OF GARDENS AND STREETS: A DIFFERENTIATED MODEL OF PROPERTY IN INTERNATIONAL AND NATIONAL SPACE LAW

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INTRODUCTION

Often, when I visit cities, I go to gardens. A visit to a garden works on many levels. You can walk on the trails and paths that the landscape architect has deftly laid out. As you walk, you can admire the beauty of the various things that make up gardens such as the flowers, the trees, the vines, and other flora. And once you leave the garden, you can recall its beauty with pictures of the garden or a diary account of the particular property. A key aspect, then, of the "garden" is your ability to experience the pleasure of walking along the path, the pleasure of viewing flowers, and the pleasure of recalling both of these experiences. Your supposedly singular experience, then, is really one of many discrete and overlapping experiences. While you, a casual visitor, may be content to simply "visit" the garden, within a legal context, this choice may flatten important distinctions between categories. Indeed, an important task of a legal regime is the ability to differentiate between these diverse "things" which may underlie a singular subject.

I begin with gardens, not space, the subject of this conference for two reasons. Initially, the metaphor of a garden serves to "normalize" the treatment of space within the law. Often, analyses of space law treat this subject as a separate area, in-

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dependent of standard debates in other disciplines such as property and intellectual property. For example, the recent innovative scholarship as to "the commons" that has taken place in both intellectual property and property discussions is largely absent from the treatment of property in national and international space law. I think of this conference and resulting Essay as the opportunity to begin a fruitful dialogue between space law and a number of the more traditional disciplines.

The metaphor of the garden serves another narrower purpose. The garden reflects the way in which property law creates a differentiated legal framework, which I argue below, would be useful in describing how property should be treated within the space law regime. The metaphor of a garden very nicely reflects the different categories used to describe those "objects" in which claims of property ownership are made. The garden I have described roughly corresponds to the categories we assign to regulated "things" in property. The garden itself is land or real property;[1] the items contained in the garden such as flowers and trees are chattels;[2] and the subsequent accounts could be copyrighted and are thus, fall within the category of intangible or intellectual property.[3] This differing treatment is furthered by the process of dividing the rights of users into a separate series of categories, such as the right to exclude, the right to use and the right to transfer.[4] This so-called "bundle of rights" can have

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[1] Real property is commonly defined as land and generally whatever is erected or growing upon or affixed to the land. BLACK'S LAW DICTIONARY 1218 (6th ed. 1990); *see also* J.E. PENNER, THE IDEA OF PROPERTY IN LAW 105-111 (1997) (reviewing the distinctions between the types of different objects of property).

[2] A chattel is commonly defined as an article of personal property that is personal and movable in nature. Two types of categories of chattel exist: (1) personal chattel, which have no connection with real estate; and (2) real chattels, which are those interests annexed to the real estate. BLACK'S, supra *note* 1at 236. Arguably, some ambiguity exists as to whether the flowers, flora, other trees, would be classified as things annexed to real property or to real chattel. For purposes of this discussion, I refer to these things as real chattel.

[3] Intangible property is commonly defined as property that is a "right" such as patent, copyright, trademark or one that is lacking a tangible existence. *Id.* at 809.

[4] While I will not discuss extensively in this paper, another way to differentiate the treatment property is to distinguish between private and public spaces. The space itself can be further divided by the "public" or "private" qualities of a thing. A space or thing that is somehow is subject to multiple users can be defined as a "public"; a space or thing that is available only to a singular owner or that whose use is controlled by that owner

varying amounts of strength when applied to any particular object as Justice Stanley Mosk, in dissent, noted in *Moore v. University of California Regents*[5]:

> But the same bundle of rights does not attach to all forms of property. For a variety of policy reasons, the law limits or even forbids the exercise of certain rights over certain forms of property. For example, both law and contract may limit the right of an owner of real property to use his parcel as he sees fit. Owners of various forms of personal property may likewise be subject to restrictions on the time, place, and manner of their use. Limitations on the disposition of real property, while less common, may also be imposed. Finally, some types of personal property may be sold but not given away, while others may be given away but not sold and still others may neither be given away nor sold.[6]

What characterizes these property rights, then, is the ability to have mutable, differential relationships, depending on both the characteristics of the property itself as well as the right at stake.

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is defined as "private". Of course, such boundaries are complicated all the time. A "private" space may accommodate public purposes; a "public" space may yield to private uses. Here, I return to gardens, and one set of gardens, in particular, the formal gardens of Versailles. The formal gardens of Versailles demonstrate these potential dualities. While the formal gardens of Versailles were nominally constructed as a "private" space for the King Louis XIV, he often designed elaborate garden tours for tourists and visiting dignitaries that reinforced and re-iterated his "public" power as the King. So, the "private" roles of Versailles became intrinsically linked to "public" roles, thus demonstrating the potential ambiguities in how we conceive of and subsequently attach rights to, different types of spaces. Chandra Mukerji states that:

> The importance of the gardens to Louis XIV's reign was underscored by the itineraries written to direct visits to the gardens of Versailles. Some of the few pieces written in Louis XIV's own hand were itineraries for promenades that he penned for his own use on diplomatic occasions; the king wrote these guides himself apparently because he placed great weight on the ritual tours of the park. The promenades were formal affairs, at which distinguished visitors were feted and entertained as they followed the prescribed paths through gardens. What they did and saw in these circuits was somehow meant to inform their assessments of the king and his court.

Id. CHANDRA MUKERJI, TERRITORIAL AMBITIONS AND THE GARDEN OF VERSAILLES 9 (1997).

[5] Moore v. University of California Regents, 51 Cal. 3d 120, 166-65 (1990).

[6] *Id.* at 166.

This Essay is divided into two sections. As I view this as an exercise in normalizing "space", Section I explores how the different treaties that comprise the international space regime treat two key analytical categories—things and rights. By analyzing these objects in within space law regime, I hope to explore how a differentiated model of property illuminates tensions over property allocation within the current international legal regime. Section II examines how a differentiated model of property law in space will help us to "re-think" two key areas in space: (1) the appropriateness of a de-contextualized treatment of property; and (2) the usefulness of an overarching "commons" principle in limiting potential broad claims of property in various objects. While a number of radical reforms have been proposed that involve wholesale privatization of space objects, arguably, recognizing the "differentiated" aspects of property within space law would achieve a more nuanced perspective on reform that takes into account the overall historical goals of the international space regime.

I. A DIFFERENTIATED MODEL OF PROPERTY IN SPACE

After briefly analyzing the pre-occupation with territorial claims of ownership (or the lack thereof) in the international space regime, I first outline the basic framework of differentiated model, which places more importance on a wider range of "property" categories than currently understood. I then examine two key categories—types of objects and types of rights—which form the bases of a differentiated framework of property in space. Finally, I examine how these categories could work together to create a contextual understanding of rights that conform to pre-existing norms in property law.

A. Territorial Property in Space

The basic framework of international space consists of five treaties[7], which constitute binding law and over seventy associ-

[7] The five treaties are: (1) 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, T.I.A.S. 6347, 610 U.N.T.S. 205 [hereinafter Outer Space

ated principles and declarations, which offer guidance as to the content of national legislation.[8] Analyses of property in space have usually focused on its most unique characteristic: its use of a communal regime to allocate access to the territory of space. Article II of the Outer Space Treaty provides that "[o]uter space, including the moon and other celestial bodies, is not subject to national appropriation by the claim of sovereignty, by means of use or occupation, or by any other means."[9] This statement, commonly referred to as the "province of mankind" principle is based on the theory of *res communis*. The theory of *res communis* provides that since the character of some common resources is open to all by their very nature, exclusive appropriation is

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Treaty]; (2) the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, U.N. GAOR, 22nd Sess., Supp. No. 16, at 5, U.N. Doc. A/6716 (1968), 19 U.S.T. 7570, 1968 U.S.T. LEXIS 584 [hereinafter Rescue Agreement]; (3) the Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 961 UNTS 187 [hereinafter Liability Convention]; (4) the Convention on the Registration of Objects Launched into Outer Space, Jan., 14, 1975, art. II, U.N. GAOR, 29th Sess., Supp. No. 31, at 16, U.N. Doc. A/9631 (1975), 28 U.S.T. 695, 1975 U.S.T. LEXIS 552 [hereinafter Registration Convention]; and (5) the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, U.N. GAOR, 34th Sess., Supp. No. 46, at 77, U.N. Doc. A/34/46 (1980), 18 I.L.M. 1434 [hereinafter Moon Treaty]. Widespread acceptance, of the Moon Treaty, however, is limited. *See* Brian M. Hoffstadt, Comment, *Moving The Heavens: Lunar Mining and the "Common Heritage of Mankind" in The Moon Treaty*, 42 UCLA L. REV. 575, 583-592 (1994) (examining the limited international acceptance of the Moon Treaty).

[8] Over seventy sets of declaration and principles exist related to space-related activities. For the purposes of this paper, the most relevant principles and declarations are: (1) Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space, GA Res. 1962 (XIII), U.N. GAOR, 18th Sess., Supp. No. 15, at 15, U.N. Doc. A/5515 (1964); (2) Principles Governing the Use by States of Artificial Earth Satellites For International Direct Television Broadcasting, GA Res. 37/92, UN GAOR, 37th Sess., Supp. No. 51, at 98, UN Doc. A/37/51 (1982) [hereinafter Artificial Earth Satellite Principles]; (3) Principles Relating To Remote Sensing of the Earth From Outer Space, U.N. GAOR, 41st Sess., Supp. No. 53, at 115, U.N. Doc. A/41/53 (1986) (hereinafter Remote Sensing Principles]; (4) Principles to Use of Nuclear Power Sources in Outer Space, GA Res. 47/68 (Dec. 14, 1992); and (5) Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in Interest of All States, Taking In Particular Accounts the Needs of Developing Countries, Ga. Res. 51/122, , U.N. Doc. A/AC.105/572/Rev. 1 (1996). Other sources of space law include: (1) bilateral agreements between individual nations; (2) domestic space regulation, such as statutes and regulation; and (3) case law, interpreting the scope of international and domestic treaties. *See* Ty S. Twibell, Note, *Space Law: Legal Restraints on Commercialization and Development of Outer Space*, 65 U.M.K.C. L. REV. 589, 591-609 (1998).

[9] *See* Outer Space Treaty, *supra* note 7 at art.11.

difficult, and therefore, use and access is open to all.[10] The "province of mankind" of Article II of the Outer Space Treaty is often contrasted to the broader "common heritage" doctrine of contained in Article 11 of the Moon Treaty. Article 11 provides that: (1) the moon and natural resources are the common heritage of mankind; (2) the moon is not subject to national appropriation by use, occupation, or other means; (3) the surface or sub-surface of the moon cannot be become the property of any state, international intergovernmental or non-government organization, national organization, non-governmental entity or natural person; (3) equal non-discriminatory rights exist as to exploration and use of the moon; and (4) an international regime must regulate the common territory.[11] The "common heritage" embodied by the Moon Treaty differs significantly from the "province of mankind" principle contained in Outer Space Treaty for two key reasons. First, unlike the province of mankind framework, the "common heritage" principle outlines a basic framework for extracting the resources.[12] Second, the "common heritage" principle dictates that any resource allocation must be conducted on an equitable basis by an international governing regime.[13] The "common heritage" principle, thus, goes

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[10] Carol M. Rose, *Romans, Roads, and Romantic Creations*, 66 SPG LAW & CONTEMP. PROBS. 89, 91 (2003); Gerald Torres, *Who Owns The Sky*, 19 PACE ENVTL. L. REV. 515, 528, 529-532 (2002) (examining the development of the *res communis* principle).

[11] *See* The Moon Treaty, *supra* note 7 at art. 2 (1-6).

[12] Joanne Irene Gabrynowicz and Jacqueline Etil Serrao, *An Introduction to Space Law For Decision Makers*, 30 J. OF SPACE L. 227, 229 (2004); *see also* Ellen S. Tenenbaum, *A World Park in Antartica: The Common Heritage of Mankind*, 10 VA. ENVTL L.J. 109, 113-115 (1990); Joanne Gabrynowicz, *Crisis of the Commons: A Turning Point*, PROCEEDINGS OF THE THIRTY-FIRST COLLOQUIUM OF THE LAW OF OUTER SPACE 31 (1988); B. Mairorski, *A Few Reflections on the Meaning and Interrelation of Province of Mankind and the Common Heritage*. PROCEEDINGS OF THE 29TH COLLOQUIUM OF THE LAW OF OUTER SPACE 58-61 (1986).

[13] The strong principles of equitable treatment between developing and non-developing nations, which are the core of the "common heritage" principles serves as a useful counter-example to recent trends in international intellectual property, which have typically neglected the issues of equity within the development context. Margaret Chon has argued that the international intellectual property should take into account into equitable considerations, by utilizing a principle of substantive equality. Under a principle of substantive equality, the "the decision maker should accord much less deference and exercise much more skepticism towards the proposed government action (in this case, the regulatory intervention by the state in the form of the grant of intellectual

much further than the neutral "province of mankind" principle by providing for a more defined account of resources that may result from exploring the territory of space, and moreover, providing for a governance model for determining how those resources will be allocated.

Use of each of these models has proven to be controversial. According to critics, the failure of the two principles lies primarily in their perceived inability to secure private property rights in territory to various commercial and non-governmental actors. Legal uncertainty exists as to the scope of private territorial rights because of the ambiguities contained in the "no sovereignty" language of Article II. Article II could be interpreted to either allow a state to recognize extraterrestrial claims by asserting jurisdiction over its citizen's actions or to preclude all private claims in territory, whether the claim comes from nation-states, natural persons, or juridical persons.[14] As a result of this ambiguity, territorial claims of private property are not accommodated and the subsequent failure to accommodate private claims in territory distorts incentives to develop a range of resources from commercialized space travel to lunar mining. A number of solutions have been suggested to resolve this perceived inability, among them: (1) amending Article II of the Outer Space Treaty to eliminate the "no-sovereignty" clause[15]; (2) allowing governmental entities to issue land grants or other similar grants of interests in territorial space[16]; (3) creating a system to register and license territorial claims[17]; (4) adopting a free market approach undertaken limited by a defined regula-

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property protection) in the context of the provision of a basic human development capability, such as basic education or health care." Margaret Chon, *Intellectual Property and the Development Divide*, 27 CARDOZO L. REV. 2821, 2837 (2006).

[14] Brandon C. Gruner, Comment, *A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles Into The 1967 Space Treaty For Colonization of Outer Space in The Twentieth-First Century*, 35 SETON HALL L. REV. 299, 333 (2004) (citing Glenn H. Reynolds & Robert P. Merges, OUTER SPACE: PROBLEMS OF LAW AND POLICY 27 (1989).

[15] Twibell, *supra* note 8, at 638.

[16] Glenn H. Reynolds, *Symposium, Environmental Rights and International Peace: Outer Space: Some Thoughts on Structures and Relations*, 59 TENN. L. REV. 729, 733 (1992).

[17] Kevin Cook, *The Discovery of Lunar Water: An Opportunity to Develop a Workable Moon Treaty*, 11 GEO. INT. ENVTL. L. REV. 647, 698 (1999).

tory umbrella[18]; and (5) adopting common-law possessory concepts.[19]

These proposals all share one common premise, namely, by extending the ability of non-governmental (whether they be public or private) actors to claim territory, claims as to other objects of property—land, chattels, and intangible property—will be strengthened. This premise, however, conflates the territorial approach embodied by the "province of mankind" and "common heritage" principles to *all* types of potential objects of property claims. According to this view, if territory is assumed to be opened, all other objects in that territory are presumed to be open. This premise is flawed. This premise presumes that the principles as to territory to extend to *all* other objects in which property can be claimed. Communal access to territory, however, does not preclude all other claims of private property in that territory. A more appropriate metaphor may be one suggested by Carol Rose, who has proposed that a proper way to conceive of this mixed regime is that of a street. In a street, "there is public access but private property too. People stop to chat with one another and with the street vendors. They laugh at the pet monkey's antics, drop into a shop and buy something, or have a seat and watch the other's pass by."[20] Rose's account of a "street" landscape suggests that communal treatment of territory in space does not necessarily preclude that all other claims of ownership. Any analysis of the property law of space, then, does not end with the communal nature of territorial claims. Indeed, the treatment of property in international and national space law proves to be quite diverse if we look beyond *territory* as the only object of property claims in space.

