not, contractual liability could only refer to the damage caused to the contract partner's receiver, not to the damage, such as an aircraft crashing, resulting from incorrect information delivered to the receiver, or from information not sent to the receiver.

If the focus is on the aviation sector as the major target for augmentation by EGNOS, WAAS and MSAS, the issue of contractual liability in view of the existing air law liability regimes is raised and a fourth relevant category of legal relationships, clearly "contractual" in nature, also arises. In Figure 1 (Appendix 1), the end-users effectively represent the aircraft operators. The consumers, the passengers or consignors of cargo, arise as a separate category of "actors". They find themselves in a contrac-

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[32] *See e.g.*, Henaku, *supra* note 1, at 183-85.
[33] *See* Milde, *supra* note 5, at 134-35.
[34] *Id.* at 133-35.
[35] *See supra*, Section 2, on the definition of contractual liability.

tual relationship with the airlines, a relationship represented by an arrow D in Figure 2 (Appendix 2). This is an important aspect which in turn relates to liability as will be seen.

For non-contractual liability, as previously defined in terms of the structure summarised by Figure 1 (Appendix 1), this results in the following picture. The essence of non-contractual, third-party liability, it may be reasserted, would be that outsiders to a specific activity suffer damage as a consequence of an activity. For such reasons, regardless of the existence of GNSS, relevant non-contractual tort and third-party liability regimes not specifically focused on GNSS would nevertheless apply.

In terms of "actors" in the area of GNSS, as the building blocks for the Legal/Functional Model of Figure 1 (Appendix 1), such "outsiders" could therefore be easily lumped together in one category, as third-party victims. All possible non-contractual liability relationships of such third-party victims with all of the true "actors" of Figure 1 (Appendix 1), including the consumers added above, can then be represented by various arrows E.

It depends on any applicable third-party liability regime, national or international, whether such third parties suffering damage could assert a claim not only to the entity or person causing the damage directly, for example, the aircraft operator, but also to the system signal provider having delivered wrongful navigation information to that entity ultimately at the root of the accident.

In the case of GPS, U.S. national third-party liability, that is, tort law would be considered. Here, the concept of sovereign immunity is key to successfully assert a claim for non-contractual liability. Absent specific provisions to the contrary, this concept means that any claim for public liability against the U.S. government would be inadmissible. The rule would be that the U.S. government may not be sued for public liability.[36]

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[36] "Sovereign immunity" is defined as "preclud[ing] litigant from asserting an otherwise meritorious cause of action against a sovereign or a party with sovereign attributes unless sovereign consents to suit". BLACK'S LAW DICTIONARY, *supra* note 13, at 1252, and WEST'S LAW & COMMERCIAL DICTIONARY, *supra* note 13, at Vol. II, p. 552, referring to Principe Compania Naviera, S.A. v. Board of Com'rs of Port of New Orleans, 333 F. Supp. 353, 355 (1971).

By way of exceptions to the rule, precise regulations then exist which provide for circumstances where the sovereign immunity of the U.S. government is or might be waived. The relevant U.S. regulations for the present purpose would be the Federal Tort Claims Act,[37] the Suits in Admiralty Act,[38] the Foreign Claims Act[39] and the Military Claims Act.[40] Generally speaking, it is rather uncertain that either of these acts could be used for the successful assertion of claims regarding GPS failures and consequent damages. As a result, claims for U.S. public liability for GPS might easily fail.[41] For example, the Federal Tort Claims Act does not apply in case of "any claim arising in a foreign country".[42] Or, the Suits in Admiralty Act applies only if "the accident (1) arose on the high seas or navigable waters of the United States; (2) posed a potential threat to maritime commerce; and (3) was substantially related to traditional maritime activity."[43]

Moreover, in view of the global application of GPS, the problem of non-U.S. citizens claiming for compensation in U.S. courts would remain. From a practical and political point of view, such claims would require the claimant to travel to the United States, introduce his claim in English to U.S. courts, possibly hire a U.S. lawyer, and suchlike. There would be no fundamental legal impediment for non-U.S. citizens to do so, but in practice it might turn out to be rather difficult to assert one's claims. Furthermore, a claim before a U.S. court against the U.S. government for damage resulting from the usage of signals provided for free is not a very promising venue in terms of possible success.

It is doubtable, finally, whether other governments which would ultimately be held responsible for the safety of aviation in

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[37] Federal Tort Claims Act, 28 USC §§ 1346(b), 2671-2680 (1988).

[38] Suits in Admiralty Act, 46 USC Appx. §§ 741-752 (1988).

[39] Foreign Claims Act, 10 USC § 2734 (1994).

[40] Military Claims Act, 10 USC § 2733 (1994).

[41] *See* Jonathan M. Epstein, *Global Positioning System (GPS): Defining the Legal Issues of its Expanding Civil Use*, 61 J. AIR L. & COM. 243, 262-68 (1995).

[42] Federal Tort Claims Act, *supra* note 37, §2680(k). *See also* Epstein, *supra* note 42, 265.

[43] Under the so-called "*Sisson* test", Sisson v. Ruby 497 U.S. 358 (1990), as dealt with by Epstein, *supra* note 42, 266.

their own airspace[44] would agree to sue in a private capacity within the U.S. legal system. This was the main reason states in ICAO proposed that a relevant treaty on GNSS liability should be drafted.[45] Additionally, if the damage occurs in a jurisdiction other than that of the United States, it might be possible to assert a claim against the GPS providers in those jurisdictions. In practice however, the option for the United States not to waive its sovereign immunity would make any such possibility a theoretical one.

Finally, as to product liability, the manufacturers and sellers could be brought into Figure 1 (Appendix 1) as another category of relevant actors within the GNSS Model. The potential liability relationships are represented by arrows F in Figure 2 (Appendix 2). This is the result of applying the relevant categories of liability onto the Figure 1 (Appendix 1) Model. These relationships are with all the actors referred to before, including the third-party victims even though in practice this would likely be dealt with by law which is not GNSS-specific (*see* in particular arrow F-6). Since the manufacture or sale of relevant products is not the business of the GPS operators, further analyses are beyond the scope of this paper. In sum, as to the issue of liability for the first generation global navigation systems, Figure 2 (Appendix 2) represents the situation as applicable to GPS as a basic signal provider and for its augmentation provider.[46]

Using the aviation sector as an example for illustrating the relevant liability issues, it is noted that the value-added service providers would be mainly ATS and ATC providers, the end-user would consist of the airlines and the consumers would be the passengers and consignors of cargo.

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[44] *See* Convention On International Civil Aviation, Dec. 7, 1944, art. 28, 61 Stat. 1180, 15 UNTS 295 [hereinafter Chicago Convention]. *See also* Schubert, *supra* note 8, at 252-54.

[45] *See e.g.*, Schubert, *supra* note 8, at 258-61.

[46] Figure 2 is a reproduction of Figure 4 located in, *The GNSS-1 Functional Model and Liability Issues (GPS, GLONASS)*, [2002] WP I.4.B, GALILEO System Liability – Part I – Interoperability, v.2, of the GALILEI Study Cluster. Whilst this document is not publicly available, this Figure is an adaptation of Figure 1 to the liability scenario, and as such underlying also Figure 5, *infra*.

Since A does not encompass contractual liability, both foreign ATC-providers and foreign airlines could only claim for anything other than contractual liability for GPS-related damages. This leads to the crucial question of how compensable damage is to be defined: events likely to cause damage of a really major dimension as a consequence of erroneous or absent navigation information by GNSS do not concern the direct damage caused by emission of the signals as such, but, for example, the crash of an aircraft. The conclusion should be that such latter cases of liability would normally be dealt with by either contractual liability as far as the passengers or consignors of cargo are concerned, or third-party liability relative to innocent victims on the ground. In air law, the first refers to the 1929 Warsaw Convention[47] and subsequent contractual liability conventions up to the 1999 Montreal Convention[48] – which are subsumed under D. The second refers to the 1952 Rome Convention on third-party liability,[49] or for the many states where this Convention is not in force, national tort law, which is subsumed under E-4.

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[47] *See* Warsaw Convention, *supra* note 5.

[48] Convention for the Unification of Certain Rules for International Carriage by Air, May 28, 1999, ICAO Doc. 9740 (entered into force Nov. 4 2003) [hereinafter Montreal Convention]. The other international instruments to be referred to encompass such agreements as the Hague Protocol, *supra* note 5; the Convention, Supplementary to the Warsaw Convention, for the Unification of Certain Rules Relating to International Carriage by Air Performed by a Person other than the Contracting Carrier, Sept. 18, 1961, 500 U.N.T.S. 31, ICAO Doc. 8181 (entered into force May 1, 1964) [hereinafter Guadalajara Convention]; the Agreement Relating to Liability Limitations of the Warsaw Convention and the Hague Protocol, May 4, 1966, Civil Aeronautics Board Agreement No. 18,900, approved by Exec. Order No. 23,680, 31 Fed. Reg. 7302; Additional Protocol No. 1 to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, Signed at Warsaw on 12 October 1929, Sept. 25, 1975, U.K.T.S. 1997 No. 75, ICAO Doc. 9145 (entered into force Feb. 15, 1996); Additional Protocol No. 2 to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, Signed at Warsaw on 12 October 1929 as Amended by the Protocol done at The Hague on 28 September 1955, September 25, 1975, U.K.T.S. 1997 No. 76, ICAO Doc. 9146 (entered into force Feb. 15, 1996); and Montreal Protocol No. 4 to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, Signed at Warsaw on 12 October 1929 as Amended by the Protocol done at The Hague on 28 September 1955, September 25, 1975, U.K.T.S. 1999 No. 28, ICAO Doc. 9148 (entered into force June 14, 1998).

[49] Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, October 7, 1952, 310 U.N.T.S. 181, ICAO Doc. 7364 (entered into force Feb. 4 1958) [hereinafter Rome Convention].