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[18] Lynn M. Fountain, Note, *Creating Momentum in Space: Ending the Paralysis Produced by the "Common Heritage of Mankind" Doctrine*, 35 CONN. L. REV. 1735, 1772-1781 (2003).

[19] Gruner, *supra* note 14, at 345-354; Ezra J. Reinstein, *Owning Outer Space*, 20 NW. J. INT'L L. & BUS. 59, 98 (Fall 1999) (suggesting that space law must embrace the principle of private property).

[20] Carol M. Rose, *Symposium, Introduction: Property and Language, or the Ghost of the Fifth Panel*, 18 YALE J.L. & HUMAN. 1, 18 (2006).

B. Chattels and Intangible Property in Space

Both the core treaties and subsidiary principles offer avenues for claiming property in chattel-type claims as well as intangible property claims. The importance of Article VIII for this framework cannot be underestimated. This clause identifies a range of potential property objects and more importantly, establishes a framework for establishing jurisdiction over a wide variety of objects. This jurisdictional element has allowed states to recognize a broader range of property rights, such as intangible property through domestic laws. In a differentiated model of property in space, Article VIII assumes an importance equal to that of Article II in terms of defining the scope of property rights.[21]

1. Chattels As Objects of Property in Space

The Outer Space Treaty refers twice to objects that can be classified as personal chattel (since these items are movable in nature). Article VII refers to the "launching of objects" into outer space.[22] Article VIII outlines a method of registering those objects.[23] Article VIII identifies three types of potential objects: (1) an object launched into space; (2) objects landed or constructed on a celestial body; and (3) the component parts of each of these objects.[24] Later treaties have expanded upon these initial definitions. For instance, the Liability Convention and the Registration Convention define the term "space object" as "in-

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[21] A number of recent articles have emphasized the importance of Article VIII for establishing property rights in non-territorial objects. *See, e.g.*, Henry R. Hertzfeld and Frans G. Von der Turk, *Bringing Space Law Into the Commercial World Without Sovereignty*, 6 CHI. J. INT'L L. 81, 83 (2006); Kelley M. Zullo, Note, *The Need To Clarify The Status of Property Rights in International Space Law*, 90 GEO. L.J. 2143, 2430 (2002).

[22] Article VII refers to the liability assessed to one state party if the launching of a registered space object causes damage to another state party or the natural or juridical actors of that state. *See* Outer Space Treaty, *supra* note 7, art. VII. An earlier version of this clause was included in Section 8 of Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space. *See* Declaration of Legal Principles Governing the Activities of States, *supra* note 8, § 8.

[23] Article VIII refers to the ability of a state to obtain jurisdiction over a space object placed upon the relevant state registry. *See* Outer Space Treaty, *supra* note 7, at art. VIII.

[24] *Id.*

cluding component parts of a space object as well as its launch vehicle and parts."[25] A number of national laws have incorporated the same definition of "space object" into their domestic laws.[26] A number of countries have adopted equivalent definitions that protect a broader range of objects.[27]

The Outer Space Treaty also contains references to items that can be classified as real chattel since these items can be potentially annexed or attached to the land of a celestial body. Article XII of the Outer Space Treaty refers to "all stations, installations, equipment and space vehicles on the moon and other celestial bodies."[28] This type of chattel is less frequently referenced in subsequent treaties. Only Article 8(2)(b) of the Moon Treaty refers directly to this type of annexed property.[29] The infrequency of reference to this type of property may be explained by the current difficulty of actually annexing items to space territory.

2. Intangible Property As Objects of Property in Space

Three types of potential intellectual property rights can potentially apply to space activities: (1) patents that protect scientific and technical information; (2) copyrights that protect satellite broadcasts and remote sensing data; and (3) trademarks

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[25] *See* Liability Convention, *supra* note 7, at art. 1(d); Registration Convention, *supra* note 7, at art. 1(c). Article 8 (2)(a) of the Moon Treaty also refers to the abilities of space parties to land on and launch space objects from the moon. *See* Moon Treaty, *supra* note 7, at art. 8(2)(a).

[26] A number of nations have adopted the same language for their domestic statutes. *See, e.g.,* The Outer Space Act, 1986, c.38, §13 (England) (the term space object includes "component parts of a space object; its launch vehicle, and the components of that."); 605A Royal Decree 278/1995, Establishing in the Kingdom of Spain of the Registry Foreseen In the Convention Adopted by the United Nations General Assembly on 2nd November 1974 (February 24, 1995) (Spain) (the term space object is "deemed to include both component parts thereof and the launch vehicle and parts thereof.").

[27] A number of equivalent definitions exist in other domestic statutes. *See, e.g.,* The National Aeronautics and Space Act of 1958, 42 U.S.C. § 2452 (2006) (the term "aeronautical and space vehicles" means "aircraft, missiles, satellites, and other space vehicles, manned and unmanned, together with related equipment, devices, components, and parts."); Space Affairs Act, Trade Industry No. 84 of 1993, s. 1 (South Africa) (the term launch vehicle means "any device manufactured or adapted to land a space-craft").

[28] *See* Outer Space Treaty, *supra* note 7, at article XI.

[29] *See* Moon Treaty, *supra* note 7, at art. 8(2)(b).

that may protect the naming of space projects and satellites.[30] Notably, however, these intangible objects of property are not directly referenced in the text of the Outer Space Treaty or the subsequent treaties. Of the relevant treaties, the Convention Relating To Distribution of Programme Carrying Signals Transmitted By Satellite ("the Brussels Convention") is the only standing multi-lateral agreement that specifically acknowledges the potential existence of intellectual property rights in a space-related creation.[31] Article 6 of the Brussels Convention states that "[t]his Convention shall in no way be interpreted to limit or prejudice the protection secured to authors, performers, producers of phonograms, or broadcasting organizations, under any domestic law or international agreement."[32] While Article 6 recognizes the existence of potential intellectual property rights in direct satellite broadcasting, Article 6 is still negative in its effect since it relies on domestic law or international agreements to fill in the meaning of those rights.

Any protection of intangible property, then, has been the result of two developments. First, Article VIII of the Outer Space Treaty has been interpreted to protect those intellectual property rights associated with a covered chattel. Under Article VIII, a property owner can claim a corresponding intangible property right under the relevant domestic regime due to the nation's ability to exercise in personam jurisdiction over the

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[30] Leo B. Malagar & Marlo Apalisok Magdoza-Malagar, *International Law of Outer Space and the Protection of Intellectual Property Rights*, 17 B.U. INT'L L.J. 311, 350 (1999); *see also* Ruwantissa Abeyrante, *The Application of Intellectual Property Rights to Outer Space Activities*, 29 (1), J. OF SPACE L. 1-20 (2003).

[31] Convention Relating To Distribution of Programme Carrying Signals Transmitted By Satellite, May 21, 1974, 1974 Lexis 269, TIAS 11078.

[32] *Id.* at art. 6. The approach of Article 6 is also reflected in the Article H of the Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting. *See supra* Artificial Earth Satellite Principles, note 8, at art. H ("[w]ithout prejudice to the relevant provisions of international law, States should cooperate on a bilateral and multilateral basis for protection of copyright and neighbouring rights by means of appropriate agreements between the interested States or the competent legal entities acting under their jurisdiction. In such cooperation they should give special consideration to the interests of developing countries in the use of direct television broadcasting for the purpose of accelerating their national development"). Notably, Article H of this Principle does include a focus on the equitable redistribution of resources between developing and non-developing nations.

listed chattel.[33] The intellectual property right, then exists, as a subsidiary right that arises upon listing of an object on the register. National statutes that grant intellectual property rights in items placed on a register typically contain an explicit jurisdictional grant. For example, Section 105 of the Patent Act grants a patent in "an invention made, used or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States."[34] Section 105 reflects two common limits contained in these national statutes: (1) the patent has to be granted on a space object or component of that space object; and (2) the patent has to be under the jurisdiction and control of the United States. The major flaw, however, of this approach is that an intellectual property right will not be recognized if the chattel is not listed on the registry; this potentially precludes a broader range of intellectual property rights from being claimed.

A treaty or principle can also create a new property object and that property object can become subsequently assimilated into a nation's existing intellectual property regime. Take, for example, the passage of the Land Remote Sensing Commercialization Policy Act ("the Policy Act")[35] which referenced the definition of "primary data" contained in Principle I(b) of the Remote Sensing Principles in its definition of "unenhanced" data.[36] By

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[33] *See* Ex Parte McKay, 200 USPQ 324, 326 (1978) ("It is clear from Article VIII of said Treaty that jurisdiction of the United States in personam over any person is present if the object launched into outer space is of United States registry. A patent grant under 35 U.S.C. 154 by the United States for a process to be carried out on the moon by personnel subject to its jurisdiction is thus not inimical and at variance with the indicated section of the statute."); *see also* Twibell, *supra* note 8, at 617.

[34] 35 U.S.C. § 105 (2006). Notably, the language of Section 105 is broader than the same contained in Article VIII of the Outer Space Treaty since Section 105 subjects space objects listed on a register to the "jurisdiction" or "control" of the United States. *See* Dan Burk, *Application of United States Patent Law to Commercial Activity in Outer Space*, 6 SANTA CLARA COMP. & HIGH TECH. L.J. 295, 347 (1991).

[35] Land Remote Sensing Commercialization Policy Act, 15 U.S.C. § 5601 *et seq.* (2006).

[36] *Compare* Remote Sensing Principle, *supra* note 8, at Principle I(B) ("The term 'primary data' means the raw data that are acquired by remote sensors borne by a space object and that are transmitted or delivered to the ground from space by telemetry in the form of electromagnetic signals, by photographic film, magnetic tape or any other means") with the Policy Act, *supra* note 35, at § 5602(13) ("The term 'unenhanced data' means land remote sensing signals or imagery products that are unprocessed or subject

incorporating the Principles into its national law, a new category—data collected from remote sensing objects—then came under the ambit of the relevant domestic intellectual property regime. Such protection, however, depends on the scope accorded to that right by the domestic intellectual property regime. To continue with the above example, unenhanced data does not receive protection under copyright law in the United States because it lacks sufficient constitutional originality while under the copyright law of the European Union it most likely would receive a significant level of protection.[37]

One central consequence results from this failure to develop an independent intellectual property regime in space law. From its beginning, the international space regime has emphasized the usefulness of a unified framework in addressing the significant theoretical issues associated with the unique territory of space and its associated resources. Now, because the approach to intangible property has developed incrementally within particular national traditions, the overall space regime has turned to local approaches to allocate resources. This only deepens a commitment to a contextual approach to the treatment of property within the overall space regime. One nation could potentially grant stronger intellectual property rights to an item, while another could potentially grant less intellectual property rights to an item. Of course, these potential differences may have been diminished due to the Agreement on Trade Related Aspects of Intellectual Property, Including Trade in Counterfeit Goods of the General Agreement on Tariffs and Trade (hereinaf-

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only to data preprocessing."). *See also* Joanne Irene Gabrynowicz, *Defining Data Availability for Commercial Remote Sensing Systems: Under United States Federal Law*, 23 ANNALS OF AIR AND SPACE L. 94, 98 (1998).

[37] *Compare* Fiest Publications, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 350-51 (1991) ("Facts, whether alone or a part of compilation, are not original, and therefore, may not be copyrighted. A factual compilation is eligible for copyright if it features an original selection or arrangement of facts, but the copyright is limited to the particular selection or arrangement.") *with* Council Directive 96/9/EC, Art. 7, 1996 O.J. (L 77) ("Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or reutilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.").

ter to referred to as "TRIPS")[38] since TRIPS requires a minimum standard for intellectual property rights protection.[39] The minimal standard however, may not completely ameliorate the possibility of different approaches. The rapidness of technological change that takes place within the context of space may overtake the abilities of the international community to negotiate the varying demands of property owners and public users.

C. Rights in Property in Space

A differentiated approach to property also necessitates a more nuanced understanding of *rights* in those property objects. The rights of property owners as an object of property fall into three categories: (1) the right to exclude others from using the object; (2) the right to use the object in a socially appropriate manner; and (3) the right to transfer the object. The strength of these rights, however, will ebb and flow, based on how much power, we accord to potentially competing public rights in that property. Laura Underkuffler has argued that the power afforded these rights reflects two underlying conceptions, the common conception of property rights and the operative conception of property rights.[40] The first, the common conception of property rights, affords "the individual tremendous protections against competing public interests...[and, therefore these rights] are presumptively superior to the public that oppose

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[38] Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299, 33 I.L.M. 1197 (1994) [hereinafter TRIPS].

[39] *Id.* at art. 3 ("Members shall accord the treatment provided for in this Agreement to nationals of other Members."); art. 9 (outlining minimum standards of protection for copyright); art. 15 (outlining minimum standards of protection for trademark); & art. 16 (outlining minimum standards of protection for patents).

[40] LAURA S. UNDERKUFFLER, THE IDEA OF PROPERTY: ITS MEANING AND POWER 132-34 (2003); *see also* Laura S. Underkuffler-Freund, *Takings and the Nature of Property*, IX CANADIAN J.L. & JURIS. 161, 182-91 (1996); Laura S. Underkuffler-Freund, Response, *Property: A Special Right*, 71 NOTRE DAME L. REV. 1033, 1034-38 (1996). Underkuffler's theory has been applied in a variety of settings, *see, e.g.*, Susan Ayres, *The Rhetorics of Takings Cases: It's Mine v. Let's Share*, 5 NEV. L.J. 615, 628-31 (Spring 2005) (discussing Underkuffler's two conceptions of property in relation to takings cases); Lior Zemer, *The Conceptual Game in Copyright*, 28 HASTINGS COMM. & ENT. L.J. 409, 412-14 (Spring 2006) (explaining Underkuffler's two conceptions framework and its application to copyright law).

them."[41] Thus, the rights of a property owner seem to be inherently opposed to the rights of the public and in a dispute between the two, individualized property rights will usually trump any expressed public goals. The second, the operative conception of property rights is a more flexible one. Under an operative conception of power, "collective powers to control are seen as an inherent part of the initial configuration of ownership privileges."[42] An operative conception then accords less power to any individual property right, by incorporating collective rights into the initial allocation of property rights.[43] Underkuffler's theory recognizes that the outcome of many debates in property reflects the underlying theoretical conception selected by the relevant decision-maker.

Underkuffler's account of variable property rights is consistent with a differentiated model of property in space law as the particular strength of individual rights to exclude, use, and transfer will vary depending on the relevant property object. For instance, individual rights in territory are accorded little or no value and must yield to a number of important public interests. Article I of the Outer Space Treaty does not simply require access to territorial space but also states that access and use must take place on a non-discriminatory and equal basis.[44] These collective "use" rights to territory can be seen to act consistently with an operative conception of property in which rights are seen as inherently collective from the onset.[45] By contrast, the rights to use, transfer, and exclude in intangible property objects, are stronger than those in territory. For instance, a potential copyright owner has a right to prevent others from

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[41] *See* UNDERKUFFLER, THE IDEA OF PROPERTY, *surpra* note 40, at 132.

[42] *Id.* at 41.

[43] *Id.* at 62.

[44] *See* Outer Space Treaty, *supra* note 7, at art. I.

[45] The corresponding right to exclude is diminished in light of these strong collective "use" rights. As J.E. Penner notes "rights to purely exclude or purely to use interact naturally, as it were, in the sense that use almost always involves some exclusion of others...So long as we conceive of a right to use in a social situation, in the real world, that is, the implications of that kind of right will raise issues about the rightfulness of excluding others, because the vast majority of the uses that a person will make of a thing are impossible if everyone tries to use the thing at the same time. *See* PENNER, *supra* note 1, at 68-69.

using and distributing enhanced data under the current international space regime.[46] Arguably, it could be said that rights as to an intangible property right are those typically associated with a common conception of property. Of course, a number of factors may complicate this claim such as the status of the intangible property within national law or the intrinsic characteristics of the intangible right itself.[47]

The sharp contrast, however, between the treatment of territory, on the one hand, and intangible property, on the other, may over-simplify how *all* categories of property objects are treated in space law. Often, a more nuanced account of these rights will suffice. For example, the treatment of chattel placed on land in Article XII of the Outer Space Treaty implies an ability for individuals to own the relevant chattel (thus, a corresponding right to a transfer ownership of that right), but then subjects the chattel to significant public use and access rights.[48] Moreover, the rights of use and access are not unbounded. Article XII imposes a number of restrictions on this access, including: (1) reciprocal access to the relevant chattel; (2) reasonable notice of the projected visit; and (3) reasonable safety precautions.[49] This nuanced account of property rights demonstrates the importance of differentiating the type of property at issue from the beginning since the subsequent assessment of relevant property rights will depend very much on the type of property at issue.

II. RE-THINKING PROPERTY: ADOPTING A DIFFERENTIATED MODEL INTERNATIONAL AND NATIONAL SPACE LAW

Adopting a differentiated framework has its limits. Space, unlike a garden, or a street is a territory that is uniquely inac-

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[46] J. Richard West, Comment, *Copyright Protection For Data Obtained by Remote Sensing: How The Data Enhancement Industry Will Ensure Access For Developing Countries*, 11 NW. J. INT'L & BUS. 403, 416-20 (1990) (reviewing the copyright protection that attaches to enhanced data under national laws).

[47] For example, the monopoly rights associated with a patent may accord stronger individual rights to an owner than the lesser use rights associated with a protected copyright.

[48] *See* Outer Space Treaty, *supra* note 7, at art. XII.

[49] *Id.*

cessible to human exploitation. Moreover, space law, may resist differentiation to the extent that it relies on a treaty framework for its primary source of law. A differentiation process benefits from the fact that common law can adopt a contextual approach to issues as they arise; a treaty framework does not always provide the same flexibility. Despite these concerns, however, a differentiated model of property in space will, perhaps, provide a useful way to analyze tensions within the current space regime that have become apparent upon the increase commercialization of space resources. In this Section, I will address two key consequences of adopting a differentiated framework. First, I will examine the other types of treaties and frameworks that have adopted a differentiated model in their treatment of property. Second, I will analyze the usefulness of a differentiated framework to support a re-conceptualized "communal" principle in the space regime.

A. Re-Thinking Context

Two treaty regimes usually serve as the primary models as to the treatment of property in space: (1) the treaty regime that regulates the use of Antarctica; and (2) the treaty regime that regulates use of the deep seabed mining.[50] Neither of these treaty regimes, however, differentiates between the objects of property claims. For example, the Article VII of the Antarctica Treaty refers to a category of chattel outlining a right to inspect "all stations, installations, and equipment" located on Antarctica.[51] The term "inspect", however, implies a lesser type of license right rather than a broader right to use. Despite these limits, notably, both treaty regimes have adopted approaches which allow governing authorities to exercise jurisdictional control over property claims associated with nationally approved

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[50] *See, e.g.*, Eric Husby, Comment, *Sovereignty and Property Rights in Outer Space*, 3 J. INT'L L. & PRAC. 359, 362 (1994) (discussing the importance of the Antarctica Treaty regime for the development of the Outer Space Treaty); Hoffstadt, *supra* note 7, at 593-603 (discussing the deep seabed mining regime).

[51] The Antarctic Treaty, arts. VII(1) & (3), Dec. 1. 1959, 12 U.S.T. 764, 402 U.N.T.S. 71.

non-governmental actors.[52] However, an articulated framework that distinguishes between the types of potential objects remains notably silent.

On the other hand, TRIPS, the multi-lateral treaty framework for governing intellectual property, may offer a more relevant model for a differentiated framework in property in space. The framework of TRIPs recognizes a range of objects subject to property claims, including copyright and related rights, trademarks, geographical indications, industrial designs and trade secrets.[53] While protecting such a wide of range of objects has created intense criticism[54], the usefulness of the TRIPS' models lies in the way the treaty differentiates between the different limits placed on right-holders. TRIPS offers two distinctly different types of limits on the right-holders. First, Article 8 provides two distinct principles that members may take into an account when drafting or formulating relevant intellectual property principles. Article 8(1) allows members to "adopt measures necessary to protect public health and nutrition and to promote the public interest in sectors of vital importance."[55] Article 8(2) allows members to take appropriate measures "needed to prevent the abuse of an intellectual property rights holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology."[56] Other articles are to be interpreted in lights of these general principles; therefore, these principles can be said to

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[52] *Id.* at art. VIII.

[53] TRIPS, *supra* note 38, at art. 9(1) (protecting copyrights recognized under Berne Convention); art. 10 (protecting copyrights in computer programs); art. 14 (granting performers public performance rights); art. 15 (protectible subject in trademarks); art. 22 (protecting geographical indications which identify a good as a originating in the territory, region or locality of a member nation); art. 25 (protecting new or original industrial designs); & art. 27 (protecting patentable subject mater in all fields, providing that they are new, involve an inventive step and capable of industrial application).

[54] *See, e.g.*, Marci Hamilton, *The TRIPS Agreement: Imperialistic, Outdated, and Overprotective*, 29 VAND. J. TRANS. L. 614 (1996) (TRIPS imposes a Western notion of copyright on developing nations); Donald P. Harris, *TRIPS' Rebound: An Historical Analysis of How the TRIPS Agreement Can Richocet Against the United States*, 25 NW. J. INT'L & BUS. 99, 102-03 (2004) (TRIPS undermines the sovereign power of the United States to determine domestic policy and further undermines the specific public policy goals of domestic intellectual property policy).

[55] TRIPS, *supra* note 38, at art. 8(1).

[56] *Id.* at art. 8(2).

temper these scope of the enumerated rights. Second, TRIPS contains a number of limitations and exceptions that can be applied to a discrete set of objects, namely, copyrights, trademarks, and patents. Article 13, Article 17, and Article 30, all, in varying degrees, allow members to enact laws that allow for "limitations or exceptions to exclusive rights."[57] These three Articles, in particular, are examples of a differentiated notion of property. These Articles only apply to those rights which are afforded stronger set of enumerated rights. So, for instance, these Articles are not applicable to other types of protected rights under TRIPS such as industrial designs or trade secrets. Moreover, the scope of the Articles differs. Article 13 only protects those limitations or exceptions that do not "conflict with the normal exploitation of the work" and do not "unreasonably prejudice the legitimate interests of the right holder" while Article 30 permits a member nation considering the above interests, to take into "account of the legitimate interests of third parties."[58] The variable strength of these limits emphasizes the contextual analyses under TRIPS that result from the differentiated treatment of objects and rights in those objects.

TRIPS, then, is useful in that it suggests potential strategies that support contextual interpretations of property within a treaty regime. General principles can apply to a broad range of categories covered by the treaties; more specific limitations or exceptions can be applied to specific categories. As to the former, the international space regime, actually offers a useful counter-example to TRIPS. General principles, such as the "peaceful purposes" principle articulated in the introduction of the Outer Space Treaty have been commonly viewed as an integral to interpreting the specific provisions of the relevant treaties; by comparison, this claim as to Article 8 of the TRIPS is still relatively controversial.[59] As to the latter, as discussed infra, the international space regime has not developed a sophisticated framework. In that, TRIPs can serve as a useful example

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[57] *Id. at* art. 13 (limitations and exceptions on copyrights); art. 17 (limitations and exceptions on trademarks); & art. 30 (limitations and exceptions on patents).

[58] *Compare id.* at arts. 13 & 30.

[59] *See generally* Chon, *supra* note 13.

given its careful account of the appropriate balance between public and private interests.

B. Re-Thinking Commons

A differentiated model of property in space may also support a more sophisticated view of the underlying communal principles central to the current international space regime. Two significant interpretative distortions arise from a refusal to acknowledge that the international space regime contemplates variable rights in diverse property objects. Initially, certain areas of international space law may be developing in ways inconsistent with the overall communal purposes of the international space regime due to the failure to openly acknowledge the differentiated aspects of the space regime. Over-reliance on different domestic regimes to articulate the boundaries of these property rights may create inconsistent, over protective approaches to different objects.

I return to the useful example of Section 105(a) of the Patent Act. Section 105 allows a patent to be granted in any invention made, used, or sold in outer space on a space object or a component of a space object.[60] The inclusion of the terms "made, used, or sold" has typically been interpreted to read Section 105 together with Section 271(a) which defines the acts of infringement under the Patent Act.[61] Recently, Federal Circuit considerably expanded the extra-territorial scope of Section 271(a) in *NTP, Inc. v. Research in Motion, Ltd.*,[62] In *NTP,* the Federal Circuit found that if the beneficial use of the claimed invention is in the United States, a patent could be infringed even if a key

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[60] 35 U.S.C. §105(a).

[61] Burk, *supra* note 34 at 342-43.

[62] NTP, Inc. v. Research in Motion, Ltd., 418 F.3d 1282, 1317 (Fed. Cir. 2005). Potentially expansive extra-territorial interpretations have also been applied within the context of 35 U.S.C.§ 271(f). *See* AT & T Corp. v. Microsoft Corp., 414 F.2d 1366, *cert. granted,* Microsoft Corp. v. AT&T Corp., 127 S.Ct. 467 (U.S. Oct 27, 2006)(a master version of software code transmitted electronically and replicated abroad constitutes a component supplied from the United States, and therefore, violates 35 U.S.C. §271(f)); Eolas Technologies, Inc. v. Microsoft Corp., 399 F.23d 1325 (2005)(master version of software code made in the United States, shipped on a golden master disk to be replicated abroad constitutes a component supplied from the United States, and therefore, violates 35 U.S.C..§ 271(1)(f).

component or step of the allegedly infringing product is located or performed abroad.[63] Under a generous reading of *NTP*, a patent claimant in a space object (such as a satellite) could assert that the laws of the United States would apply since the beneficial use of the product was in the United States even if a key component of the invention was located in space.[64] Such claims, by their very nature, may be potentially disruptive to the overall goals of the space law regime. For instance, significant proprietary claims on satellite technology itself could undermine the principle of non-discriminatory access of data contained in Article XII of the Remote Sensing Principles.[65] Refusing to address differentiated aspects of property in space leaves questions such as these unexamined and is detrimental to the overall functioning of the international space regime.

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[63] *Id.* (The use of a claimed invention is "the place in which the system as a whole is put into service, *i.e.*, the place where control of the system is exercised and beneficial use of the system obtained.")

[64] The United States is not the only nation that appears to be broadening its extra-territoriality concepts, *see also* Menashe Business Mercantile Limited v. William Hill Organization, Ltd., RPC 31, EWCA Civ 1702 CA (2002), at H11-12:

> The claimed invention required there to be a host computer. In the present age it did not matter where the host computer was situated. It could be in the United Kingdom or on a satellite or elsewhere. Its location was not important to the user of the invention nor to the claimed gaming system. In that respect, there was a real difference between the claimed gaming system and an ordinary machine. It was wrong to apply the old ideas of location to inventions of the type under consideration in the present case. A person who was in the United Kingdom who obtained in the United Kingdom a CD and then used his terminal to address a host computer was not bothered where the host computer was located. It was of no relevance to him, the user nor the patentee as to whether or not it was situated in the United Kingdom. Where the host computer was situated abroad and the terminal computer was in the United Kingdom, it was pertinent to ask who used the claimed gaming system. The answer was that it was the punter who used it. There was no doubt that he used his terminal computer in the United Kingdom and it was not a misuse of language to say that he used the host computer in the United Kingdom. It was the input to and output of the host computer that was important to the user and in a real sense he used the host computer in the United Kingdom even though it was situated and operated abroad. Thus, the supply of the CD in the United Kingdom to the United Kingdom punter was intended to put the invention into effect in the United Kingdom.

Id.

[65] *See* Remote Sensing Principles, *supra* note 8, at Principle XII.

Failure to appreciate the differentiated aspects of property in space also leads decision-makers to insufficiently address whether the communal approach articulated by Article II would have any subsequent interpretative force for Article VIII. While this Article suggests that Articles II and VIII outline variable property rights in different objects, it remains unclear whether Article II should serve as a "first among equals", performing as a basic normative principle that marks and constrains maximal private property assertions in non-territorial property objects. Again, reference to TRIPS provides a useful perspective. Margaret Chon argues that international intellectual property regime should adopt a substantive equality principle, based in part, on the general principles articulated by Article 8 of TRIPS.[66] Under such an approach, a decision-maker will engage a strict scrutiny analysis when an intellectual property right conflicts with a basic development right such as a right to health or education.[67] Arguably, Article II could be used to play a similar role within the international and national space law regime in two significant ways.[68] First, using Article II, a decision-maker might determine that in a conflict between an owner's asserted intellectual property right and wider public use of the protected object, the goals and principles of Article II protects the expansive use rather than the limited property claim. Second, a decision-maker could argue that a domestic legislative decision to expand an individual intellectual property right broadly could amount to appropriative act under Article II. However, use of Article II as a substantive norm would not eliminate the existence of property rights in non-territorial property rights. Rather, use of Article II could serve as a limiting principle that could constrain over-enthusiastic grants of an intellectual property right at the national or regional level.

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[66] Chon, *supra* note 13, at 2885-86.

[67] *Id.*

[68] The use of overall principles to govern interpretations of space law appears to be a common practice. For instance, Ram Jakhu has argued that any appropriation of space territory under Article II may also be governed by the general purposes outlined by Article I, Paragraph 2 of the OST. *See* Ram Jakhu, *Legal Issues Relating to the Global Public Interest in Outer Space*, 32 J. OF SPACE L. 45 (2006).

CONCLUSION

Hopefully, this Essay is the beginning of a fruitful dialogue on claims of property within international and national space. I have attempted to sketch out the basic contours of a differentiated model in property in international and national space law. A nuanced framework is necessary in the international and national space law for two key reasons. First, a more nuanced framework would be helpful to respond to the major changes in technology that characterizes space law. Second, a more nuanced framework recognizes the flexibility of the treaty regime itself to accommodate and respond to stronger claims of individual property. In this, space law may share other characteristics of the gardens I mentioned at the beginning of this Essay: the ability to change and grow in response to the needs of its users.

SYMPOSIUM TRANSCRIPT: OPENING AND CLOSING STATEMENTS; PRACTITIONER'S PANEL

INTELLECTUAL PROPERTY RESOURCES IN AND FOR SPACE: THE PRACTITIONER'S EXPERIENCE

OPENING STATEMENTS

PROF. JOANNE IRENE GABRYNOWICZ: Welcome and thank you for coming today. Welcome to our speakers, students, and participants here in Oxford and out in the world via the real-time webcast. Today we have a first of its kind event: a symposium that will consider the interface of two important bodies of law: space law and intellectual property law. Space law, as a body of law, began during a time when the strategic, military and peaceful uses of space were the focus of the law. Although intellectual property has been a part of space law from the beginning it has not been as a major component. Initially, little thought was given to space as a commercial or creative environment. Today, our inquiry is timely because, increasingly, intellectual property law is becoming more important in space activities. The increasing sophistication of international cooperation and the growth of commercial and private space activities have brought intellectual property issues to greater prominence. For example, the intellectual property provisions of the International Space Station Agreement were among the most challenging provisions to be negotiated and a major feature of NASA's Commercial Orbital Transportation Services competi-

tion is the right of the winners to own the intellectual property generated by them as they provide NASA with goods and services. More mature Cold War technologies like satellites and launch vehicles have long been rich sources of intellectual property issues. Now, in the era of globalization these issues are being augmented with new issues catalyzed by commercial satellite imagery and even orbits. The fact that space itself is a global commons not subject to sovereignty but the human creativity and efforts occur on Earth in sovereign nations and often by global entities presents a challenging context in which to address intellectual property issues generated by space activities. Today, we will begin to do that. I will now turn the podium over to my friend and colleague, Prof. Gary Myers.