It follows that both these regimes would apply in principle regardless of whether navigation errors were the cause of the accident, or more "traditional" events – human errors, thunderstorms, engine failures or sabotage, if not specifically falling under clauses excepting terrorism-related accidents. Both of them point to the airlines as the liable entities. So the first question under non-contractual liability is to what extent claimants might want to circumvent these regimes, and then, as third-party claimants from the perspective of navigation service providers, claim directly against the basic signal or augmentation providers. The extent to which the applicable third-party liability regimes, in this case the U.S. tort system, would allow them to do so is then the next, more important question. Other states do not feel comfortable with this option, hence their desire to solidify possibilities for claims by an international convention on GNSS liability for the aviation sector. However, the United States is not particularly interested in such an option, which may likely cause this approach to be impractical for the time being.[50] As a consequence, Eurocontrol has developed the concept of the contractual liability chain. Contracts are to spell out the extent of liability accepted between the parties, including to what extent derogation to the other party of "ulterior" liabilities under the contract might be warranted.[51]

V. *GALILEO* AND THE LEGAL/FUNCTIONAL MODEL

The complexity of *Galileo* as compared to the current situation becomes apparent upon adapting the Model for GPS, that is for generic systems of the first generation to the case of *Galileo*, which is effectively a second-generation system. Firstly, GPS is operated and controlled by a single-state entity, the U.S. Department of Defense, even if civil users are involved through consultation boards and other mechanisms, whereas *Galileo* is envisaged to be operated by a private operator, provisionally

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[50] *See* Schubert, *supra* note 8, at 261; Milde, *supra* note 5, at 132 .

[51] *See e.g., Setting up the Contractual Framework*, Eurocontrol *GNSS LTF*, C/SF/p010506/17.05.01; *Skyguide memo to Eurocontrol GNSS LTF* of 5 March 2003; *Refocusing the work of the EUROCONTROL GNSS Legal Task Force, Skyguide Memo*, C/SF/October 6, 2003. *See also* Schubert, *supra* note 8, at 261.

called the *Galileo* Operating Company (Company).[52] It is to be supervised by a public entity provisionally called the *Galileo* Supervisory Authority (Authority) representing the European Union, the European Space Agency (ESA) and their member states.[53] Together they comprise the *Galileo* Core Structure.

The main reasons for involving a private operator as a key entity in the organisational structure for a system with obvious fundamental public aspects were:[54]

- flexible, non-bureaucratic and commercial modes of operation;
- marketing purposes;
- obtaining finances and investments from the capital markets in normal commercial modes;
- dealing with intellectual property rights in a proper and more commercially-oriented fashion;
- obtaining insurance against limited liability;[55]
- making a sensible business partner; and
- the far better capabilities of, and opportunities available to, a private entity to develop new services and markets in a commercially assertive manner.

Conversely, the reasons for involving a public oversight body as a key entity in the organisational structure for a system where private and commercial modes of operation have been deemed to be most beneficial were:[56]

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[52] It may be noted that the process of tendering the concession began October 2003, the aim being that by the end of 2004 a winning concessionaire will be selected to fulfil that role of the "Galileo Operating Company".

[53] *See also* the Proposal for a Council Regulation on the establishment of structures for the management of the European satellite radionavigation programme, COM(03)471 final at 4 & art. 19 [hereinafter Management Structures Proposal].

[54] *See e.g.*, Recommendations and Conclusions, supra note 10, at 33.

[55] It may be noted that insurance against unlimited liability is either outright impossible to obtain, or likely to be impossibly expensive. *See also infra* note 59.

[56] *See e.g.*, Recommendations and Conclusions, supra note 10, at 33-34.

- negotiating and concluding agreements with states "external" to *Galileo* yet hosting *Galileo*-related assets and service providers;[57]
- licensing non-European augmentation and integrity providers, or negotiating and concluding agreements on such operations by the private operator;
- serving the general public interests, for example in regard of safety, security and search-and-rescue issues;[58]
- possibly offering unlimited liability in the last resort to value-added service providers and end-users;[59]
- enhancing the trust by the public at large in the system with respect to such issues as certification and safety licenses;

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[57] The Management Structures Proposal provides that,

> "The Supervisory Authority shall be open to the participation of countries which are not members of the European Union and which have concluded agreements with the European Union to this effect. Under the relevant provisions of these agreements, arrangements shall be worked out specifying, in particular, the nature, scope and procedural aspects of the involvement of these countries in the work of the Supervisory Authority, including provisions relating to financial contributions and staff."

Management Structures Proposal, *supra* note 53, at art. 19.

[58] *Id.* art. 1 (the Galileo Supervisory Authority should "manage the public interests relating to the European satellite radionavigation programme"), *also id.* arts. 20-22 (setting up a Centre for Security and Safety).

[59] In order to enhance the attractiveness of Galileo to the maximum, offering acceptance of unlimited liability (where appropriate) would be necessary; this however would somehow have to rest upon the shoulders of the public entities concerned, namely the GSA and the member states behind it. *See also supra* note 56. Clearly, this has not been decided yet. Article 17 of the Management Structures Proposal only mentions:

> "1. Contractual liability on the part of the Supervisory Authority shall be governed by the law applicable to the contract in question..."
>
> 2. In the event of non-contractual liability, the Supervisory Authority shall take steps, in accordance with the general principles common to the laws of the Member states, to remedy any damage caused by its departments or by its staff in the performance of their duties..."

Management Structures Proposal, *supra* note 53, at art. 17.

- for purposes of negotiating where necessary access for the private operator to the markets of states not belonging to the *Galileo* core group of states; and
- liaising with other relevant organisations such as ICAO.

Secondly, *Galileo* aims to provide at least five different sets of services as opposed to GPS which, apart from an open SPS signal, only emits a closed access PPS signal. Technically speaking, a number of various signals-in-space will be emitted by the *Galileo* satellites which, through being combined in various ways and further differentiated by means of additional characteristics, result in the four main *Galileo* services being delivered to value-added service providers and end-users. They are the open service, the commercial services, the safety-of-life services and the public-regulated services.[60] In addition, a contribution to existing search-and-rescue services (SAR) as currently provided by the COSPAS-SARSAT system is intended.[61]

The open service will be provided for free and will be similar to the GPS SPS, albeit perhaps slightly enhanced in respect of accuracy and continuity. Most importantly therefore, from a legal and regulatory perspective the characteristics of this service would again lead to the principled absence of a contractual situation between the Company and the value-added service provider or end-user. Hence, it is referred to as A for the purpose of the Model.

The open service would be provided directly by the *Galileo* system to both value-added services providers and end-users. This is where a number of individualised mass-market applications are envisaged to arise. Any user with a technically compatible receiver will be able to receive and use the signal for his or her own purposes, and he or she would require no more than such a receiver to benefit from the signals.

From a legal and regulatory perspective, the commercial services, the safety-of-life services and the public regulated services, can be taken together as B in the Model because of the

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[60] *See* GALILEO Mission Requirements Document, *supra* note 10, at 19-22.
[61] *Id.* at 24.

presence of a contract in some form with the Company. Whatever characteristics would then be added per service, or per type of contract, some form of contractual relationship will arise. This allows for considerable opportunities for the Company to determine the legal relationship with value-added service providers and end-users, including liability.

Perhaps the signals involved still would call for a user to have a compatible receiver, were it not devices would be used to control access to them. In the latter case however, which is the current scenario, both a compatible receiver and the encryption or authentication key would be necessary before the signals can be used in an authenticated fashion. Consequently a contract for subscription, or other legal instrument setting forth rights and obligations of the two parties between each other, will be required. These aspects would apply to all three variants of B.

There are, of course, elements which separate those variants. The commercial services would specifically focus on providing higher accuracy by added data, higher continuity and higher availability with the support from local elements where required. A proper service guarantee would come to spell out the obligation of the Company to provide services up to certain standards of accuracy, continuity and availability. These services would be renumerated directly through a user fee, by any value-added service provider, or other user, interested in the higher accuracy, continuity and availability as well as the service guarantee likely to be provided. Applications would arise in such higher-end mass-market areas as location-based services, integrated telecom-and-information services and those traffic control systems which are commercially- but not safety- or security-sensitive, like road tolling.

The safety-of-life services first focused on aviation. With the potential to be extended to other safety-sensitive transportation, high-speed vessels, high-speed trains, for example, these services will have as their outstanding feature integrity monitoring up to the level required by aviation for taxiing, take-off and landing addressed by the Chicago Convention and its Annexes,

containing the relevant SARPs.[62] Where the world-wide integrity to be provided by the Company is not acceptable or not accepted, such integrity monitoring may also be provided by regional elements outside of the *Galileo* Core System (GCS). In this respect the legal situation will be correspondingly complicated because of an additional, non-*Galileo* and presumably non-European entity being involved next to the Company. Furthermore, local elements might be involved in locally providing the necessary higher performance in terms of accuracy, availability and continuity. Payment would be through the general user fees for navigation services of which *Galileo* would only form one element. The payment would be paid by the users to the value-added service providers which in turn would pay the Company for the *Galileo*-input it provided.[63]

Currently, safety and security-sensitive sectors such as aviation, and maritime transport, are involved in the usage of such services, whether GNSS-based or not. They would provide the relevant markets for these types of *Galileo* signals.

The public-regulated services will aim at governmental and other public services such as police, fire-brigades, emergency, perhaps crucial infrastructures for energy, water and communications. Their outstanding feature will be a high level of technical security against interference, jamming, spoofing and unauthorised usage. This will be guaranteed through technical robustness and encryption. Payment for those services would likely occur through availability payments or other lump-sum arrangements, by the relevant governmental department or service. The SAR service falls outside of the construct of the Model. Essentially the signal provider, the *Galileo* core entities, will pay for signal provision, to be refunded through the participating states.

In principle, the *Galileo* Model could be developed for each of the four core services, in order to achieve a precise overview of the relevant issues. This, however, would obviously go beyond the scope of the current article, and it suffices here to "stack"

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[62] *See supra* note 2.