PROF. GARY MYERS: The main intellectual property protection in the satellite technology area deals with how to protect the data that is produced in remote sensing and the added value that a variety of people bring to this raw data. That presents some serious intellectual property challenges.

I would begin with a phonebook case. I brought my local telephone directory. This is the Oxford phone directory and, as you can see, Oxford is a small town. The reason I brought the phone directory is to give you that visual of a case called *Feist*[1] versus Rural Telephone. I think of *Feist* as presenting some of the main challenges for intellectual property in remote sensing.

Feist was a case that involved phonebooks. Rural Telephone was a local Kansas telephone company. Like all phone companies, it laboriously and assiduously gathered telephone data; everybody by name, address and telephone number is in that directory. A lot of labor went into it. In the view of Rural, it had a copyrightable work. *Feist* is one of those regional phone companies that tries to put together data from a variety of different phonebooks. They basically copied the Rural Telephone database wholesale—all the names, all the numbers, all the addresses. They did that in part because Rural refused to license it.

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[1] Feist Publications Inc. v. Rural Telephone Servs. Corp., 499 U.S. 340 (1991).

But that is neither here nor there. The real issue in the case was whether this raw data, assembled at great expense by Rural, was copyrightable. The Supreme Court, addressing that issue in 1991, held that the information which was factual in nature, and therefore not copyrightable in and of itself, was assembled in such an ordinary way that it lacked sufficient creativity to be protectable under the Copyright Act of 1976[2] under U.S. law. Therefore, that it was essentially free to be copied and in the public domain.

So this ruling, which on its face perhaps we might think, "Well, what are the implications for space law?" My first thought on that is much of the raw data that might be assembled faces the same kind of difficulty, namely that it is factual information. Though it involves labor and effort, the Supreme Court found that that kind of sweat of the brow effort was not sufficient to entitle someone to copyright protection under U.S. law.

So what more do we have to do? How much value must we add to have copyright protection? That is a question others will address in much more detail than I will. In basic terms, we know that it has to involve some creativity in the selection and arrangement of that data. How we define that is something that is still unsettled under U.S. law.

Two cases, to me, illustrate this. The first one is a case called *Mason v. Montgomery Data*[3], which involved protectability of maps. If you think about a map, this presents the very kind of problem that I think is highly relevant. The second case that I would use to illustrate that point is a case that involves photographs and photographic reproduction. It is a case called Corel versus Bridgeman. In this case Bridgeman was the producer of exact photographic reproductions of works of art, including public domain works. I got my Monet painting from their website. Their task and their role were to try to capture the Monet as completely and perfectly as possible, and therein was the problem. The court in this case found that an exact photographic reproduction, though it might involve great labor, was

[2] Copyright Act, 17 U.S.C. §§ 101-1332 (2006).
[3] Mason v. Montgomery Data, Inc., 967 F. 2d 135 (5th Cir. 1992).

not the type of creativity that would entitle Bridgeman to copyright protection for its reproduction.

So, to the extent that we have raw data that is translated in such an exact way, we have a problem of unprotectability that can arise, I think, in the remote sensing area. My point is that copyright offers uncertain protection. We certainly will have to look at that issue in more detail as some of the speakers today will do.

Can we have other alternative avenues of protection for remote sensing information? Yes. There are a number of other avenues. They all present both advantages and pitfalls. An example would be protection through trade secret law. Trade secret law, which is primarily a vehicle of state law, offers some very valuable protection. But, in my mind, trade secret law is a bit of a misnomer because it is not really law, it is self-help. Trade secret law is really about taking steps, secrecy measures, reasonable in the circumstances, to protect your information and to keep it from becoming public, or to keep others from gaining access to it.

In some areas, this will be a serious problem. How do you maintain the secrecy of the information? How do you allow others to use it while maintaining confidentiality? Of course, there is also the problem that reverse engineering is a complete defense to a trade secret case. Somebody who comes along and independently develops similar information will be free to use that information without any liability. So trade secret is one avenue, but an imperfect one.

What else is there? Contract, certainly contract law and licensing, confidentiality agreements. Like trade secret, they offer a kind of self-help avenue for preventing the disclosure of confidential data. In some circumstances this can be a valuable protective measure, and it can be enforceable in court. Lastly, there are technological measures: various means by which data can be secured online and otherwise, encryption and other methods of preventing people from gaining access to information. This, too, is a form of protection.

Is this enough? I think one of the questions we face in U.S. law is the issue of whether there should be some particular protection for laboriously maintained databases. The European Un-

ion database directive is an example of the type of protection that might be brought into play. There is no counterpart in U.S. law. Certainly, that is one of the issues that is debated in political circles today. I am sure we'll hear more on that subject as well. But there is the question of whether a database type protection would offer an alternative avenue that would protect the creative efforts of people in the remote sensing industry. I think that is an issue that we should talk about further.

PROF. JOANNE IRENE GABRYNOWICZ: Thank you. So that is a broad overview of these two bodies of law that are coming together and we are going to be discussing for the rest of the day. With that, I am going to ask our first presenter and commentator to come up and have a seat. Before I do, are there any questions or comments anybody would like to ask either of us? I do not know if they are coming in from outside, but they will let us know from the control booth. If not, we will just proceed.

PANEL THREE: A PRACTITIONERS' PANEL

PROF. GABRYNOWICZ: Welcome back to the second half of the Symposium for Intellectual Property and Space Law.

This afternoon is about practice, being in the trenches, and realistically dealing with a lot of the questions, issues and concepts we raised this morning. I am going to introduce everybody from my left to right, and then each speaker will come up individually.

The first person to my immediate left is Gary G. Borda. Gary is the Agency Counsel for Intellectual Property in the Office of General Counsel at NASA Headquarters in Washington, D.C. He joined NASA in 1997 and began his legal career as a patent attorney with the Navy in the Office of General Counsel. Obviously, he has strong experience in government and intellectual property issues. Gary received his J.D. degree *cum laude* from the University of Baltimore in 1990 and his Bachelor's Degree from Virginia Tech.

To his left is Pamela L. Meredith.

Pam is a rare breed in space law. She is one of the very few people who have set out a shingle in space law practice and actually has been succeeding at it. Pam has a very diverse career.

She advises clients in commercial space project planning and implementation, risk management and other aspects of commercial space activities. Pam is a frequent speaker in the space law community. She is also an Adjunct Professor of Satellite Communications and Space Law at American University in Washington.

The next person who will speak is Brad Smith. He is a European patent attorney and Senior Consultant in International Intellectual Property Law. He's currently working for the largest satellite manufacturer in Europe and the third largest in the world. He's a fascinating person to talk to. He has degrees in nuclear physics, particle physics, biophysics and neurophysics. He has been a lawyer in Europe for over 25 years or so.

The last person to my left, last but certainly not least, is Will Wilkins. Will is the intellectual property lawyer for the University of Mississippi and he is the director of the Mississippi Law Research Institute.

Without further ado, I will hand this over to Gary.

MR. GARY G. BORDA: Thank you professor. I just want to say it is an exciting time at NASA right now. We are in a new era of technology development under the *Vision for Space Exploration*. We are also getting involved in a lot of new commercial initiatives. I am going to go off-subject from what has been discussed today. I am not going to talk about space law *per se*, or remote sensing, or databases. I am not a space law person. I am an intellectual property law person and Professor Gabrynowicz asked me to talk about any unique aspects we have in intellectual property at NASA and any new NASA initiatives.

In most respects, intellectual property issues and intellectual property law at NASA are really no different than at other government agencies and the private world. We face many of the same issues: patents, copyrights, trademarks, protection of sensitive, proprietary information, working with contractors and their Bayh-Dole[4] rights to inventions, things like that. However, we are different in some respects. Under our organic stat-

[4] Bayh-Dole Act, 35 U.S.C. §§ 200-212 (1980).

ute, the National Aeronautics and Space Act of 1958,[5] we are what is called a title-taking agency and we do have authority to enter into what is called 'other transactions'. I will talk about those momentarily.

Also, as part of the U.S. Vision for Space Exploration, we are pursuing collaborations that will expand the commercial space sector while also simultaneously supporting our missions and the Vision for Space Exploration. By working with established commercial launch services providers and encouraging the development of an emerging launch sector we are, consistent with our mandate under the Space Act, seeking to accelerate the growth of the commercial space industry. This is going to ultimately reduce the cost to the public and to NASA in developing technology because ultimately the new space industry can develop space-related technologies that we can purchase commercially.

On January 14, 2004, the President set a new course for the U.S. Space Program and gave NASA a new *Vision for Space Exploration*. It was to build new ships to carry humans forward into the universe, to gain a new foothold on the moon, and to prepare for new journeys to worlds beyond our own. The primary goal of the *Vision* is, however, to advance U.S. scientific, security, and economic interest. It is not the destination but what we can accomplish along the journey.

An important element of the *Vision* is NASA's mandate to pursue commercial opportunities for providing transportation and other services in support of the *International Space Station* and our exploration mission beyond low earth orbit.

The President also chartered a national commission at the time he announced the *Vision* to recommend specific measures for implementing it. Some of those recommendations included that NASA aggressively use its contractual authority to reach out to the commercial and non-profit organizations to bring the best ideas, technology, and management resources to the mission.

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[5] National Aeronautics and Space Act of 1958, Pub. L. No. 85568, 72 Stat. 426-438 (July 29, 1988) [hereinafter Space Act].

Also, the Congress increased the potential for commercial opportunities related to the *Vision* by providing incentives for entrepreneurial investments in space, creating significant monetary prizes for the development of space-related technology and to assure appropriate property rights to those who seek to develop space-related technology and infrastructure.

Based on the *Vision*, we are embarking on a new technology development era. We also have the responsibility to protect intellectual property and technology developed at public expense. Further, we are moving aggressively on these recommendations to increase commercial initiatives. I will address some of those initiatives, but I first want to talk a little bit about some of the unique aspects of the Space Act.

Now as I said, the Space Act provides us with something called 'other transaction' authority. The authorizing statute, which is very broad, allows NASA to enter into and perform such contracts, leases, cooperative agreements and other transactions as may be necessary in the conduct of our work and on such terms as we deem appropriate. The arrangements that we conduct and conclude under our other transaction authority are commonly referred to as Space Act agreements. Our agreements are generally unfunded Space Act agreements. There are two types: non-reimbursable agreements which we use for mutually beneficial activities, cooperative type of work with other parties where each side funds its own activities. We also have reimbursable agreements, which is where we might have unique goods or services that are excess to our mission needs and other entities can use those on a reimbursable basis; for example, if somebody wants to use our wind tunnels. We also enter into funded Space Act agreements.

We use these Space Act agreements to enter into a wide range of partnerships. However, all these agreements also have to comply with other laws and the rest of the Space Act. We are limited somewhat by Section 305(a) of the Space Act, which I will talk about momentarily, and other laws such as the Grant and Cooperative Agreement Act of 1978,[6] which is commonly

[6] Federal Grant and Cooperative Agreement Act, 31 U.S.C. § 6301 et seq. (2006).

referred to as the Chiles Act. The Chiles Act specifies when traditional funding agreements—that is contracts, grants and cooperative agreements—are to be used.

As I said, our 'other transaction' authority is quite flexible. However, it is not outside the Congressional intent of the Chiles Act on when we should use traditional funding agreements. Therefore, we must interpret the Space Act in a consistent and defensible manner on when to enter these Space Act agreements—especially with respect to funded Space Act agreements as opposed to contracts. Normally we use funded Space Act agreements only when the agency's objectives cannot be accomplished through the use of traditional funding agreements. So, we use funded Space Act agreements only sparingly.

Now, Section 305 of the Space Act limits our intellectual property flexibility. Under Section 305(a), we are what is called a title-taking agency. Inventions made under NASA contracts are, by operation of law, the property of the government. For the purposes of Section 305(a), a contract is defined in the Space Act as very broad. It is defined as any actual or proposed contract, agreement, understanding or other arrangement, and this includes Space Act agreements under our 'other transaction' authority. However, despite this broad definition, not all the contracts are subject to Section 305(a). We have a longstanding administrative interpretation that the types of contracts to which Section 305(a) applies are contracts for work of an inventive type for NASA. We can't waive the applicability of 305(a) for those types of contracts. However, under the Space Act, we can waive the intellectual property rights back to the inventive entity, subject to the retention of a government purpose license.

In 1980, the Bayh-Dole Act took precedence over the Space Act for traditional funding agreements with small business and non-profit organizations, which includes colleges and universities. Under Bayh-Dole, these funding recipients have the right to elect title to the technology that is developed under these funding agreements. However, Bayh-Dole does not apply to our 'other transactions' authority. So, the determination as to when 305(a) does apply is very fact specific. There is a risk if the facts do not support the determination. One of those risks is that the intellectual property of the private party could be at risk be-

cause they might not have received clear title to the property; they have imperfect title.

Now I want to talk about some of our new initiatives. There is a long history of prizes and recently there was the Ansari X PRIZE, which was for the first privately launched mission to take a human into space and back. They won $10 million. We will not be giving that much money away under our prize authority.

NASA is using new authority from Congress to establish what is called the *Centennial Challenges Program*, which is for conducting prize competition to stimulate innovations having a potential application to future NASA missions. Currently, we have announced nine prizes for a total purse of $3.9 million. We had to determine whether 305(a) applied to these prizes. NASA is using the prize money to incentivize and reward participants for reaching or achieving particular results. We are not directing how they achieve those results. We are not using the prize money to purchase work for NASA, because we might use what comes out of this prize or we might not. In fact, we did not know upfront who would be participating in the prize competitions or if anybody would be successful in getting the prize money. Therefore, our determination was that 305(a) does not apply to the *Centennial Challenges* and we do not take title to contestants' inventions.

In contrast, under most funded Space Act agreements, where NASA funds inventive R&D activities for the agency to achieve specific results for our benefit or to satisfy some specific need, 305(a) would require that we take title.

Another new initiative is NASA's *Red Planet Capital Project*. This is intended to provide NASA with early exposure to emerging technologies and private venture capital funding to help in the development of products that could potentially support our missions. We recently entered into a funded Space Act agreement with Red Planet Capital, Inc (RPC). RPC is a nonprofit corporation established for this purpose, and Red Planet will become a limited partner in an investment fund. The fund will invest in emerging, privately-held companies that are developing innovative technologies with both government and

commercial applications and with potential to support future NASA missions.

We are providing RPC with strategic direction and technical input on the types of investments that we want them to make based on areas of technical interest to NASA. With respect to applicability of 305(a), in this case the money is provided to RPC and they are investing it in the fund that is acquiring equity stakes in companies to help them stimulate technological development. We are not directing the work and we have no current mission requirements for any specific results of the work. Rather, the technical achievement might benefit us if, at some point, we decide to apply them to our missions and buy them commercially. So, while these portfolio companies are selected based on areas of technological interest to NASA, the work of the companies is not being done for NASA and Section 305(a) does not apply in this case. Thus, we do not take title to inventions made by these portfolio companies.

The last initiative I will talk about is really the most ambitious of NASA's commercial initiatives. It is called the *Commercial Orbital Transportation Services, or COTS, Demonstration Program*. It is intended to create a market environment in which commercial space transportation services are available to both government and private industry. Specifically, this demonstration project is to facilitate the demonstration by U.S. commercial providers of a capability to safely deliver cargo and crew to and from low-Earth orbit.

In January 2006, NASA released an announcement seeking proposals from U.S. companies to develop and demonstrate the technologies necessary to deliver cargo and later crews to low-Earth orbit. COTS is a major program. NASA is making $500 million available over the next five years and payments are based on negotiated milestones. We had more than 20 companies respond to this COTS announcement, and just last month we selected two start-up companies to receive COTS funding.