[63] *See* Recommendations and Conclusions, *supra* note 10, at 122, 175.

the four Models which would otherwise arise onto each other so as to form one "generic" *Galileo* Model.

Further, these four types of core services will, generally speaking, be offered to non-*Galileo* entities, which are for the overwhelming part essentially interested in offering or consuming a service of which the relevant *Galileo* service forms only one element. From a wider perspective therefore, the area of *Galileo*-relevant services is currently envisaged to encompass basically three categories of services:

- *Galileo*-only services (open service, commercial services, safety-of-life services, public-regulated services), to be provided by the GCS, that is, in terms of architecture the satellites in space and the necessary ground infrastructure, alternatively by the GCS in conjunction with regional elements providing regional integrity.

- *Galileo* local services for example, airport approach systems, to be provided by local elements in combination with the GCS, plus – optionally – regional elements.

- *Galileo* combined services such as mapping and database, or telecom services, to be provided by other systems, whether global, regional or local, together with any combination of the GCS, regional elements and local elements.

This last category is where C comes in: a theoretically wide range of value-added services incorporating *Galileo* timing, positioning and navigation information.[64] Provision of value-added services by the Company itself currently is not foreseen. All the above considerations led to the Model for *Galileo* as represented by Figure 3 (Appendix 3).[65]

A word of caution is due here, however. With the process of tendering and finally negotiating for the *Galileo* concession to be awarded by the end of 2004 just having gotten under way, this

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[64] In the context of the Galileo Architecture Definition (GALA) Study performed for the European Commission, 100 different applications were discerned as presenting potentially interesting markets for Galileo services; see in particular GALA, *Synthesis on Service Definition*, Gala-ASPI-TN011, at 39-44, (Oct. 10 2001).

[65] Figure 3 is a slightly adapted reproduction of Figure 2 of Recommendations and Conclusions. *See* Recommendations and Conclusions, *supra* note 10, at 79.

Model is reflecting the current presumptions on what the *Galileo* structure will look like by 2008, the year of envisaged full operational capability of the *Galileo* system. In the end, that structure may turn out to look different in some areas. These could include the precise outline of the relevant services, the role the Company is going to play in that respect, as well as the respective roles, rights and obligations of the Company and the Authority between them. At the same time, this largely concerns the internal division of tasks, competencies, responsibilities and liabilities within the GCS. It would not fundamentally change the equation as far as the legal role of the GCS relative to other actors is concerned.

VI. GALILEO AND LIABILITY

Similarly to the generic GNSS Model as applied to GPS, the liability issues can be charted upon the specific case of *Galileo* (Figure 4, Appendix 4). Again, the arrows in Figure 3 (Appendix 3) that represent the respective general legal relationships following from the provision of certain signals or services are now translated effectively into liability-relationships; the direction of the arrows pointing to which entity liability might be owed by the entity at the sending end of the arrow.

The regional elements as well as local elements have been left out. As to the regional elements, special contracts namely, in the form of international agreements of a specific nature might be entertained, in which case liability issues might be included in the contracts. If no such contracts would be envisaged, as the GCS would tend to view the role of such regional elements as autonomous, almost as the GPS authorities look upon EGNOS and MSAS, the liability which might apply here would be of a non-contractual nature.

A similar situation would pertain to local elements enhancing the Galileo signals and services without providing value-added services. Unlike the regional elements, local elements might have to be contracted by the Company if the Company sees a need for their involvement. In a sense, the liability issues here might work the other way around: when paying for local enhancement to better sell its services, the Company might look

for protection against liability for damage as a result of the local element-input, rather than being required to offer protection to such local elements in terms of liability. This might also be determined to a considerable extent by contractual negotiations on many levels and among many entities.

Galileo SAR services were not included in Figure 3 (Appendix 3) and are not in Figure 4 (Appendix 4). Thus, the chart in Figure 4 (Appendix 4) emerges.[66]

Figure 4 (Appendix 4) represents a generic liability chart for *Galileo*. Just as the U.S. authorities would likely deny any liability other than of a non-contractual nature for the GPS SPS, *Galileo* would not accept any contractual liability for the open service A, since A is not contracted for. Similarly to GPS, *Galileo* would also refuse to accept such contractual liability in jurisdictions other than those of the European states constituting the Authority,[67] even if the Company may not be able to invoke sovereign immunity in those cases, so that it ultimately depends upon non-*Galileo* jurisdictions whether liability, alternatively a refusal thereof, might nevertheless be acknowledged.

Regarding Figure 4 (Appendix 4), it is important to realise that the major liability issues regarding *Galileo* arise outside the core categories of actors involved in the contractual relationships and therefore are outside the *Galileo* legal framework. In the context of activities covered by the contractual relationships under A, B and even C, the possibilities for causing damage directly, in and of itself, by such activities are likely to result in damage of a rather limited nature. It is under D, that the damages start to be major, leading to key contractual liability issues.

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[66] Figure 4 is a slightly adapted reproduction of Figure 17 of Recommendations and Conclusions. *See* Recommendations and Conclusions, *supra* note 10, at 105.

[67] It should be noted that recently, the People's Republic of China and the European Commission, acting on behalf of the Galileo Joint Undertaking and hence indirectly also on behalf of ESA, have come to a mutual understanding that the former would invest an amount in the range of 200 million € in Galileo. The details of this understanding, for example as to what the investment will exactly comprise and to what extent the People's Republic of China would become "integrated" in the institutional structure still have to be negotiated, but may for example result in a sort of associated membership of the GSA.

The classical example would be that of an aircraft causing damage to its passengers in the course of the flight for which those passengers contracted, whether ultimately caused by wrong or absent GNSS-derived input, whether A, B or C, or by more traditional human or technical failures. These damages form the subject-matter of a well-elaborated regime of air law.[68]

In case of system signals used in other transport sectors, relevant sector-specific regimes would apply in similar fashion. Thus, for maritime transport, available treaties include the Athens Convention of 1974[69]; for rail transport, the Convention concerning the International Transport by Rail,[70] together with the Convention concerning the Carriage of Passengers and Luggage by Rail,[71] and the Convention concerning the Carriage of Goods by Rail[72] and its 1990 Protocol[73] on cargo; and for road transport, the Convention on the Contract for the International Carriage of Passengers and Luggage by Road[74] on passenger liability.[75]

Major or catastrophic damage could also arise under certain categories of the non-contractual liabilities E, along the lines of the above, especially E-4, mirroring D. It is unlikely that the

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[68] *See* Warsaw Convention, *supra* note 5, and *supra* note 48.

[69] Athens Convention Relating to the Carriage of Passengers and Their Luggage by Sea, Dec. 13, 1974, U.K.T.S. 1987 No. 40, 14 I.L.M. 945, INTERNATIONAL TRANSPORT TREATIES, I-229 (Supp. 1-10 1986) (entered into force Apr. 28, 1987).

[70] Convention concerning the International Transport by Rail, May 9, 1980, INTERNATIONAL TRANSPORT TREATIES, V-183 (Supp. 1-10 1986), entered into force May 1, 1985 [hereinafter COTIF Convention].

[71] Convention concerning the Carriage of Passengers and Luggage by Rail, Feb. 7, 1970, INTERNATIONAL TRANSPORT TREATIES, V-133 (Supp. 1-10 1986) (entered into force Jan. 1, 1975, effectively incorporated and superseded by the COTIF Convention of May 1, 1985, *supra* note 70).

[72] Convention concerning the Carriage of Goods by Rail, Feb. 7, 1970, INTERNATIONAL TRANSPORT TREATIES, V-58 (Supp. 1-10 1986) (entered into force Jan. 1, 1975, effectively incorporated and superseded by the COTIF Convention of May 1, 1985, *supra* note 70).

[73] Protocol of 1990 to Amend the International Convention concerning the International Transport by Rail (COTIF) of 9 May 1980, Dec. 20, 1990, INTERNATIONAL TRANSPORT TREATIES, V-300 (Supp. 15 1991) (entry into force Nov. 1, 1996).

[74] Convention on the Contract for the International Carriage of Passengers and Luggage by Road (CVR), Mar. 1, 1973, INTERNATIONAL TRANSPORT TREATIES, IV-43 (Supp. 1-10 1986) (entered into force Apr. 12, 1994).

[75] *See* Frans G. von der Dunk, *The European Equation: GNSS = Multimodality + Liability*, *in* AIR AND SPACE LAW IN THE 21ST CENTURY 240-245 (Marietta Benko & Walter Kröll eds., 2001) [hereinafter *The European Equation*].

provision of open service A, commercial services/safety-of-life services/public-regulated services B, or value-added services C, or even of final services to consumers D, in itself causes any significant harm to third-party victims. More likely, major damage would be the result of end-users using those signals or services and in doing so causing non-contractual damage leading to non-contractual liability.

The example here is an aircraft crash causing damage to third party victims on the ground. Here also air law provides the applicable rules: to the extent applicable, the 1952 Rome Convention, and where not, national tort namely, third-party liability regimes.[76] In case of system signals used in other transport sectors, there are as of yet no international regimes dealing with third-party liability.[77] So, in conclusion, *mutatis mutandis* national regimes likely of a general nature would apply.

In terms of product liabilities subsumed under F, liability may be different in each instance of F represented. It will depend upon the product at issue, the potential uses to which the actors in Figure 4 (Appendix 4) put those products, and the particular risks they entail of being harmed themselves by doing so. They may only incidentally serve to deal with system-induced damage. In any case, the conclusion should be that such liabilities are, so far, not dealt with by GNSS-specific product liability law, but rather, if at all, by general product liability law normally of a national character. Only in the context of EC law has distinct product liability law been developed at an international level.[78]

What remains then are possibilities under general national tort law to assert claims directly against the *Galileo* entities, in spite of the fact that this means circumventing existing and applicable liability regimes. In other words, a passenger (con-

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[76] *See* Rome Convention, *supra* note 49.

[77] *See The European Equation*, *supra* note 75, at 240-245.

[78] Council Directive of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products, 85/374/EEC, 1985 O.J. (L 210/29); and Directive of the European Parliament and of the Council amending Council Directive 85/374/EEC on the approximation of laws, regulations and administrative provisions of the member states concerning liability for defective products, 1999/34/EC, 1999 O.J. (L 141/20).

sumer) damaged by an aircraft accident may not wish to sue the airline (end-user) under contractual liability through D. But when convinced that the ultimate cause of the accident is a wrongful or absent *Galileo* signal or service, the passenger will directly address the Company through tort/third-party liability law.

This would refer especially to E-1 and E-2, where the distinction between them would justify different arguments being applied to them. Regarding the open access signals used for the open service under E-1, there is no contract. Regarding the closed access signals used for the commercial services, safety-of-life services and public-regulated services under E-2, there is a contract between key players. It is for existing national rules and practices on tort law and third-party liability to be the basis for whether and to what extent claims under E-1 and E-2 would then have to be rejected by courts.

The Company could therefore only deal with liability issues in the context of service guarantees. This depends upon the extent to which offering liability reimbursement in case the *Galileo* service could be blamed for damage would be a feasible and interesting proposition. The Authority, the Concession Agreement, and possibly a *Galileo* Convention would be important in defining the respective roles of the Authority and member states in such arrangements. An international compensation fund similar to the ones used in cases of oil pollution[79] and by the nuclear power industry[80] is an option worth considering.[81] Such

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[79] International Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, 973 U.N.T.S. 3; and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, Dec. 18, 1971, 1110 U.N.T.S. 57; both amended by the International Maritime Organization Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage of 18 December 1971, Nov. 27, 1992, U.K.T.S. 1996 No. 87; Cm 2657; ATS 1996 No. 3 (entered into force 30 May 1996).

[80] Convention on Third Party Liability in the Field of Nuclear Energy, Paris, July 29, 1960, 956 U.N.T.S. 251 (entered into force Apr. 1, 1968); and the Convention Supplementary to the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy, Jan. 31, 1963, 2 I.L.M. 685 (1963); both as amended by the Convention on Supplementary Compensation for Nuclear Damage, Sept. 12, 1997, 36 I.L.M. 1473 (1997) (not yet entered into force).

[81] *See e.g.*, Sean. D. Murphy, *Prospective Liability Regimes for the Transboundary Movement of Hazardous Wastes*, 88 AM. J. INT'L L. 24 , 56 (1994).

arrangements are a matter for negotiation between the *Galileo* Joint Undertaking (GJU), established by the European Commission and ESA *inter alia* to develop the concession for the future Company,[82] and the prospective concessionaire in the bidding process, as well as a matter of commercial policy for the concessionaire once the bidding process is over.

As between the various *Galileo* services subsumed under B in the generic Model, the major distinction between commercial services, safety-of-life services and public-regulated services lies in the measure of involvement of governmental authorities. This translates into issues of sovereign immunity possibly being invoked when it comes to liability for the safety-of-life services and the public-regulated services.

SAR services are a different issue. The role of *Galileo*, the GCS and the Company will be confined to contributing to an existing system, which means basically accepting the legal framework already been developed throughout the life of the COSPAS-SARSAT system. Even the role of local elements is fundamentally circumscribed by that framework, including any issues of liability. Thus, charting liability onto the *Galileo* Model and the inclusion of local elements shows the limits of what contracts can arrange in terms of contractual versus non-contractual liability as well as the special role of product liability, which largely depends upon the actual role of the Company and local elements in terms of producing or selling products.

VII. LIABILITY AND INTEROPERABILITY OF GPS AND *GALILEO*

The final issue to be discussed concerns that of "interoperability", that is, the fact that GPS and *Galileo* to a considerable extent will provide for signals and services which can be used by the same user. "Interoperability" in this context does not mean the operational, economic, institutional or legal integration of the satellite systems. Although previously considered a possible option, the scenario of GPS and *Galileo*, and possibly GLONASS, evolving into one second generation system with

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[82] *See* Council Regulation 876/2002/EC, *supra* note 9.

shared responsibilities, liabilities and competencies, has been abandoned.[83]

Therefore, for "interoperability" to have meaningful content in the present context, it shall not presume that either A or B will be jointly provided. What "interoperability" then refers to, for the purposes of this paper, is the receiver level, that is, in first instance with the value-added service providers and end-users. Value-added service providers may receive both the A from GPS and A or B from *Galileo* subject to the various applicable conditions and integrate them into the service C delivered to the end-users. Similarly, these end-users may wish to benefit from both at the same time for their own usage, whether these end-users are providing services to consumers or not.

This is illustrated by Figure 5 (Appendix 5), reflecting at the same time the provision of signals and services, and the liability relationships attached to them.[84] For reasons of clarity, as well as the indirect relevance of product liability for interoperability, some of the F-arrows have been shortened. They should be read as extending as far as they did in Figures 2 (Appendix 2) and 4 (Appendix 4). Here, GPS and EGNOS have been specifically mentioned next to *Galileo* as examples of basic signal providers and augmentation providers.

As a consequence of this paper's definition of "interoperability", the generic liability charts depicted for GPS (Figure 2, Appendix 2) and *Galileo* (Figure 4, Appendix 4) will continue to apply in the case of GPS-*Galileo* interoperability (Figure 5, Appendix 5). GPS will continue to provide A, just as *Galileo* will provide A and B, the difference being that they are now being received by the same receiver simultaneously. This is likely to be transparent to the value-added service provider or end-user. It is unlikely that either would be interested in such visibility either, until liability (and hence, for *Galileo*, service guarantees) would become an issue.

The extent to which the U.S. authorities would accept liability for GPS-related accidents remains as described above. This liability is a U.S. domestic matter: claims have to be enter-

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[83] *See, e.g.*, Schubert, *supra* note 8, at 248-50.

[84] *See* Recommendations and Conclusions, *supra* note 10, at 108.

tained in U.S. courts in accordance with U.S. law. The possibility to sue the U.S. government successfully meets with some severe statutory and practical limitations. Therefore, arguably the U.S. authorities perhaps may not be expected to put a lot of effort into distinguishing GPS input from *Galileo* input unless they would perceive a substantial risk of being held liable for cases of damage where the respective inputs from GPS and *Galileo* would not be clearly distinguishable. Of course, GPS being a national U.S. asset, in the absence of any contract, U.S. authorities are fully entitled to ensure that only national regimes and procedures can be used for claiming liability for damage ultimately caused by GPS, and resist any call for wider liability-acceptance such as, for example, by means of a GNSS Convention. It is then, equally obvious, for any potential user to determine his own risks in doing so, and if such risks are considered unwarranted, to desist from using GPS.

Similarly, the authorities under which the Company resorts to may limit its (non-contractual) liability to that imposed by the relevant national regimes, which will be the case for the open service. By contrast, for the contractual services, it is currently assumed that under the concession the Company should accept a certain additional liability through the contract, but not confined to contractual liability-proper. Apart from such contractual liability, the contracts with value-added service providers should, under current assumptions, allow for derogation of non-contractual liability. For those reasons, the Company should ensure that its input to a dual receiver is recognisable, in order not to risk paying compensation when GPS would be responsible for damage.

There is an additional issue of non-contractual tort liability at stake here. Circumventing any contract, whether concerning GPS or *Galileo*, third-party claimants may wish to ignore the contractual chain, which would cause them to sue only the value-added service providers or end-users that directly caused the damage and instead assert a claim directly against the signal provider(s). Leaving aside the question of the possibilities in any legal system to have such a claim accepted, such a case would require *Galileo* to prove that in the "interoperation" of GPS and *Galileo* signals and services it is the GPS input that

was responsible, if the Company/GCS is to avoid paying unjust compensation. This would amount to a serious defence in court, and the issue of evidentiary value of technical means of monitoring.

Whilst the A and B of GPS and *Galileo* may "interoperate" at the receiver level, by the time it comes to C, the respective inputs of GPS and *Galileo* are indistinguishable. Nor need they be distinguishable from a legal, including a liability, perspective. C, being a matter of contract, is for the contracting parties to decide whether they want to deal with such interoperation, or not. This is the more likely case because the end-user is more interested in being provided with a certain service rather than in knowing the technical requirements of the service. The Company might be interested in ensuring that also on liability the benefits of using *Galileo* will partly accrue to both contracting parties, by ensuring in its contracts with any of those that any liability within C may be derogated to the *Galileo* Core System to the extent *Galileo* is ultimately to blame for the damage at issue.

Going still further down the chain of relevant relationships and ensuing liabilities as illustrated by Figures 2, 4 and 5, Appendices 2, 4 and 5) as a consequence of the foregoing, neither in D, nor in E, nor in F does any "interoperation" of GPS and *Galileo* at the receiver level have any impact on liability as different from liabilities which would anyway exist. D concerns a contractual liability, which would at best lead *Galileo* to undertake the same derogation offer to be provided regarding C, as described above. E concerns non-contractual liability; but where it concerns E-3, E-4 and E-5, *mutatis mutandis* the same applies: applicable derogation could be offered through the contractual chain.

On the other hand E-1 and E-2 apply to a pre-interoperation phase, where consequently the issue of interoperability-liability is not posed. At the same time, both E-1 arrows are similar in referring to open access signals in the context of which contracts are totally absent. Whereas both E-2 arrows refer to controlled access signals where contracts, namely under various versions of B, would crucially be at issue. This distinction may have a bearing on whether liability claims along

these lines would be easily accepted in the presence of other possibilities or absence thereof to sue under A or B.

Finally, F concerns product liability, and to the extent neither GPS nor *Galileo* have a role in manufacturing the involved products, this kind of liability will not be a relevant issue. In case manufacturers would be directly contracted by the *Galileo* Core System to manufacture hardware, the situation again becomes similar to the previous ones: product liability resting on the manufacturer not going away merely because of such a contract, the contract may be used by the *Galileo* Core System for offering derogation.