Now, at the Administrator's direction and aligned with the Commission's recommendations—to spur development of the emerging space industry and provide incentives for COTS participation—it was the Administrator's direction that intellec-

tual property rights to technology developed under the COTS effort would stay with the developing parties. However, we have Section 305(a), which limits our flexibility with respect to invention rights. The COTS program is organized in a two-phase structure. The first phase is under a funded Space Act agreement for the demonstration of a crew cargo transportation capability to the *International Space Station* or another test bed identified by the COTS participant.

Phase two, if phase one is successful, is the procurement of space transportation services to the *International Space Station*. Basically, upon retirement of the shuttle we would like to purchase commercial launch services to the *ISS*, but first we need to gain confidence that these commercial providers can provide safe, reliable and cost-effective services. This phase one demo is intended to do just that, because only upon a successful demonstration would we then purchase any commercial launch services. Therefore, we saw the phase one demo, in this case, as work for NASA. Thus, Section 305(a) applies and we have to take title, under law, to the technology that is developed under these COTS efforts.

As I said earlier, based on the administrative interpretation that we have followed for forty-odd years, we cannot waive Section 305(a) requirements. However, under the Space Act, we can waive title to the technology back to the developing entities subject to, again, the government purpose license.

So, the COTS-funded Space Act agreement provides that, upon petition by the participant, we will grant an advance waiver to all technology developed under the COTS agreement. We have two types of waivers. There is the advanced waiver whereby if the COTS participant requests a waiver prior to or soon after initiation of the agreement, we can waive everything developed under the agreement. Otherwise we can issue individual waivers of title on a case-by-case basis. There are requirements: they have to, of course, report the technology to us so that we know we have our government purpose license in it. They also have to file patent applications, normally within a certain amount of time.

Now, as I said, we will grant the advance waiver subject to the government purpose license. However, we have agreed to

refrain from any NASA use or exercise of the government purpose license for a specific period of time.

On the other hand, we are spending a lot of money on this effort and we need to protect the government's interest and the public's interest in their taxpayer money. Therefore, in the event of termination of a COTS effort because of lack of performance—that is, a participant's failure to reach a defined milestone—we can then exercise the government purpose license immediately.

It has been our experience and the experience of the Department of Defense, which is the other agency that has other transaction authority, that the retention of the government purpose license by the government is not the big issue to most of our contractors. There are other flexibilities under our other transaction authority; things like relaxed financial reporting requirements and relaxed patent filing requirements that are more relevant to contractors. For example, we can allow them a longer period to file patent applications on waived inventions than they would have under the Federal Acquisition Regulations, which allows them to keep their technologies as a trade secret for a longer period of time. Also, we may allow relaxed data delivery requirements to protect data. We've used these flexibilities to try to meet the Administrator's goal of providing the maximum intellectual property rights to the participants.

So, Section 305(a) applies to invention, not to technical data. This is key, because it is very important to most of these new small entrepreneurial technology companies to protect their technological data—basically, their know-how to make and use the technology. It's one of the reasons why if you look at NASA's history, it has worked with traditional contractors such as Boeing and Lockheed, the big guys. We do not get the innovative ideas from the smaller companies because they do not want to enter contracts with the Government. Thus, one of the goals that we are trying to accomplish with the COTS Space Act agreements is to get these companies working with NASA. Congress and the President in the *Vision for Space Exploration* have decided we should step out and try to help foster a new commercial space industry. So that is one of the reasons we de-

termined that funded Space Act agreements in this case are proper and give us that flexibility.

So, under the COTS agreement there is no affirmative requirement to deliver technology and data developed under the COTS efforts. We can request delivery of that tech data, but we can only use it to evaluate performance of the participants. In the event, however, of a termination for failure to reach a milestone, we then can use the data right away. We could use it and transfer it for government purposes.

MS. MEREDITH: I am going to talk about commercial space contracts and IP. When Joanne asked me to talk at an IP forum I thought, "Well, IP is not what I do." But then I sat down and thought about what I actually do when I do contracts, which I do a lot of in the space area, and there are a lot of IP clauses in those contracts. They just come in everywhere, whether it is a launch contract, or a spacecraft component supply contract, or a satellite manufacturing contract, or a satellite operator's note purchase agreement, you name it. So I thought, "Well, that at least I can talk about."

Intellectual property – this is a forum where I do not need to introduce that concept. I suppose there are many ways to skin this cat, but rather than getting into the meaning of intellectual property, proprietary information, trade secrets, and patentable inventions; or where the divisions between these concepts actually go, I will leave it to you to sort out the details, and I will move on to something I am more comfortable speaking about: commercial space contracts.

We do a lot of satellite purchase contracts. We review them as part of advising insurance underwriters, satellite purchasers, satellite manufacturers, and financial institutions. We also draft and review satellite launch contracts as well as contracts for the supply of various space products, whether it be a satellite component or a launch vehicle component. The approach of course depends on who you represent. If you represent the one with the intellectual property the key for us is, as lawyers, to make sure that that intellectual property is protected. At the same time, the other party's legitimate rights to that IP needs to be satisfied so the transaction makes sense. If you are representing the buyer, you need to make sure that the buyer has

what he or she needs in terms of intellectual property, to make or use the product. If you are representing the seller, you need to make sure he or she has access to buyer's IP to the extent necessary to make the product. If it is a joint venture, the joint venture company needs freedom to operate without having to seek all sorts of other licenses and permissions after it has been set up. So, again, as legal practitioners, depending on which side we are on, we have different responsibilities.

Let's look at proprietary information. In the contracts that I come across, there is always a confidentiality clause – or a reference to a separate confidentiality agreement. Basically, the rule, as you know, is no disclosure of proprietary information to third parties. Within the receiving party's organization there is usually a disclosure right on the basis of need-to-know. The term, or duration, of the confidentiality obligation varies; could be from five to ten years and it tends to be longer in the aerospace industry than in other industries that I have come across. With respect to the care of the proprietary information, it's usually so that the receiving party has to take the same degree of care of the disclosing party's proprietary information as he does his own, assuming those procedures are reasonable.

While the rule is that you cannot disclose proprietary information, there are certain exceptions. Again, these are very standard. They are when something is in the public domain or the receiving party has independently developed the information or has gotten it from another source with no confidentiality obligation attached. Then, there is usually a right to release the propriety information if required by law or in the context of a legal proceeding. This phrase 'legal proceeding' is key. Sometimes it says 'judicial proceeding'.

Let's say your client is in arbitration and you have one of these agreements and you would like to, for purposes of document production, have some of the documents that you have gotten under one of those agreements into the arbitration. You find yourself in a situation where you have to interpret what 'judicial proceeding' means for purposes of releasing the documents. Can you, then, release documents into the arbitration proceeding if you have a right only to do it under judicial proceedings? The best answer to that is no.

What you end up doing, in this case, is you have to go back to the disclosing party while you are in arbitration for your client with a third party, to ask for permission to disclose. Then, the disclosing party, depending on its interests, may say, "Well, no. I am going to be difficult. So I am going to put new conditions on." And then you go down that road.

Let's look at the spacecraft purchase contract. Basically, the ones that I have come across — and I have come across a lot of them over the years — are written so that IP rights remain the property of the owner, whether it be the seller or the buyer. The two exchange rights, or licenses, to do what each needs to do. This is the key, as far as I am concerned, when you deal with intellectual property in these contracts. Each needs to get the rights that it needs to do what it legitimately needs to do, if you see what I mean. That is where I am coming from with these contracts. The manufacturer, of course, has legitimate rights to protect its intellectual property in the satellite it sells. The manufacturer typically will have a satellite bus, a platform, which is its standard platform that it sells to a number of customers; and it will guard those IP rights carefully. There will be a payload on the satellite platform, which may or may not be supplied by the same manufacturer — usually not. Somebody else, a subcontractor, then has IP rights in that payload, and that subcontractor will have protected its rights in a subcontract with the satellite manufacturer.

The buyer needs to have enough license rights to use, operate, repair and maintain that satellite. Sometimes the buyer also needs to test the satellite and it needs to have rights to do that. Sometimes the buyer does not test the satellite, the manufacturer does that and delivers the satellite "turn-key" in orbit fully tested and then those rights may not be included.

The buyer also needs to be able, sometimes, to sub-license. There may be someone operating the satellite for buyer. Satellite buyer sometimes also needs to have the right to transfer that license, for example, to a financial institution in connection with the financing for the satellite.

Also, with regard to the satellite manufacturer, it of course needs to have whatever the buyer has of IP that is critically

necessary to design, develop, and manufacture that satellite for the buyer's application.

There also is a distinction that is drawn in these types of contracts between what they call background and foreground IP: background IP being what each party had when they came to the table and foreground IP being what was developed within or during the contractual relationship. Obviously, there are greater rights to the foreground IP than the background IP, as a general matter.

Typically, not a lot of IP is exchanged in satellite launch contracts. As for patents, each party retains ownership and rights in its own inventions and patents. There is not really a lot of need to exchange rights to each others' inventions. There is of course exchange of proprietary information, especially satellite-launch vehicle interface data and information on satellite environmental tolerances.

Supply contracts get trickier. Here, again, we are talking about a launch vehicle component supplier or a satellite component or sub-system supplier. We have represented engine suppliers, upper-stage suppliers, fairing suppliers, satellite component suppliers, you name it. In each of these cases there were interests on the part of the supplier in protecting its IP. Again, the buyer needs enough IP rights or license rights to use or sometimes also make the product, depending on what the product is, but usually just to use it. The parties arrange the contracts depending on what needs each party has. But, of course, the parties typically differ as to what each believes is the other party's legitimate needs.

I put a "no infringement" clause at the end of these contracts. There are also usually these types of clauses in the satellite manufacturing contract. Here is where each party warrants that there will be no infringement of third party patent rights through the use of the license granted. In other words, if the other party – say buyer – uses the IP to which seller grants a license, then seller warrants that using that IP will not infringe any third party patents. There is also usually indemnification, by the seller, in this case, if infringement results. So, if you buy a component of a satellite, let's say, and in using that component you find out you were infringing and you were sued by

somebody because you were infringing their rights. Then the seller has undertaken to indemnify you for any liability or claims or suits.

Contracting with the government gets interesting. Sometimes you have contracts directly with the government. You represent, let's say, the private party in the contract with the government, the prime contractor. Where the contract mixes commercial concepts and FAR clauses, Federal Acquisition Regulations,[7] protecting your client's interests can be challenging.

The other situation is where you have supply contracts. Let's say you represent a foreign supplier of a subsystem for a launch vehicle. That supplier is contracting with a U.S. prime contractor, itself under contract to the U.S. government for supply of a launch service. So the contract with your client is a commercial contract with IP provisions included. But what typically happens is that the prime contractor, in addition, will flow down FAR clauses from the prime contract with the U.S. government, plus other so-called standard IP clauses that a company uses in all its subcontracts. Then you sit there and try to make sense of all of this. It usually does not make sense and then you have to negotiate. I guess it makes for a fun and interesting practice. That is all I have to say on IP and contracts.

MR. SMITH: I introduced myself as an Alcatel employee. That is true. But I am also a General Intellectual Property Counsel for the European Space Industry Association, which is a conglomeration of about 60 space manufacturers all across Europe. That is primarily for lobbying purposes.

Mostly, when I speak about divergences and convergences, I get stuck on divergences between intellectual property law and space law, in particular, when intellectual property law is applied in outer space.

So, legal considerations on space patents: when you make patents on things that can only be used in outer space, and then you come up with questions about what is the applicable law. I would like to take the example of patents on orbits. It is a kind of hot topic because then we run into these questions of appro-

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[7] Federal Acquisition Regulations, 48 C.F.R. § 1.000 – 53.303 (2006).

priation and Article Two of the Outer Space Treaty.[8] I have a case study where there have actually been some problems presented before the court in California. Then I will speak about the recent developments at the UNCOPUOS on this issue, and what, finally, the interface is between IP and space law.

Basically, the origins of today's IP law, as it is practiced around the world, are to be found in the United States Constitution, the first patent law being passed in 1790, and followed shortly by the French patent law in 1791. Now, as you know, they have gone in different directions because of the nature of the common law and the nature of U.S. law and the coded nature of French patent law. I think it is always useful to go back to the roots. The purpose of patent law is to promote the progress of science and useful arts. As we can see in some examples, maybe sometimes it is actually slowing down progress in the way that the owners of IP use it.

Intellectual property has to be intellectual; it is property, and it belongs to somebody. Quite often it does not belong to the person who created it because it has been assigned one way or another, or the rights have been diluted, or else they were bought before they produced. The right is the right to forbid. It is not the right the use; it is the right to forbid. For naïve people this is really hard to understand, but all of us in the room are experts so I just want to insist on that. The second right is to make all kinds of transactions. You can use it to license, lease, assignment, collateral, technology transfer, and so forth.

Satellites have been a major motor in world economic development over the years. The first Intelsat Treaty Organization gave universal telecoms to countries that had little or no access to telecoms. The Inmarsat Treaty made maritime telecoms possible and then branched out into land mobile telecoms. Regional telecoms and meteo-sats organizations include: Eutelsat, EUMETSAT. There are some Russian equivalents as well, in the former U.S.S.R., and all of these things are leading to multibillion dollar industries. Private spending in outer space has

[8] 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. 2, T.I.A.S. 6347, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

exceeded public spending for the first time in 1998 and has been accelerating.

Now let's have a look at the typical costs of some of the satellite systems that are being put up by private money. The Iridium Constellation cost $5 billion, Globalstar cost $5 billion, ICO would have cost $5 billion but it never got up there, SkyBridge was budgeted $5 billion (this was an Alcatel project). I would estimate that it would have cost $8 billion if it actually got up there. Teledesic, the Bill Gates world satellite grid, was estimated at $10 billion with 266 LEO satellites. Actually, they filed at the ITU for something like 888 but they scaled back. They all went broke. The only one that has not gone broke yet is *Galileo*. It has cost € 1.2 billion in taxpayer money. It is supposed to cost another € 3 billion, split two-thirds by industry and one-third by public financing. We'll see if that one goes broke too. It might then be able to work, because you can reclaim what went broke, and after canceling all of the unpaid debts, end up with a system which works. Globalstar went broke; now it works. ICO went broke, was bought up in a fire sale by Craig McCaw, and it probably will work as well. But the first thing you have got to do is invest $5 billion, lose it all, and then you can make money.

Intellectual property in outer space activities has actually been used in the courts a few times. It is hard to know what has been going on in transactions because transactions are generally kept secret. However, sometimes you can find filings at the Security and Exchange Commission for publicly-traded companies.

This first example is the case *Space Systems/Loral v. Com Dev. Com Dev*, when it was a Canadian company, was importing high-power filters to the United States for Intelsat satellites, infringing the Space Systems/Loral patent. They got hit with an out-of-court settlement of only $3 million, but with a guaranteed running rate of 100% royalties for future supplies. That is pretty stiff to try and be competitive with 100% royalty rate.

In the *Hughes Aircraft Company v. the United States Government*,[9] I was quite interested to hear in a preceding talk about this Section 35 U.S.C. 105. Now, maybe we can go into this a little bit more in the question and answer period, but Hughes Aircraft won nearly $1 billion in damages after appeal. Basically, this was on the famous Williams' patent, which was funded by the Navy. Unfortunately, at the time in this particular instance, the Navy did not see the need for having a license for government use. So, Hughes requested a reasonable royalty rate of 3% on all of the geostationary satellites that were sent up with the spin stabilization. By the time the case was judged there were 84 of them up there. Three percent of 84 times an average price of about $300 million and you get up, easily, to a billion dollars.

I also know that the European Space Agency was attacked and they settled out of court for an undisclosed amount. Another European company was attacked as well, DASA. The next example in my list is TRW versus ICO—we will speak about that later on because that is a patent on the orbits.

The Hughes patent was on the spin of the satellite. Obviously, this alleged patent infringement can only occur in outer space. This was the case law that led to the legislation 35 U.S.C. 105. In fact U.S.C. 105 says exactly what the judge said in the Hughes case: any space object under jurisdiction or control would then be considered as part of U.S. territory for patent purposes.