VIII. CONCLUSION

As the analysis and Model have shown, under current law the situation with respect to liability for global navigation satellite systems operations is still fairly simple at the abstract level, that is, which liability regimes might or do apply. However, statements of certainty might have to wait until a proper case which represents a first instance where various national regimes, basically of all states on whose territory or by whose citizens global navigation satellite systems services are made use of. It may be expected however that for GPS, no contractual liability would be accepted, whereas in the absence of international treaties stipulating otherwise non-contractual liability claims would only be possible under U.S. tort law, where the few statutes mentioned would severely limit the possibilities for successful claims in this respect.

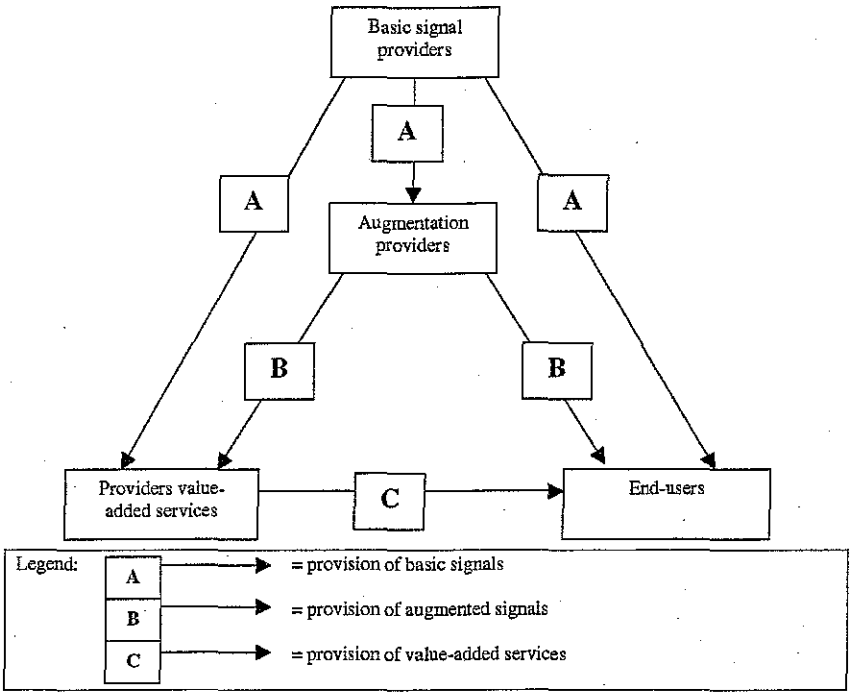
Even with GPS, however, that is not the full story, as from a civil perspective at least the applications downstream are more important. This is where the area of sector-specific liability regimes become relevant such as, the largely international one of contractual liability and the partly international one of third-party liability in air law. Whilst for GPS authorities such liabilities may be less relevant, for the measure of interest in the downstream applications sectors such liabilities to a considerable extent determine the interest, feasibility and ultimately, perhaps, the commercial viability of using GPS.

That is where *Galileo* will come in, representing a quantum leap in operational as well as legal complexity precisely. Because for *Galileo*, contrary to GPS and as evidenced also by the private operator in the centre of the *Galileo* institutional structure, a major justification for its future existence lies in attracting and serving downstream applications: aviation and other transport sectors as well as telecommunications, leisure activities, urban planning, banking and suchlike.

Dealing with liability in a customer-oriented fashion is part of that approach. In principle, the Model applicable to the liability issues works no differently for *Galileo* than it does for GPS. Thus, for the open service, principally similar to GPS's SPS, no liability would be accepted other than general tort or third-party liability under applicable national regimes. For the other services, commercial services, safety-of-life services and public-regulated services, *Galileo* could have chosen the same approach, but it likely will not. In order to entice downstream value-added service providers, end-users and ultimately also consumers properly speaking into using *Galileo*. It may be expected *Galileo* will offer under relevant contracts and through service guarantees certain contractual liabilities to reimburse downstream contractual partners under applicable contractual or non-contractual liability regimes if they would be forced to pay for claims to their contractual partners, third-party victims. The damage leading to such compensatory payments has to be proven to have been ultimately caused by erroneous or absent *Galileo* signals.

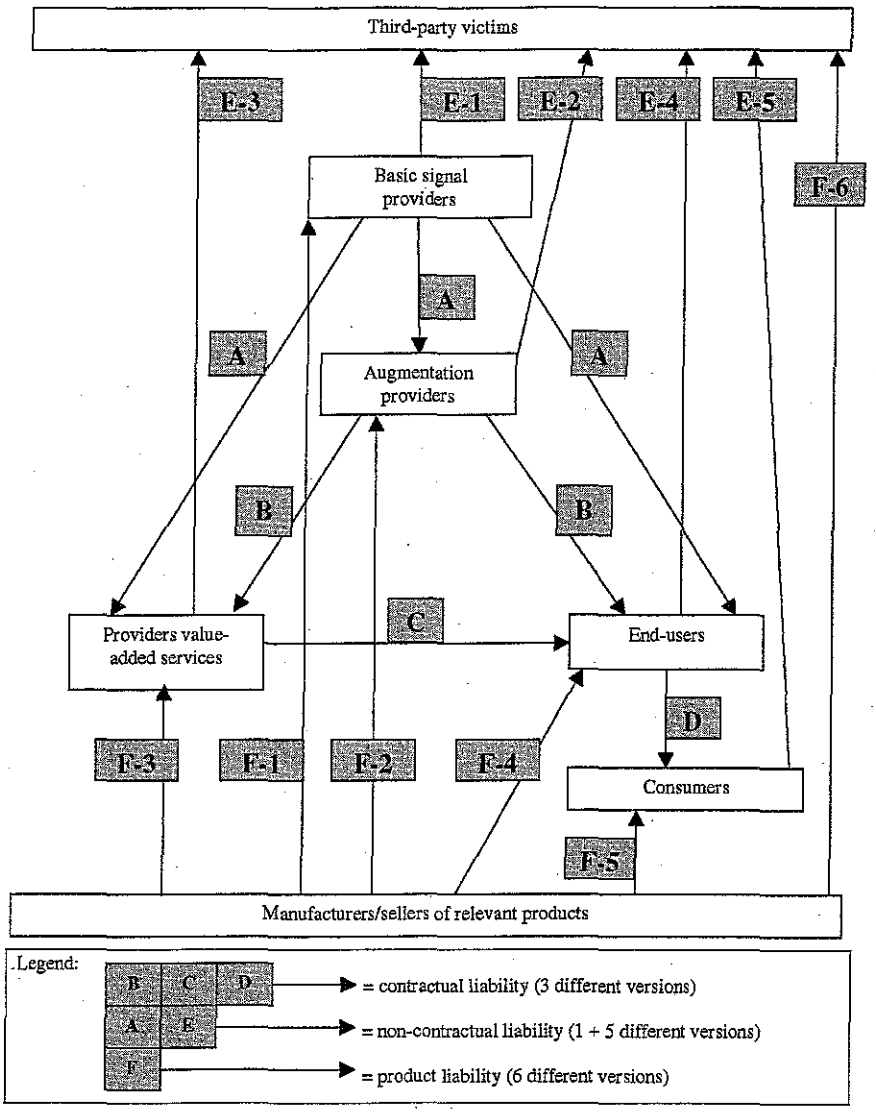
What this means in terms of substantive liability obligations and consequences downstream, however, is a totally different matter, which is beyond the scope of this paper. Such obligations and consequences would depend on whether and how any of the plethora of relevant liability regimes would apply. This paper addresses a theoretical and general perspective of liability regimes relevant for any sector involved in any national jurisdiction where global navigation satellite system applications would be feasible, plus a few international and European Community law-regimes.

Figure 1. The Legal/Functional Model of GNSS (GPS) signal and service provision.



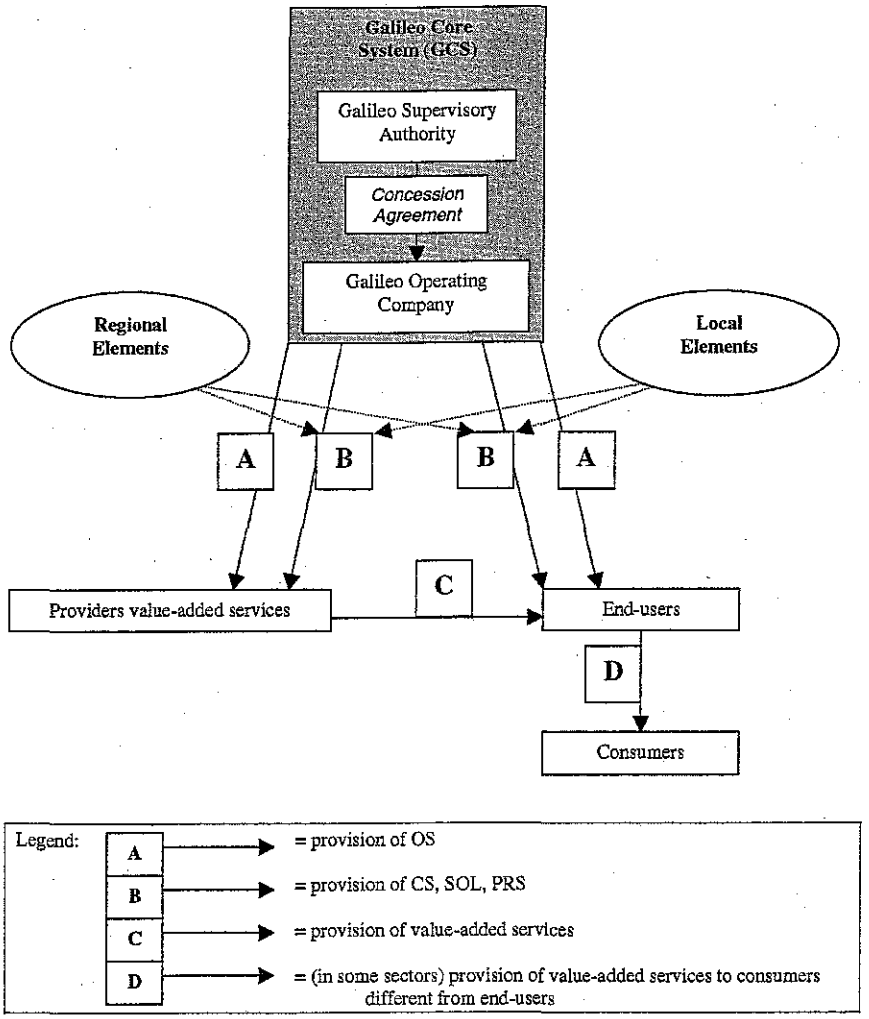
Appendix 1

Figure 2. The GNSS (GPS) Legal/Functional Model and liability.



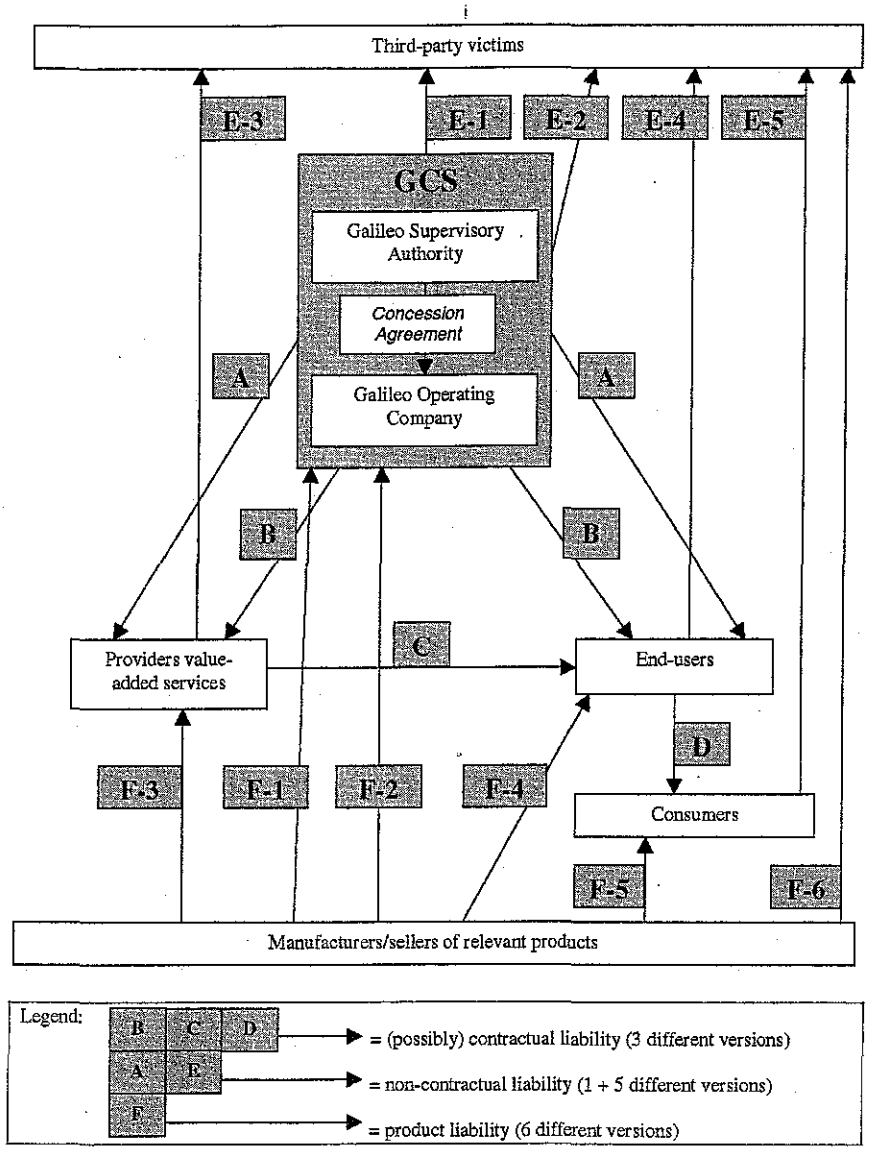
Appendix 2

Figure 3. The Legal/Functional Model of *Galileo* signal and service provision (generic and envisaged).



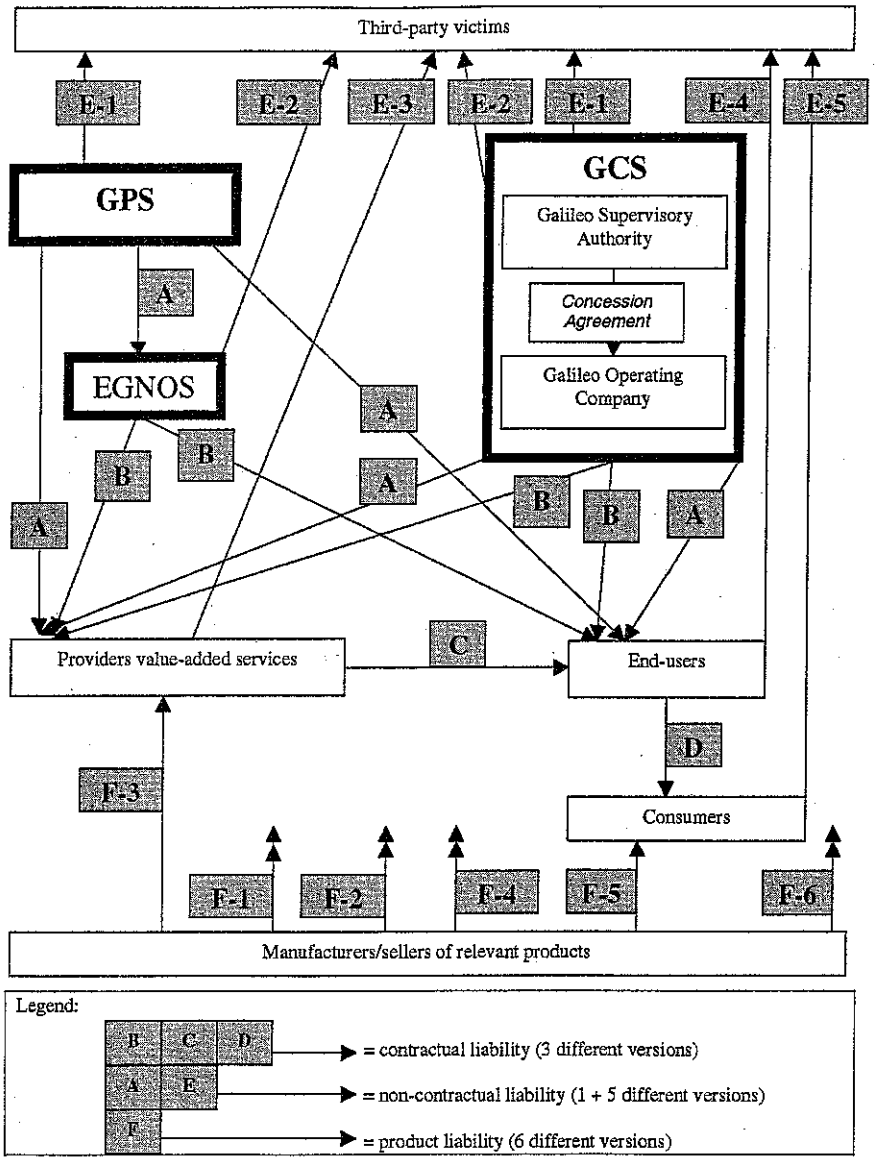
Appendix 3

Figure 4. The *Galileo* Legal/Functional Model and liability.



Appendix 4

Figure 5. Interoperability of GPS and *Galileo*, and liability.



Appendix 5

COMMENTARY

NO SPACE COLONIES: CREATING A SPACE CIVILIZATION AND THE NEED FOR A DEFINING CONSTITUTION

George S. Robinson[*]

Principal issues *not* addressed by the Congress, the National Aeronautics and Space Administration (NASA), as well as by other U.S. departments and independent agencies in the Executive Branch, and by most if not all relevant public and private international organizations, in their many studies of future directions of the U.S. and international space programs, are: (1) that infinite growth on a finite planet is not an option, and (2) human curiosity is not necessarily synonymous with species survival as a driving factor in human and human*kind* space migration. Not addressed, also, is whether we must confront the realities and demands of the New Millennium that might force human and/or human*kind* migration to the broader ecotone of near space, including the Moon and perhaps Mars, with greater urgency, alacrity, and deliberateness in the context of species survival. In a broader, but no less compelling, context needing emphasis is the ageless and most noble quest of *Homo sapiens sapiens* to determine the self-explanatory extraterrestrial imperative of humankind, i.e., where we came from, where we are going, and what the likelihood might be that our descendents will survive long enough to know they have arrived there and why.[1]

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[*] Dr. Robinson, retired from the Smithsonian Institution, is currently in private law practice, and serves on several boards of trustees and advisory committees, including NASA's Planetary Protection Advisory Committee. He received an AB from Bowdoin College ('60), an LL.B from the University of Virginia ('63), an LL.M. from the McGill University Institute of Air and Space Law ('67), and the first Doctor of Civil Laws degree from McGill University's Graduate Law Faculty, Institute of Air and Space Law ('71).

[1] Although clearly using the term "colonize" as an undefined generalization, renowned aerospace engineer and visionary Krafft A. Ehricke addressed why humans

Mark R. Whittington, a space policy analyst in Houston, Texas offered a much-needed restatement of the obvious by calling for the United States and its allies to recommit to human occupation and settlement of near and deep space. He emphasized the view that "more important than any economic and scientific benefit, space settlements would ensure the long-term survival of the human species." He continued a bit gloomily that "should human folly or nature cause the death of the human race on the Earth, space settlements can ensure that humanity survives beyond the Earth."[2] We mostly are well aware that life on Earth has experienced six major species extinctions, with the seventh being the current one orchestrated by our own hands.[3]

It is an extraordinarily unique point at which we find ourselves in the natural and cultural history of the hominid evolutionary bush, where we, ourselves, are consciously beginning to change, through the application of our biotechnological accomplishments the very nature or essence of being human. And what will be the role of these capabilities in formulating the kinds of "envoys of mankind",[4] or perhaps even of human*kind,* or "spacekind" to which our various space treaties refer. We are in the midst, also, of another birthing process for our species, or species*kind,* based on two elemental principles of evolutionary biology and species survival: grow or die, and seed dispersal.