But, we also have a lot of other strange patents that can only be used in outer space: pseudo-geostationary orbits, frequency sharing between LEO and GEO satellites, unfolding of solar panels and antennas, and so on.

This next example is something that has to do with the radio regulation issues of the ITU. Another example: GSM in the Sky, from Motorola. The Comsat maneuver for end-of-life; and at the time, Comsat was an Intelsat signatory, one of the first of Intelsat signatories to go private. They started thinking about things like, "Well, what happens when the satellite is at the end

[9] Hughes Aircraft Co. v. United States, 86 F.3d 1566 (1998).

of its life?" "That means the fuel is running out and it starts wobbling." "Well, let's patent that, you know, because that is a great way to save fuel. Just let it wobble." So the satellite makes a small figure eight in the sky and anytime you get to end-of-life on a geostationary satellite it is going to do that. So, it is going to automatically infringe that patent. Very clever!

Then there is Motorola's LEO smart satellite constellation called *Iridium*. If you do not want to infringe this patent, it is easy: you just send only dumb satellites. Recalling the relevant articles of the Outer Space Treaty, basically the benefit for all countries, Motorola's *Iridium* would argue that every country can benefit from the *Iridium* constellation, you just have to buy the telephone for $1,000 and pay $12/minute and everybody can benefit, except those who only earn $12/year, of course.

What we see here is a constellation of basic contradictions. Space law is extra-territorial. IP law is fundamentally territorial; it is only valid on the State in which it is granted. Space law is the same for all States, and IP law is different in every State in the world and at different stages of development as well. Space law is extraterrestrial and IP law is terrestrial. It is 200 years old and it has not changed that much. The United States is the only one that has made any specific provisions for space in IP law. Space law says share benefits, but IP law operates a monopoly. I see it is a head-on collision in all of these areas.

Now, just recalling that IPR, Intellectual Property Rights, are those rights granted to the owner by a state, enforcement and legislation in each state, and logically, for acts occurring within the State territory. The right is to forbid. However, the IPR owner does not necessarily have free rights to use. He may be dependent on third-party rights to do so. There is a particular problem if those third-party rights belong to a United States entity, whether is be a legal or physical person, the reason being that intellectual property rights having to do with satellites fall under ITAR.[10] As a dual-use technology, there are restrictions on the export of such rights, and even discussing such rights

[10] International Traffic in Arms Regulations, 22 C.F.R. Parts 120-130 (2006).

with third parties and third countries. It may be difficult to get the necessary license on those third-party rights if you need to use them.

Only the United States has made specific provisions for intellectual property law by the U.S. Space Bill signed into law by George Bush, Sr.: the 1971 NASA Act, which foresees a temporary exclusion for launch purposes.

I would like to point out, in the U.S. Space Bill, that concerning the IPR, the jurisdiction is determined by the registry on the UN Register. The UN Register was never foreseen to determine jurisdiction. It was foreseen to determine liability, this sort of thing: ownership, jurisdiction and control. When it was translated into American, this turned into jurisdiction or control. The difference is substantial. Jurisdiction and control is this big. Jurisdiction or control is bigger.

This was codification of the Hughes case, because the Hughes lawyers argued that when the satellite went up into geostationary transfer orbit there was a control signal sent from the Virgin Islands, which is a U.S. protectorate. So, it was under the control of the United States. Secondly, the use of the satellite: what is the use of a telecommunication satellite? Lawyers cleverly argue that the use of a telecommunications satellite occurs in the receiver. The receiver is on the ground, on the territory of the U.S. Therefore, the spin of that satellite is not being used in outer space; it is being used on the ground in the receiver.

There are exceptions for foreign registry. This also brings up the issue of what happens when a satellite changes ownership and the owner is of a different nationality. This is an open question.

What about the patentability of orbits? Could this lead to new type of merchandizing? Claims laid on orbits, claims which are upheld or believed to be valid claims on orbits. Could they, first of all, be patentable? They could easily satisfy the novelty criteria if they had not been previously described. They could also have an inventive step if it, you know, solves some sort of practical, technical problem.

There is also the question of industrial application. If you can make money at all from it, generally it is considered to have

industrial application. But there is another aspect of industrial application; it has to also be feasible. In general, orbits may have patentable characteristics. We will see that, in fact, many patents have been taken out on orbits. In that case the objects of transaction are just like any other technology. There is the example of the Luxemburg company SES making deals with an American company over a Mexican satellite orbital slot.

The most important patent that was never patented is the geostationary orbit. In 1945, Arthur C. Clarke described the advantages of a geostationary orbit. A satellite placed 36,000 miles above the Earth and turning, therefore, with a period of 24 hours at the same rotation rate as the Earth appears to be stationary in the sky. This is an enormous advantage because you do not need a tracking antenna. The first satellites were using C-band, which needs an antenna just about as big as this room. If you have to turn that thing to track the satellite you need some pretty hefty motors.

This was a really great idea. But was it a patentable idea? In fact, it wasn't, because at the time, we had no means of getting satellites into that orbit. It was pure science fiction. So it could not be patentable because it could not be implemented. One of the requirements for a patent is you have to describe the way that you could best implement it, and it was not described. I recall that Arthur C. Clarke also was the author of 2001: A Space Odyssey. Great author, and he had some great ideas, but they were not all patentable.

If you go to the U.S. PTO and type in 'satellite orbits', you get a list of patents like this. It goes on and in the long version you get abstracts from all of these patents.

There is the TRW patent on a MEO, for medium earth orbit, satellite based cellular telecommunications system. TRW is a well-known California military contractor. They took out a patent in 1995 saying that if you launch a constellation of satellites between 5,600 and 10,000 nautical miles and you put them into radio communications contact with handheld telephones, it belongs to us. So you can imagine this shell around the Earth between 5,600 and 10,000 nautical miles, which belongs to TRW for telecommunications applications to handheld sets. Great patent.

They decided to litigate on that because there was a UK company called ICO Global Communications who had the intention to build such a system. They made the bad mistake of asking Hughes to build the satellites. Hughes in El Segundo, California and TRW is right next-door, practically. They are both at Los Angeles International Airport. So, they sued and requested an injunction on the construction of those satellites before the California Federal Circuit Court on the basis that if those satellites were built and they were launched they would become infringing. "We need an injunction right now!" Of course, the court threw that out because the satellites were not on that orbit, so they obviously were not infringing.

The problem is TRW appealed. During that time, ICO could not find the necessary funding to do their project, so they had to try and settle out of court in order to stop, first of all, the investor scare and also to stop the legal expenses, which were a couple million dollars per month. What turned out is they settled for $150 million and a few months later they went broke for $450 million worth of debt. They were subsequently bought up by Craig McCaw for only $50 million. When Craig McCaw bought this system it was really great; it was nothing but some satellites sitting on the ground. Then he went to the FCC and said, "Look, I am going to make a telecom system to handheld mobiles. But I am going to have a hard time penetrating into buildings so I am going to need some Earth-based and terrestrial repeaters." In fact, the gambit is that he would be able to deploy a terrestrial system on the excuse that he has a couple of satellites in the air that cannot communicate directly with handheld sets.

Here we can see how a U.S. patent on an orbit can keep a foreign country from making progress into outer space in deploying its own space-based system. Does this seem consistent with Article Two of the Outer Space Treaty? "... Not subject to national appropriation by claims of sovereignty, use occupation, or by any other means."[11] It seems to me that here we are in the characteristic of "any other means".

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[11] Outer Space Treaty, *supra* note 8, at art. 2.

I should like to also mention that there has been recently —I say recently because on the scale of time that these legal subcommittees of the United Nations COPUOS works, only ten years ago -- we have a resolution taking into account the needs of developing countries for technology transfer agreements. This is the first time where the United Nations has actually used the three words 'intellectual property rights'. In that declaration they say, "Contractual terms in such cooperative ventures should be fair and reasonable and they should be in full compliance with legitimate rights and interests of the parties concerned, as, for example, with intellectual property rights."[12]

Now, as typical of United Nations' resolutions, this is a lofty principle. But the thing is that the owners of the intellectual property rights still want to be paid for the use of those intellectual property rights. Cooperation with developing countries still has this impediment of intellectual property rights belonging to developed countries.

Finally, what is the interface between outer space law and intellectual property law? As it stands, intellectual property law has a few steps. First of all, you have to make a patent application and it goes to the Patent Office. The Patent Office has a huge, thick book just full of rules. The legislation is only this thick, but the book of rules, how to apply that legislation, is about four times as thick. In the MPEP, the Manual of Patent Examiners Procedures, there is nothing said about the Outer Space Treaty, there is nothing said about international public law. The examiner just does his or her job. They look for novelty, inventive steps, and industrial application—and that is it. You can thus end up with patents that seem to be contrary to Article Two of the Outer Space Treaty. Nobody expects that this will be brought up in court before a judge. First of all, the judge probably did not learn that in school. Secondly, the lawyer would probably get fired for bringing up such an argument.

I have presented this to the UNCOPUOS Legal Subcommittee as well. They thought it was a very interesting problem.

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[12] Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, A/RES/51/122 (Dec. 13, 1996).

They said, "Well, you know, IP contains the word property"; therefore, it is not in their territory and it is not up to them to resolve. There is no interface between outer space law and intellectual property. They can be in contradiction and for the moment, there's just nothing we can do about it."

It is going to get worse because we have new emerging space powers. The Brazilians are working with the Chinese and they have launched satellites. The Nigerian satellite is a Chinese satellite. The payload was supplied by a French manufacturer. We have evolution of applicable law, but applicable law is still piecemeal in the intergovernmental agreement (IGA) on the *International Space Station.*

On the ISS, which took about ten years to negotiate because of IP issues, we ended up with a total patchwork. On each segment, and each module supplied by a different country, the intellectual property law of that country applies. If we do get similar provisions from the European Commission and the new European Community Patent, which is in the recommendation stage but has not yet passed, mostly because of language and translation requirements. There are some United Nations efforts which have been endorsed by Unispace III, but this has not gone forward. The World Intellectual Property Organization has also studied the problem. They said it is not for us because, you know, we are just here to grant patents. We have an arbitration committee but, for us, a space patent is like any other patent.

The World Trade Organization and the TRIPS Convention have totally ignored this problem. There was a revision in the millennium round. Intellectual property was not opened for question. The United States does not want to hear that question opened at the moment.

A revision of the Munich Convention, this is the European Patent Convention, overlooked this problem as well. There was lobbying from the European space industry for that. So in the meanwhile, we are on the point of passing appropriate legislation into French law which is basically the same as the U.S. law, except that it does not have the 'or' under 'jurisdiction and control'. We prefer to stick to the international law terms. Other national laws are in the works in India, Kazakhstan, and a few other countries.

So, is there divergence or convergence? IP can aid if it contributes to promote the progress. That is what it is made for. But we have seen in practical examples that quite often it is preventing people from going forward. I would be tempted to say there is a misuse of intellectual property law. Appropriate legislation should be put into place to ensure that it actually does promote progress, that the goals that we set ourselves in making these laws can actually be met.

I didn't give you lists of all the different people that have made these patents I showed you, but you find individual inventors who have absolutely no means whatsoever to make a satellite or launch it. You have consulting companies who will go knocking on doors saying, "Hey, don't you want to use this idea?" You have national space agencies who own patents on orbits. Remember, owning a patent on an orbit is in order to forbid somebody else from using it. What is the logic in national space agencies taking out patents on orbits? In order to keep somebody else from using it, obviously.

Somebody else's IP is always a barrier to overcome. So, if the United Nations' public international law is to have any useful effect, it has to be translated, in adequate terms, into national legislation.

MR. WILLIAM WILKINS: My name is Will Wilkins. I work for a department of the law school called the Mississippi Law Research Institute. What I thought I would do is just give you a little rundown of some things I do and be very brief, and then sit down—a little rundown of an issue or two that I have run into in working with Joanne and some other groups in space law. Again, I work for all the universities in the state of Mississippi for intellectual property issues. It is very broad. It is almost like a practice, it is very broad. I am a generalist inside the intellectual property field and so what I do is extremely terrestrial. I work on a really base level on a lot of these issues: from copyright issues to dealing with bands playing across campus, to T-shirts being sold at football games, to people that are developing technologies dealing with space issues and geospatial issues.

In my experience working with the space and remote sensing programs, I have worked with Joanne's Center, the Center that is sponsoring this program, and also another center here

called the Center for Geospatial Workforce Development. The issues that we have had have ranged from fairly usual publishing issues: copyright issues, speakers' issues, release issues—things that would generally come up—to more technical patent issues: issues of data, what we can do with data that was generated in space. I have not really dealt much with data while it is still in space, but once it gets down here it comes into my field. Like the previous speaker said, there is a divergence of what has been developed in space, which is covered by space law, and once it gets down here it is covered by what I know, which is intellectual property law.

The problem with intellectual property law is it is jurisdictional. From country to country there is a wide divergence on coverage. Even within individual U.S. states, there is a wide divergence.

A lot of the issues that I have dealt with have involved software that is used to translate the data once it has come to Earth. It was fortuitous that I was going to talk about this today, because in the window of the library at the law school was a book exactly on what my experience his been, which is Math You Can't Use. I haven't read the book yet, but its cover says, "Patents, copyright, and software." The gist of the book, from what I got in my five minutes of reading the cover, is that patent and copyright law are being used to take principles of math and make them unusable, as in the orbits that are now unusable. Basic mathematical principles are becoming unusable.

We have had some experience in dealing with algorithms. Algorithms are patentable in certain circumstances. The exact language is that they are protectable, if they produce a definite tangible concrete result. In other words, if the data comes from space, from a satellite, you can patent, in certain circumstances, the algorithms that you use to crunch those numbers, to do something with those numbers, if there is output on the other end—if something comes out of there. That is the holding of the State Street Bank[13] case and it has become kind of established law. The problem is, as this book points out, we have a lot of

[13] State Street Bank & Trust Company v. Signature Financial Group, Inc., 149 F. 3d 1368 (Fed. Cir. 1998).

math that is becoming unusable. It is a struggle that the courts are taking up on a real base level right now, which is probably going to have to be settled statutorily, eventually. The problem is that the argument on the unpatentability of algorithms and things is that these are math principles; they have always been there, there is no originality, they are there. We may not know them today, but they are there. All we are doing is figuring out something that is there.

It has been a real struggle when I am working with people on algorithms patenting or working on software that they have produced to deal with this information, the breadth of the information that has come from space. That is the majority of my experience working with intellectual property issues and space law: working with what we do with the information once it comes back to Earth, whose information it is. Was the information in the public domain, and then what we do with the information? Does that transfer it into something that is proprietary? When does it become a trade secret? What steps do we have to take to make it become a trade secret? Things like that.

My issues, again, have been much more basic. But it does tie into the previous talk, which is that what we have done with algorithms has been that we have tied up a bunch of things that may not be very usable, and may not in the end satisfy the Constitution's requirement of progressing the natural progress of science and arts.

PROF. GABRYNOWICZ: Any comments, questions, reactions to anything you heard? Anything you want to direct to anybody? Yes.

FEMALE VOICE: I have a question about inventions for the Other Transactions Authority. Is that a literal translation of invention or is that going on to include other branches of intellectual property law?

MALE VOICE: Inventions under Section 305A is inventions in the normal sense of the word; patentable inventions. Basically, the transfer may be patentable. An invention that is or may be patentable. Inventions 305A applies to contracts for large businesses that have not been craved out by Bayh-Dole and other transaction authorities. When we talk about title taken to inventions, it is the rights in the inventions and the

patent. That something is in the patent that was made, which is conceived or first actually reduced to practice under the agreement.

FEMALE VOICE: So that extension does not extend to copyrighted works? So those could be other transactions?

MALE VOICE: 305A does not apply to copyrights.

FEMALE VOICE: Right.

MALE VOICE: This would be more of a data rights type of issue.

FEMALE VOICE: Okay.

MALE VOICE: And we have much more flexibility in data. We talk about data; it is broader than databases, it is information.