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must migrate to space. *See* Krafft A. Ehricke, The Extraterrestrial Imperative: Why Mankind Must Colonize Space, Address at a New York Fusion Energy Foundation meeting (Nov. 1981), *cited in* Adriano Autino, *New Credit Tools and Tax Concepts for the Opening of the Space Frontier,* 51ST INT'L ASTRONAUTICAL CONG. (Rio, 2000).

[2] *See* Mark R. Whittington, *Missing the Big Picture,* SPACENEWS, May 5, 2003, at 13.

[3] *See generally* PETER WARD, THE END OF EVOLUTION: ON MASS EXTINCTION AND THE PRESERVATION OF BIODIVERSITY (Bantam 1994); RICHARD E. LEAKEY & ROGER LEWIN, THE SIXTH EXTINCTION: PATTERNS OF LIFE AND THE FUTURE OF HUMANKIND (Anchor 1996); George Moffet, *The Population Question Revisited,* 28 WILSON QUATERLY 54, 54-79 (1994).

[4] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty]. Article V of the Outer Space Treaty provides in part that "States Parties to the Treaty shall regard astronauts as envoys of mankind". For an interesting assessment of astronaut status, *see generally* GEORGE S. ROBINSON & HAROLD M. WHITE, JR., ENVOYS OF MANKIND: A DECLARATION OF FIRST PRINCIPLES FOR THE GOVERNANCE OF SPACE SOCIETIES (Smithsonian Inst. Press, 1986).

That, in essence, sums up our timely effort to migrate from the womb of Earth into space, to occupy and settle it,and to create a new civilization(s). Our current and ongoing achievements relating to human biotechnological integration, genome mapping, and gene replacement/modification/sequencing intervention, reflect our growing and technological capacity to disperse our "seed" long-duration, if not permanently, into a broader ecotone in order to enhance survivability of *Homo sapiens sapiens*, or its human*kind* variations and descendants.[5]

The Orbiter Shuttle *Columbia* disaster in February 2003 brought us to the point, once again, of an imperative and critically serious assessment of directions to pursue in giving solid and durable meaning to the next step, not only in the U.S. space odyssey, but that of all nations on behalf of its citizens, perhaps even that of the species at large. If the human population is to continue a crewed program, as determined by President George W. Bush to be the case for the moment,[6] at least for the United

[5] Much discussion is taking place regarding direct and indirect intervention with the human genome and gene sequencing as a method for altering human capability to accommodate the extreme environments of outer space. The alteration, both by biotechnological integration and technological merging, have emphasized the likelihood of changing what traditionally has been considered, both culturally and biologically, to be the essence of humans; thus, the emphasis in human*kind*, and the evolving use of *Homo sapiens alterios*, and *Homo alterios spatialis*, or Space*kind*. For interesting discussions regarding the ethics of human genetic intervention, *see* WALTER GLANNON, GENES AND FUTURE PEOPLE; PHILOSOPHICAL ISSUES IN HUMAN GENETICS, (Westview Press, 2002). *See also* Deepak R. Kaura, *Drawing the Line on Genetic Intervention in Humans*, CAN. MED. ASSOC. J., 154, 927-929 (1996). In the context of the potential for human alterations and enhancements for specific purposes (such as protection against high radiation levels in space) through lateral gene transfer from other vertebrates, *see* Diane P. Genereux, & John M. Longsdon, Jr., *Much Ado About Bacteria-to-Vertibrate Lateral Gene Transfer*, 19 TRENDS IN GENETICS 191, 191-94 (2003). Finally, *see also* George S. Robinson, *Editorial: Human Rights and Rebus sic Stantibus*, COSMOS 2001 (2001), *available at* http:// www.cosmos-club.org/journals/2001/robinson.html (last visited Apr. 12, 2004), in which the editor discusses work conducted at the Max Planck Institute for Biochemistry in Germany where several brain cells from a snail were linked with silicon chips to create a living mechanical-electronic circuit, and notes that at the very least, the implications for human-machine intelligence and accumulative changes to taxonomic characterizations of *Homo sapiens sapiens* may well be fruitful paths of research for enhanced human*kind* migrating to space.

[6] *See* President George W. Bush, Renewed Spirit of Discovery, The President's Vision for U.S. Space Exploration, White House Press Release (Jan. 14, 2004) (delineating the Administration's policy that emphasized, in part, the manned portion of the U.S. space program by returning to the Moon and establishing a permanent base, with expectations that the next phase would be to send humans to Mars).

States, and provide all the sustaining resources and commitment necessary to ensure its success and a growing space migration of human*kind*, all nations must become responsible in some degree in a global effort to uncover and illuminate the fundamental requirements for such an undertaking beyond transitory economics, strictly domestic and international partisan politics, and shifting military requirements for the protection of equally shifting national and international interests.

A reasonable, rational, and real-time recognition is critical that the world's spacefaring cultures are in the process of structuring and building an entirely new and unique civilization in space, i.e., they are pursuing the incipient design and fabrication stages that will establish a "cradle of space civilization"; not simply a space "colony" or society, but a *civilization*.[7] And yet, Earth indigenous historical values, principles, and motivating factors are being relied upon that largely are irrelevant to societies and civilizations that exist and will exist in completely synthetic and alien life support environments. In short, cultural recidivism is being relied upon to establish the legal foundation and social constructs for human and human*kind* evolution off Earth. This deficiency is classically represented in the multilateral agreement[8] governing the cutural/social/commercial/military aspects, as well as operational objectives and control, of the *International Space Station.*

We seem to be giving no significant and meaningful time to investigating and assessing in a systematic and disciplined fashion the underlying values of the "why" and the "how" of humankind space migration beyond transitory interests. We are focusing only on the fact that our technology has allowed us

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[7] *See* George Robinson, *Must There be Space Colonies?: A Jurisprudential Drift to Historicism, in* PEOPLE IN SPACE: POLICY AND PERSPECTIVES FOR A NEW CENTURY (U. Texas Press, 1985).

[8] Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, *available at* 1998 U.S.T. LEXIS 212 (entered into force Mar. 27, 2001) [hereinafter IGA]. A full text of the IGA, as well as dependent bilateral agreements that involve NASA, can be obtained by contacting the NASA Office of General Counsel, Code G, 300 E Street, SW, Washington, DC 20546.

access to near and deep space with very little thought being given to the reality that we are in the process of laying, albeit in a helter-skelter and piecemeal fashion, a complex foundation for new civilizations. And our technology is telescoping drastically the time available to us to determine how and why we migrate to and settle near and deep space, rather than just dragging old and frequently irrelevant Earth indigenous values and requirements along with us. We seem to be repeating all the disasters in economic, military, and cultural imperialism that inevitably result, as history has shown time and again, in establishing "colonies" the futures of which will assume, yet again, the complexion of subsequent ongoing violent confrontations.[9]

The human brain and its entire morphological and physiological support system (regardless of whether synthetically altered to meet unique demands of off-Earth existence) are capable of adjusting to new, even unique, psychopathological demands and stimuli offered by a physically and socially-alien near and deep space existence and survival. The technological, genetic, pharmacological, and bio-surgical tools available to assist in that effort of re-adaptation to a totally different physical and cultural ambience are at hand. And yet, we are not exploring how to use them to create a new civilization ideally suited to a non-Earth society embracing equally as new and evolving biological and cultural dictates.[10]

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[9] *See* NICHOLAS THOMAS, COLONIALISM'S CULTURE: ANTHROPOLOGY, TRAVEL AND GOVERNMENT (Princeton Univ. Press 1994); NICHOLAS B. DIRKS, COLONIALISM AND CULTURE (Univ. of Mich. Press 1994); JÜRGEN OSTERHAMMEL, COLONIALISM: A THEORETICAL OVERVIEW (Markus Weiner 1996).

[10] For an interesting discussion outlining the biological foundations of unique values and laws applicable to early and current space habitat participants, *see generally* GEORGE S. ROBINSON, LIVING IN OUTER SPACE (Public Affairs Press, Wash. D.C. 1975); George S. Robinson, *Man's Physical and Juridical Relationships in Space: A Key to Quantification of His Cultural Activities on Earth*, J. MAN/ENVTL. SYS. (April 1972); George S. Robinson, *Psychoanalytic Techniques Supporting Bio-Juridics in Space*, 2 J. SPACE L. 95 (1974); George S. Robinson, *Astronauts and a Unique Jurisprudence: A Treaty for Spacekind*, 3 HASTINGS INT'L & COMP. L. REV. 483-499 (Spring 1984); George S. Robinson & J. Hughes, *Space Law: The Impact of Synthetic Environments, Malnutrition and Allergies on Civil and Criminal Behavior of Astronauts*, 19 JURIMETRICS J. No. 1 at 59 (Fall 1978). *See also* M. Ephimia Morphew, *Psychological and Human Factors in Long Duration Spaceflight*, 6 MCGILL J. MED 74 (2001).

A recognition of this shortcoming was attempted in 1985 when, as a part of the bicentennial celebration of the United States Constitution, a project was undertaken by the Smithsonian Institution in Washington, D.C., to help determine which, if any, of the underlying values and principles of that document could, or indeed must, be applied to American citizens and others subject to U.S. jurisdiction who are living and working in space habitats, not colonies, such as the *International Space Station*, as well as settlements planned for other extraterrestrial bodies. More than forty experts from around the country, ranging from astrobiologists, engineers, scientists, economists, senators, thespians, diplomats, and lawyers, were asked to participate. Among those involved and contributing were: U.S. Supreme Court Justice William J. Brennan, Jr.; Senator/astronauts John Glenn; Harrison Schmitt; Representative Don Fuqua; Walter Cronkite; astrobiologist Dr. Gerald Soffen; and actor Richard Dreyfuss.

In furtherance of the undertaking, two three-day meetings were held at the Smithsonian's National Air and Space Museum, one in December 1986 and one in November 1987. The conferees decided at the outset not to attempt to frame an actual constitution. Rather, they would examine the values and principles underlying the formulation of the American Constitution and draft a *Declaration of First Principles for the Governance of Outer Space Societies*. Both the document and the process of formulating it were intended only as templates for addressing and establishing principles for free and quasi-independent societies in space habitats or settlements. Nevertheless, several conferees stated a strong preference, under appropriate circumstances and timing, for presenting the document to the White House and to the United Nations.

The Declaration that ultimately emerged from the deliberations is a three-part document. The first part is a ringing preamble embracing the reasons for the Declaration; the second is a reaffirmation of faith in fundamental human freedoms and the inalienable rights of individuals who live in space; and the third is an assertion that the governance of and by space societies should reflect the "will" of the participants. The document is designed to evolve and adjust to equally as evolving realities,

not the least of which is the changing nature and definitions of what constitutes "normal" human functions, what in fact is "human," and what are "*inherent* human rights." The focus of the conference was on the most fundamental values and principles underlying any space civilization.[11]

President George W. Bush's recently announced policy for the future of the U.S. space program seems heavily oriented toward enhancing military interests and re-establishing broad leadership in space technology.[12] Permanently staffed habitats on the lunar surface and that of Mars sound more like the establishment of military outposts or "colonies" than the genesis of a new civilization of human*kind* or space*kind*, a unique part of the human evolutionary odyssey. Various ongoing private and public conferences to study and assess whether the American space program in the New Millennium are not much more than a convening of the usual suspects, that is, bringing into one forum a broad scope of the nation's elite space experts from the aerospace industry, NASA, the Department of Defense, Congress, and the executive branch to help continue in a parochial fashion the vision of America's role as leader in space activities.

Time is much shorter than Earth's current civilizations seem prepared to recognize in order to avoid dragging old and frequently irrelevant values/principles and controlling legal constructs into space simply because we know them and are comfortable with them, despite their histories in practice of destruction as well as creativity. We should be pressing with great urgency to catch up with our unfolding space technology in terms of philosophical, theological, and biocultural constructs necessary for establishing a civilization that reflects not only a framework of values we wish to inculcate at the outset, but the

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[11] For a complete text of the Declaration of First Principles for the Governance of Outer Space Societies *See* George Robinson, *Re-Examination of Our Constitutional Heritage: A Declaration of First Principles for the Governance of Outer space Societies*, 3 HIGH TECH. L.J. 79 (1989). *See also* George Robinson, *Rethinking Outer Space in the 200th Year of our Constitution*, AIR & SPACE LAW. (Fall 1987).

[12] Pres. George W. Bush established a Commission on Moon, Mars, and Beyond, on Feb. 9, 2004, "to provide recommendations to the President on implementation of the vision outlined in the President's policy statement entitled "A Renewed Spirit of Discovery" and the President's budget submission for Fiscal Year 2005. *See* http://www.moontomars.org (last visited April 12, 2004).

unique demands and physical exigencies, as well, of a non-Earth life support system. At present, though, we seem to be adopting a tragic cultural *laissez faire* attitude that does not challenge our intellectual capabilities, and that does not recognize the imperative requirement of a well-considered establishment of a space civilization(s) that will ensure not only that *Homo sapiens sapiens* and its altered descendents will evolve biologically, biotechnologically, and culturally in sensible fashions but that they will evolve at all.

It is necessary in large part to return to basics and start developing core values for and by this new space civilization; values that are responsive not only to the needs and dictates of space habitation, but as well to this new phase of human biotechnological evolution. We need to address carefully the philosophical and theological constructs that might serve as the foundation to guide this phase of evolution. Toward accomplishing the first step, i.e., identifying ecumenically shared or accommodated core values and principles around which a space civilization constitution ultimately might be drafted, the proposed resolution set forth below is offered as a working template.

PROPOSAL

SPACE MIGRATION: AN ECUMENICAL MEETING OF MINDS

WHEREAS, the U.S. Government's response to the loss of the *Columbia* orbiter and its crew has been assessed principally, if not exclusively, from safety, engineering, and economic perspectives, as well as military interest in the human space program; and

WHEREAS, the current policy of the U.S. Executive Branch is to create and fund human missions that would establish a permanent U.S. presence on Earth's moon and ultimately Mars; and

WHEREAS, a number of domestic and global leaders have expressed a preference for deemphasizing the human space flight program and putting more attention on robotic exploration and

settlement activities, and still others call for the return to true human space exploration, migration, and settlement of near and deep space, including a return to the moon and human missions to Mars; and

WHEREAS, approximately thirty-five years have passed since NASA conducted a major in-depth directional program review (such as the post-Apollo "Outlook for Space" study and conclusions co-sponsored by the Smithsonian Institution in Washington, D.C.) embracing both the solicited and unsolicited views of a broad international civilian population, as well as industry and government experts and leaders; and

WHEREAS, an international conference co-sponsored primarily by non-governmental research and educational organizations, with in-kind logistical and financial support from all interested governmental and non-governmental sources, should convene for approximately five days (at an appropriate non-governmental facility, with follow-on working panels at sites appropriate to the panel tasks and participant resource locations) a diverse global community of minds united by a common interest in identifying and formulating the biocultural constructs and guiding philosophical and theological principles necessary to direct humankind's evolutionary odyssey into and settlement of near and deep space, and essential for establishing the unique framework of values for a space civilization that will ensure survival of that civilization and its component participants,

NOW THEREFORE, it is hereby proposed that said conference and follow-on working panels in furtherance of defining these constructs and guiding principles be convened to take advantage of the pivotal moment of forced reassessment of the U.S. and multilateral human space program as an opportunity to restate or redefine for and by the broadest international sector possible the core beliefs, hopes, biological imperatives, and socio-cultural survival ideals concerning the destiny of humans and human*kind* on Earth and in space, and the establishment of a cradle of space civilization.

Toward this end, the following issues and questions should be among those addressed by the conference organizers and participants:

1. Why should/must humans and human*kind* depart planet Earth to occupy and settle near and deep space?

a. Biological imperative

b. Cultural imperative

c. Philosophical constructs and theological imperatives

2. What should be the purposes or objectives of free standing and independent human*kind* (including biotechnologically integrated entities with advanced artificial intelligence components) societies in space once second generation, *et seq.*, and/or permanent space habitation have been established?

3. What ought or must be the characteristics of military participation in human*kind* space migration?

4. Who should participate in addressing these questions? Among others, participants ought to include the following:

a. Evolutionary biologists

b. Astrobiologists

c. Philosophers

d. Theologians

e. Economists

f. Cultural/physical anthropologists and historians

g. Space human factors experts, including space psychologists

h. Astrophysicists

i. Engineers and other representatives of pragmatic/empirical disciplines

j. Legislators, jurisprudents, and constitutional law experts

k. Experts in artificial intelligence, telepresence and teleportation communication, robotics, human genome mapping and gene sequencing intervention, biotechnology integration, cryogenics, cyberspace issues, etc.

ANTICIPATED RESULT

A published proceedings for distribution to participants, the United Nations, sovereign governments, members of theological organizations, and institutions of higher education; a basic statement (manifesto) of the globally formulated fundamental principles and imperatives for moving human*kind* or the essence(s) of man*kind*/human*kind* off Earth; and a constitutional structure to assure a legal framework for survival of a complex and unique culture in space, a cradle of *space civilization*.

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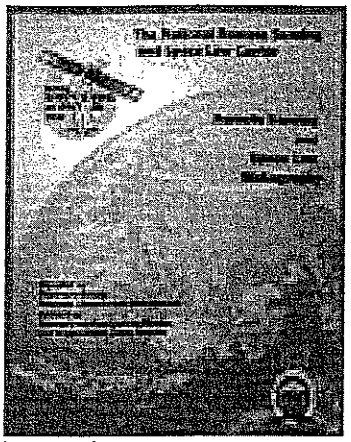

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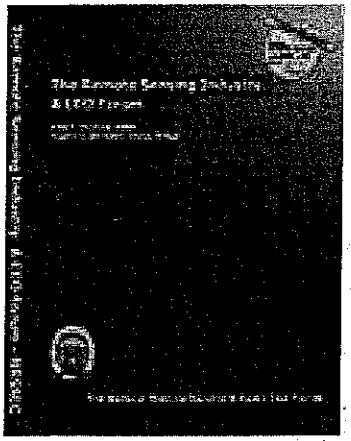

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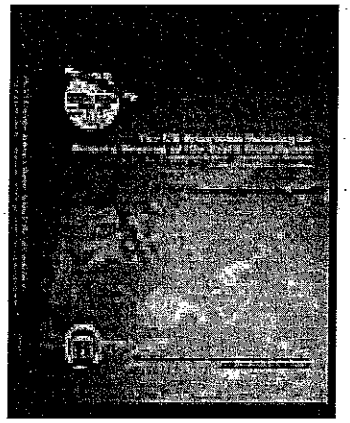

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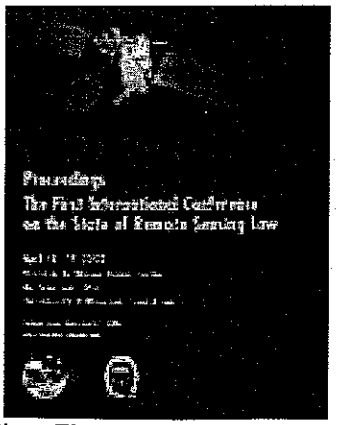

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