FEMALE VOICE: Okay.

MALE VOICE: You do not take title to copyrights, per se. Now...

FEMALE VOICE: But you could?

MALE VOICE: We can get assignment. In fact, when it comes to software, we have some NASA FAR supplement clauses or we can require contractors to assign the copyrights to software to us.

FEMALE VOICE: Okay.

MALE VOICE: Software is a unique kind of technology that is not covered by patents now.

FEMALE VOICE: All right. Thank you.

PROF. GABRYNOWICZ: Anyone else? Any of the students? Comments? Questions? Okay. Well thank you very much. I learned a lot. It was great. Thank you.

CLOSING STATEMENTS

PROF. MYERS: Thank you, first of all, to all those of you who have borne with us today. We have covered a lot of ground and I think I have learned a lot about space law that I was unaware of. I want to conclude with three points.

The first point I would make is about space law. As I may have not even brought up earlier, I was pretty much an empty vessel when it came to space law up until I started reading the

papers and listening to the presentations today. I have learned a lot from all of you and I appreciate that.

One of the things I learned about space laws is just how far-reaching the field can be. We have talked about international law, treaties, comparative law, jurisdiction, choice of law, contracts, and, of course, intellectual property. It is striking to me that you can probably find a connection to almost any area of law here. I was impressed with that.

My second point is about the convergence and divergence of intellectual property and space law. It struck me that space law, here too, is quite—and I use this word in a favorable way—imperialistic, in the sense that it has really carried through every area of intellectual property.

We have talked about patents and patent litigation and the issue of enforcing patents in extra-territorial and space locations. We have talked about copyright ability issues, database protection. Quite a bit of talk of the trade secret area, which does strike me as very important for space law, as well as technological means of protecting data. Pretty much everything that I talk about when I teach intellectual property and think about intellectual property seems to be covered here.

I guess that brings me to my third point: is there divergence or convergence or both? I think we have had healthy dialogue here among practicing lawyers/professors and there has been disagreement amongst those groups as well as between them. It strikes me there is some of both divergence and convergence.

In my view, listening to everything, I think space law and remote sensing generates a wealth of information in much the same way, for example, that pure scientific research might generate a lot of information that probably ought to be free to all. And available in part because it does frequently seem to be the product of governmental taxpayer funds, and therefore ought to be available to be used.

Once we take that raw material and alter it, make it useful, it is much like applied science, intellectual property, because at that point we are transforming something that is public in nature, something that is theoretical, something that is raw, factual, and turning it into something that would be useful to peo-

ple; maybe useful in a patent sense, maybe creative in a copyright sense.

In either case, at that point there is a role for intellectual property and for property rights in that information. To me, that is where there is both a convergence, a sense of an interplay, and a close relationship in the two fields, even though they may start off with very different premises.

PROF. GABRYNOWICZ: I am just going to try to synthesize a little bit of what I heard. I also learned an enormous amount today. I think the conversations we heard this morning is what is so desperately needed in the space law community.

I heard things that have expanded my own thinking of space law and that have opened up new opportunities in ways of thinking about both national and international space law. We had a lot of lively discussion and I did hear that there was some kind of consensus. That we do need to consider a range of property rights when we are talking about intellectual property and the territorial is only one component.

Chattel, intangible rates—all of that is appropriately discussed in the context of space law. The question is how best to do that via national legal vehicles or international law. Can intangible rights be registered the way a spacecraft is registered? Is that an appropriate mechanism for a commons?

A lot was said about the focus of space law on a commons and equity and that this is a context, which, when it meets the idea of individual rights as promulgated in intellectual property, really needs to be addressed. The assumption is there will be leakage—I think that was the word I heard—of intellectual property and the stress on individual interests. If space law is to maintain its focus on equity and a commons approach, there will need to be some kind of affirmative action for that to happen. It would be interesting to see how my colleagues from other countries would respond to that remark, but, very interesting.

The second thing we addressed was databases. We spent a lot of time dissecting and discussing the difference between the U.S. approach and the European approach, the database directive and the different values that each one of those approaches have. That dovetailed with something we kept hearing over and

over, which is the need for empirical evidence regarding the effectiveness of one approach or another.

In fact, what we did hear is perhaps in Europe they are beginning to rethink some of these things based on the fact that they have looked at the empirical side of it and it would be interesting to see if there were parallel efforts that have happened in the United States.

The practitioners' panel was fantastic. We saw a wide view of things and it came from the point of view of the client, that the practitioner has worked with in the past. We saw different angles, in one case, a speaker has NASA and the government as a client and so the discussion was about its organic statute and the use of the law and the legal tools that they have to implement national policy.

We also heard that intellectual property is an integral part of commerce, and specifically, commercial spacecraft sales and the contracts that are drafted to affect those sales. That not all space hardware is the same. Launch agreements are different. The intellectual property issues and the launch agreements were different than the intellectual property in the spacecraft agreements. To have a successful mission, you need both the launch vehicle and the thing on top of it. To see that coming from two different angles was interesting. That the law can change with institutions, whether you are NASA, the Air Force or the European Space Agency, depending on which one of those institutions you're dealing with—going to have different implementing regulations, which is also going to add a layer of complexity.

One view, based on clients that are outside of the United States, is that there is no interface between intellectual property and space law and that there definitely is a divergence, not a convergence in that point of view.

We heard from an attorney whose client was academia that there is concern for the growing use of intellectual property to prohibit the use of mathematical formulas or, in the case of Brad's presentation, physical facts, like orbits. That brings us back to the original paper, of what is the best and appropriate approach to this role of space law and international intellectual property law.

Finally, our last and most recent paper I found compelling in so many ways. The idea of discussing a developing nation's approach to laws that have historically been considered sophisticated technological requirements and which have been traditionally, within the realm of the developed world. I think it is an amazing insight into one country's approach to its beginnings and how to make it grow.

The aim to protect the intellectual property of a creator or a producer is very similar to what we hear in the developed world. But what we do not hear in the developed world, although there is increasing demand for, is to prove the social and economic value of these activities.

From Nigeria's point of view, that is their starting point. Whereas the developed world, which has been involved with space activities now for over 40 years, are still often required to prove that to funding agencies and policy-makers and decision-makers. Nigeria seems to have that from the beginning.

I love the term that Tare Brisibe used, the 'reciprocal penetration of national and international law', when we were talking this morning about what is the appropriate way to go in terms of further defining it. That sounds like a standard to me. It is a very eloquent term and I think it has value.

That is my wrap-up on the law. But, I am not finished wrapping up my wrap-up. Before I wrap up my wrap-up, I must thank a number of people who helped make this possible.

First, I have to thank Kali Murray. We just were talking one day and she was talking about the idea of commons and intellectual property. I said, "You know, space is a commons," and one conversation led to the next, and that is really what gave birth to this idea of having this conference, and Kali's resource to the IP bar has been a very valuable thing. I want to thank her for that.

I also want to thank Michelle Aten, who has been in the control booth. She has been working back there, making sure that the webcast and everything has been going smoothly and dealing with the technology here. We had an intervention by Jake Jenkins, who came from across campus to help us out. We found out that evidently there was some kind of campus-wide difficulty with audio earlier today and there was nothing we

could do about it from here and he dropped everything he was doing to come over here to get us back on track. I want to thank him for that.

With that, I will just give our participants a last chance to make a comment, a question, sign off, whatever. If not, I declare this symposium closed and thank you all for your participation. For those of you out in Webland, thank you for your patience and join us for a virtual cookie while the rest of us have a real one. Thank you, very much.

REPORT OF THE IISL SPACE LAW COLLOQUIUM IN FUKUOKA, JAPAN, OCTOBER 2005

Contributed by Rapporteurs Martha Mejia-Kaiser, Setsuko Aoki, Yasuaki Hashimoto, Motoko Uchitomi and Sethu Nandakumar

Edited by Tanja Masson-Zwaan

SESSION 1 - LEGAL ISSUES RELATED TO NEW DEVELOPMENTS IN SPACE APPLICATIONS: NAVIGATION, REMOTE SENSING AND GIS

Chairmen: Prof. Setsuko Aoki (Japan) and Prof. Jonathan Galloway (USA); Rapporteur: Dr. Martha Mejia-Kaiser (Mexico)

1. The first paper presented was "Global Earth Observation for Compliance of International Environmental Agreements" by Ms. Masami Onoda (Japan). Ms. Onoda listed the most important treaties on environment and pointed out that the implementation of international obligations in this area is addressed together with the gathering and distribution of remote sensing data. She stated that protection of the "global commons" such as the high seas, the ozone layer and the global climate, demands global responsibilities, because injured States can not identify the State which violates its obligations. She mentioned that, at present, it is necessary to find a balance between public (data as a public good) and private interests (data as a commercial product). She also recommended that national and regional interests

should be integrated into a global one, while maintaining a balance among the interests of all parties.

2. Mr. Mukund Rao and Mr. Sridhara Murthi (India) presented the paper "Legal Issues Relating to Convergence of Imaging, Positioning and Spatial Databases". The authors stated that the divide between the free access of the civilian sector and the restricted defense requirements have vanished. As a result, States' outlooks for the dissemination and use of satellite remote sensing images have had to adjust to these technological and market-driven developments. The authors were of the opinion that the integration of remote sensing images, the positioning reference and the spatial databases are powerful tools that will reach dimensions not imagined before. They commented that legal regimes for protecting and managing compilations are needed. Issues like the ownership of digital data, protection of privacy, access rights to compiled data and information liability were addressed.

3. The paper "Regulatory Framework for the Distribution of Remote Sensing Satellite Data: Germany's Draft Legislation on Safeguarding Security Interests" was submitted by Dr. Michael Gerhard and Dr. Bernhard Schmidt-Tedd (Germany). The authors presented an overview of the upcoming German legislation for the operation of "advanced" remote sensing satellite systems and the distribution of their data. The draft legislation, which may be approved by the parliament in mid-2006, was prepared with the aim to protect Germany's national security and foreign policy interests, through the granting of licenses. If a space remote sensing satellite system qualifies as "advanced", there is the need to apply for three licenses: one for the operation of the satellite system, one for the general distribution of data and one for a specific transactions of data.

4. Mr. Álvaro Dos Santos (Brazil) presented the paper "Policy for Commercializing CBERS Data", depicting the Brazilian-Chinese cooperation in the experimental operation and data distribution of the remote sensing satellite CBERS-2. He referred to the '2004 Protocol' signed between these two States and to the "CBERS Data Policy". Through this Policy, China and Brazil agree to have free access to data generated by the satellite. Through agreements, other States may be given direct

access to the downlinks of this satellite, subject to reimbursement on a per-minute basis. The author mentioned that the Brazilian Ministry of Science and Technology has decided to distribute these data free of charge to Brazilians during an initial period of two years, but both parties have agreed not to distribute such data to foreign States or persons. The author made reference to the Brazilian position in COPUOS on remote sensing. Brazil had proposed a general convention, but this proposal has now been withdrawn.

5. The paper "The Search for New Institutional Models of International Remote Sensing Activities" was prepared by Dr. Mahulena Hofmann (Czech Rep.) and Mr. Clemens Feinäugle (Germany). The authors consider that the commercial access to satellite remote sensing technology requires rethinking legal models for an international organization. Although there is no political will for the establishment of an international regime on remote sensing activities, they commented that international practice has been developing its own rules, channels and structures. The authors addressed several international organizations (FAO, WMO, UNESCO) as models for a remote sensing international organization, but also suggested to consider an international network without rigid structure (GEOSS). They concluded that it is important to coordinate the various observation systems in order to ensure consistency and interoperability.

6. The next paper was presented by Ms. Atsuyo Ito (Japan), entitled "Legal Aspects of Implementing the World Heritage Convention Using Remote Sensing Data". Ms. Ito referred to UNESCO's 'Convention Concerning the Protection of World Cultural and Natural Heritage', which is to safeguard sites with outstanding universal value. The Convention covers cultural, natural or mixed sites already on the World Heritage List. The Convention also contemplates the identification of potential sites. The author referred to the ESA-UNESCO "Open Initiative", which aims to monitor heritage sites through remote sensing satellites. She pointed out that World Heritage Convention, as a drawback, leaves it up to each individual State to take measures for protecting the sites in its territory. She mentioned that the "Open Initiative" takes the approach of requesting a

State's prior consent before teleobservation of its territory. Ms. Ito advanced the idea of collecting images in an inventory of cultural and natural heritage sites, to be managed by the World Heritage Committee. She recommended that protection of heritage sites should be the "common concern of humanity", as already stated in the Convention on Climate Change.

7. In the paper "The UN Principles on Remote Sensing Today", Dr. Maureen Williams (Argentina) presented a summary of the discussions in several international gatherings on remote sensing activities. The participants of the Conference of the ILA, of the last three years of the IISL Colloquia, of the Argentina/Brazil Meeting on Ciencia en Tecnología and of other meetings, all agreed that the UN Principles on Remote Sensing have been superseded by current technological developments, by the way in which the data is being distributed and by new areas of application not foreseen.

8. The last paper was co-authored by Prof. Anatoly Kapustin and Prof. Gennady Zhukov (Russian Federation) on the "Problem of Coordination of the Use of National GNSS Systems". In this paper the authors proposed the creation of a consortium to coordinate the civil use of national GNSS systems for civil aviation, maritime and land traffic management. They addressed ICAO's work in this field and referred to the "Charter of Rights and Obligations of States Relating to GNSS Services", which has no binding force. They held that the proposed consortium could provide and operate the system by itself or monitor and control the service provider. Finally, the authors recommended the inclusion of a new item in the COPUOS agenda: "Legal Principles on GNSS Use for Peaceful Purposes".

Notes on the discussion:

a) On the question of Germany's national legislation on remote sensing satellite data:

- *Dr. Schmidt-Tedd* clarified that the foundation of Germany's regulation was Art. VI of the OST, and was also meant to complement export control legislation.

b) On the issue of an international organization on remote sensing:

- *Dr. Hofmann* was asked how an international organization might be structured: she responded that she and her co-author didn't have any clear idea, but mentioned several organizations as examples. About the Intelsat or the Inmarsat models, *Dr. Galloway* noted that those were historical examples, because they have changed through privatization with Inmarsat's shares being traded on the London stock exchange. Dr. Hofmann replied that they only considered theoretical alternatives, but that they were aware of the problems arising from privatization.

- *Dr. Jakhu* referred to the fact that in COPUOS some States were blocking decisions. In his view, consensus is a tool, but the goal is to promote the rule of law. He mentioned that since 1979 no new treaty has been adopted and resolutions have often been bypassed. He suggested that we also look at other fora in which international agreement might be achieved.

- *Dr. Hobe* proposed an examination as to why the international community is reluctant to create hard law for space activities and asked if the existing unbinding resolutions provide sufficient legal certainty, for example in the area of private investments.

- *Ms. Onoda* responded that there is more consensus in respect to environmental principles, and that it may be more important to concentrate on this area, rather than discuss an international agreement on remote sensing activities, thus avoiding the practical problems stemming from consensus mechanisms of COPUOS.

c) On implementing the World Heritage Convention using Remote Sensing Data:

- *Dr. Martha Mejía* made reference to the systematic robbing of archeological sites in Russia, using remote sensing images. She was of the opinion that the ESA-UNESCO Open Initiative, which introduces 'prior consent' for teleobservation is a step back in the freedom of remote sensing activities. She considered that images should be taken without prior consent, in order to point fingers where poaching is taking place, rather than asking permission of the State where an archeological site is located.

- *Dr. Jakhu* commented that in analyzing the use of remote sensing techniques to protect the World Heritage Convention, one should not argue that the Convention is in accordance with the UN Principles, because there is no 'prior consent' requirement in the UN Remote Sensing Principles.

- Answering *Dr. Galloway's* question about World Heritage Sites in international territories, outside the sovereignty of States, *Ms. Ito* recalled that at present there is no such site. *Dr. von der Dunk* did wonder how "world" should be defined, and commented that there is discussion about the protection of historical sites like the steps of the first astronaut on the Moon. He wondered if such sites could be covered by this Convention. *Ms. Ito* answered that a new international instrument might be required to regulate that aspect.

SESSION 2 - LEGAL ASPECTS OF EXPANDING HUMAN PRESENCE BEYOND LOW EARTH ORBIT

Chairmen: Prof. Elisabeth Back Impallomeni (Italy) and Prof. Mamoru Koga (Japan); Rapporteur: Prof. Setsuko Aoki (Japan)

In this Session eleven papers were registered, eight papers submitted by the authors, three papers withdrawn and two papers summarized due to the absence of the authors.

1. The first paper presented was "The Sky Is The Limit - But Where Does It End?" authored by Dr. Frans von der Dunk (The Netherlands). In this paper Dr. von der Dunk reminded us of the fact that recent events including Spaceship One brought the question of the delimitation of outer space and airspace back on the table and pointed out the growing necessity to reconsider the establishing of a boundary between airspace and outer space in order to provide a stable and predictable legal framework for the development of private space flights as well as for national activities of reusable space objects. Dr. von der Dunk proposed to establish this boundary at an altitude of 100 km since this limit already has been recognized by almost consistent state practice and also by domestic legislation. It was upheld by the author that priority has to be given to this problem to better

deal with today's necessities However, he stated, any future limit should remain flexible.

2. Mr. Ricky J. Lee and Ms. Felicity K. Eylward (Australia) authored the paper "Article II of the Outer Space Treaty and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Exclusive Property Rights, or Both?" The authors analyzed in detail the relevant international agreements, *inter alia*, Article II of the Outer Space Treaty, Article 11 of the Moon Agreement and Article 137 of the Law of the Sea Convention, and they concluded that Article II of the OST itself may prohibit the exercise of sovereign rights or national appropriation through private use or occupation of celestial bodies, and arguably it was not until the entering into force of the Moon Agreement that the creation of property rights on celestial bodies came to be prohibited. However, since a significant number of commentators are of the opinion that Article II prohibits the creation of property rights and no contrary state practice could be found, Mr. Lee stated that it might be prudent to consider that Article II stipulates the prohibition of property rights. Considering the recent private activities such as selling the soil of the Moon and Mars, the authors were of the opinion that further clarification of the issue had to be achieved before space mining and other ventures would become economically feasible.

3. The third paper, "Between Concord and Rivalry - requirements for and political feasibility of modifications of planetary operations legal regime" was submitted by Mr. Jakub Ryzenko (Poland), who presented the paper orally, and Ms. Anna Burzykowska (Poland). The authors stated that the development of technological capabilities would necessitate a detailed legal regime taking into consideration prior legal regimes in other common areas such as the High Seas, Antarctica and the Deep Sea Bed. Since renewed interest in the exploration and exploitation of the Moon and other celestial bodies has recently become evident among space faring states, the authors maintained that a multilateral legal regime should be established to strike a balance between a safe business environment and the principle of space exploitation for the common interest. The authors were of the view that lessons learned by the Deep Sea Bed Authority in connection with the 1982 Law of the Sea Conven-

tion should be carefully studied to accomplish an appropriate multilateral agreement of how to share benefits and results of space activities. It was concluded that a multilateral legal regime would be politically feasible provided that economic justification and legal soundness were also satisfied. For that goal, the authors stated, the following would be key issues: (1) a successful evolutionary approach; (2) the clear and acceptable definition of Common Heritage of Mankind; (3) the reasonableness in the "benefit sharing" to non-space faring states and (4) the participation of space faring states in the decision making process for such a regime.

4. The next paper, submitted by Prof. Paul B. Larsen (USA), "Application of the Precautionary Principle to Lunar Activities" was summarized due to his absence. The author insisted that, taking special note of the fragility of the lunar environment, the "precautionary principle" applicable to Antarctica should also be applied to the multifaceted activities on the Moon. With respect to the legal basis for the precautionary approach to the Moon, it was maintained that such an approach could be drawn from the Outer Space Treaty (OST), *inter alia,* from Article I (common interest principle) and from Article IX (avoidance of harmful contamination with due regard to the interests of other states), although the volume of human activities on the Moon at present and in the near and mid-term future could not be envisioned when the OST was adopted. To preserve and to facilitate scientific investigation of the Moon, which is the important purpose stipulated in Article I of the OST, the author was of the view that precautionary measures had to be taken in order to not deteriorate the lunar environment.

5. Mr. Kallun Willock (Australia) presented a paper on "Human Colonisation / Exploration beyond Low-Earth Orbit: space: safety imperatives at conflict with the provisions of the Outer Space Treaty and other such instruments". This paper began by stating that the prospect of human settlements beyond the low earth orbit would open the question whether existing international space law could provide appropriate safeguards to explorers and settlers from asteroids or comets. In the following, Mr. Willock studied the legal permissibility in regard to applying nuclear weapons as a defensive system to protect human

settlers from asteroids and comets. In case human life is threatened in outer space, Mr. Willock questioned if the deployment of defensive systems of nuclear weapons would be permissible although it was categorically prohibited in Article IV of the Outer Space Treaty. He concluded that since human life was of supreme importance, any action to save it might be construed as a true peaceful use of outer space.

6. The paper "Nuclear Power Sources and Future Space Exploration" was presented by Mr. Steven Mirmina (USA). It was stated in his paper that using Nuclear Power Sources (NPS) was a prerequisite for planetary exploration and exploitation of the Moon and Mars since such activities required tremendous amounts of energy. However, the fear of NPS being a threat to the safety of human life and the environment both on Earth and in outer space is widely shared. First, the author explained in some detail the level of safety with respect to different types of NPS as well as the current practice of some states using NPS. After reassuring that the US use of NPS (RTG-type) belonged to the safe category without nuclear fission, the author outlined the existing international law related to the use of NPS. Analysing present international space law, nuclear law and environmental law and also the relevant US legislation, he concluded that the US practices had been strictly observing law and soft law applicable to the use of NPS. Finally, the author proposed an international technically-based safety framework by which the safe use of NPS could be ascertained worldwide without politicizing the issue.

7. Dr. Douglas A. Vakoch (USA) presented the paper "Expanding Human Presence beyond the Solar System through Active SETI: on the Prerequisites for Legal Relations with Extraterrestrial Intelligence". Dr. Vakoch stated that the expansion of human presence beyond low-earth orbits would increase the possibility of detecting any kind of extraterrestrial intelligence (SETI). Dr. Vakoch maintained the importance of "active SETI", or to transmit from *Earth de novo,* prior to detecting intelligence of other worlds, instead of traditional "passive SETI", in which humankind would detect the signals from other planets. Since no proof was found if essentially the same legal and policy considerations could apply between the two, according to Dr. Va-

koch, the central problem was the achievement of communications between the two entities: human beings and SETI. The author stressed the importance of obtaining guidance from entities other than the SETI community prior to embark on active SETI programs and gave some examples to take into consideration including how to represent humankind and how to tell the truth to SETI.

8. The last paper was submitted by Dr. Julian Hermida (Canada) and summarized because of his absence. The paper "Crimes in Outer Space. Criminal Law Policy Basis for Long-Term Human Presence beyond Low-Earth Orbit" presented an overview of the *lex ferenda* aspects of a future criminal law system in outer space, when long-term human settlements in low-earth orbits would make it possible. Currently, criminal jurisdiction in outer space, found in the International Space Station Agreement is based on the criminal law of the state of nationality of the alleged offender. Dr. Hermida predicted that such an approach would be inappropriate in the future, because the mode of life and behavioral problems would be completely different from what had been experienced on Earth. Thus, he proposed the criminological approach to construct a new rule for the life there.

Notes on the discussion:

a) On the question of delimitation:

- *Prof. Zhukov* stated that the difference between a sub-orbital flight and a ballistic missile should be clearly defined in the construction of any legal regime for sub-orbital flights and added that he thought the difference lay in the fact that an object for sub-orbital flights had space velocity, while a missile did not. *Dr. von der Dunk* confirmed that further analysis was necessary to solve the question of the definition of a sub-orbital flight.

- An interesting point was raised from the floor; since both NASA and the US Air Force had the policy of distinguishing the licensing criteria at an altitude of 100 km, consequently a flight higher than 100 km was especially planned and conducted to be highlighted and advertised as a space flight. From those facts, it

was stated, it was a bit premature to say that 100 km should be the demarcation line. *Dr. von der Dunk* responded that he constructed his reasoning taking into consideration several aspects, including the one raised from the floor.

b) On the question of the prohibition of sovereignty and property rights on the Moon:

- *Prof. Dempsey* wondered how exclusive property rights could be used on the Moon either by states or private persons under the prohibition of the exercise of state sovereignty.

- *Prof. Hobe* was of the view that it did not seem appropriate to use Article 11 (2) and (3) of the Moon Agreement to interpret the Outer Space Treaty (OST).

- It was stated from the floor that property rights on the surface or sub-surface of the Moon did not have to be considered so seriously if the setting up of a hotel on the Moon or mining natural resources from its soil were planned, since Article I of the OST guaranteed the freedom of activities in outer space. *Mr. Lee* responded that Article I of the OST did not provide for unlimited freedom, but provided for the obligation to carry out the exploration and use of outer space for the benefit and in the interest of all countries and added that as a result any provision with respect to exclusive property rights on celestial bodies had to be carefully construed.

c) On the question of using nuclear weapons as a defensive system to protect human settlers in space:

- *Prof. Dempsey* commented that it was almost impossible to distinguish between "nuclear defense systems" and "nuclear offense systems" and that allowing the former in the name of protecting human life was dangerous because it would accelerate an arms race in outer space.

- *Prof. Back Impallomeni* pointed out that two different terms were found in this paper, "colonisation" and "settlement", and asked which term Mr. Willock had really in mind. She underlined the importance of the selection of the proper term, because "colonisation" would amount to a breach of Article II of the Outer Space Treaty (OST), which prohibits national appropriation of outer space including celestial bodies. *Mr. Willock* responded that he meant "settlement".

- It was commented from the floor that it seemed highly doubtful that using nuclear devices to protect human life would be regarded as a use of a weapon of mass destruction as prohibited by Article IV of the OST.

d) On the desirability of establishing a multilateral legal regime to regulate space exploitation:

- *Dr. Perek* stated that some 100 kg of minerals were already extracted from the sub-surface of the Moon and that only small portions thereof were for pure scientific research. Residual parts were used to make a block on which experiments were conducted for not purely scientific, but military and economic purposes. Dr. Perek expressed his concern that the principle of collecting and removing minerals from celestial bodies only for purposes of scientific research began to be slightly corrupted and warned that the making of creeping boundaries and creeping national jurisdiction was gradually proceeding. Mr. Ryzenko shared Dr. Perek's concerns.

- *Prof. Kozuka* asked whether such a multilateral legal regime should be established by Treaty or as soft-law, and *Mr. Ryzenko* replied that it should definitely be a legally binding Treaty. In response to a question as to how Mr. Ryzenko assessed the on-going efforts by other fora such as COSPAR, COPUOS and UNIDROIT in regard of constructing such a legal regime, he stated that deficiencies of these efforts led him to propose a new multilateral legal regime.

- *Prof. Koga* pointed out that the mistake made by member states in the course of establishing the Deep Sea Bed Authority within the Law of the Sea Convention was that those which lacked economic background discussed the international regime of economic implications. Prof. Koga underlined that a good lesson learned from the experience of the Deep Sea Bed Authority was the importance to provide a safe business environment and incentives for various participants to establish an effective multilateral legal regime promoting economic activities.

e) Concerning Nuclear Power Sources:

- *Prof. Aoki* asked how an appropriate scientific assessment could be guaranteed in setting up a technically based framework, since scientific neutrality was not so easily assured. According to her, one example was the International Panel of Cli-

mate Change (IPCC), the assessment of which is sometimes regarded rather politicized. *Mr. Mirmina* responded that careful selection of expert groups and appropriate fora to discuss the matter would solve such doubt and referred to the upcoming "2006 Joint Technical Workshop on NPS" between the Scientific and Technical Subcommittee (STSC) and the International Atomic Energy Agency (IAEA).

SESSION 3 - OTHER LEGAL MATTERS I, INCLUDING LEGAL ASPECTS OF SUB-ORBITAL FLIGHTS

Chairmen: Prof. Dr. Stephan Hobe (Germany) and Mr. Masahiko Sato (Japan); Rapporteur Prof. Yasuaki Hashimoto (Japan)

Chairman Prof. Hobe pointed out that this session's topic, 'Other Legal Matters I' showed that nowadays, other legal matters are becoming a core issue of international space law, because this theme covers all kinds of new developments, business ventures, etc, which are so numerous that they cannot be covered in one single session!

1. The first paper was "The impact of Space tourism on the International Law of Outer Space" by Mr. Steven Freeland (Australia). The present situation of emerging low cost space tourism is his motivation for writing this paper. The author discussed and showed some points to be considered about matters like tourist status, property rights for instance for space hotels, liability, etc.

2. The second paper was "Lessons from "The Little Prince" on Space Flight" by Dr. Sylvia Ospina (USA). Private enterprises' access to outer space inspired Dr. Ospina to prepare this paper. She emphasized the importance of sharing the spirit of frontiers, learning from the Little Prince lessons.

3. "Developing a Legal Regime for Space tourism: Pioneering a Legal Framework for Space Commercialisation" was presented by Dr. Yun Zhao (Hong Kong). Dr. Zhao discussed the difference between space travel and air transportation, and applicable air laws and space laws. This includes very old questions like the demarcation between air space and outer space.

Dr. Zhao analysed several matters, including liability, insurance, criminal jurisdiction, registration, licensing, and the status of Astronauts, and indicated the tendency of expanding aviation law concepts to outer space activities.

4. Mr. Stefan Kaiser (Germany) and Dr. Martha Mejia-Kaiser (Mexico) co-authored the paper on "Space Passenger Liability". The paper compares air transport and space transport liability, and discusses the applicability of national rules like the US Commercial Space Launch Act of 2004 in case of overseas business. During the *discussion*, Dr. Mejia-Kaiser pointed out that hybrid vehicles might present a liability problem in case of accident.

5. The next paper was "Liability Arising from Article VI and Other Provisions of the Outer Space Treaty: Status, Domestic Law and Private Operators", presented by Mr. Ricky Lee (Australia). His main theme was the liability provision of Article VI of the 1967 Outer Space Treaty. The author summarised several national space legislations, like those of Norway, Russia and the USA. He concluded that while several states have enacted domestic laws, the coverage of liability varies widely, and some do not cover Article VI properly. During the *discussion*, he mentioned as an example a recent US domestic law amendment which does not cover the state's responsibility under international space law. He also pointed out that some of the provisions of the international space treaties, like Articles VI and VII of the Liability Convention, might not properly cover some cases, like for instance the in-orbit transfer of ownership, because the new owner (country) may not be bound by these provisions.

Also during the *discussion*, an important suggestion was brought up regarding the confusion that often surrounds the meaning of the words 'responsibility' and 'liability' in English. The French text of the Outer Space Treaty has no distinction between those two words, they only use "responsabilité". Although IISL meetings are always held in English, consideration of other official languages may be helpful.

6. The paper "Consumer Protection and the Limitation of Liability in the National Regulation of the Space Tourism Industry – Lessons from EU Law" was presented by Ms. Zeldine O'Brien (Ireland). This paper was this year's winner of the Isa-

bella H.Ph. Diederiks-Verschoor Award for best paper by a young author. Ms. O'Brien analysed the protection of newcomers like tourists from the viewpoint of a consumer protection concept, learning from EU laws and regulations. Such EU laws and regulations protect the rights of customers. The author offered possibilities of application of those laws. This interesting analysis and approach might provide ideas to be considered in the present and near future. During the *discussion*, the question of the applicability of EU laws and regulations to outer space was raised, because Outer Space is not within EU jurisdiction, and this idea thus raised the question of extraterritorial application of EU laws.

7. Dr. Leslie Tennen and Dr. Patricia Sterns (USA) co-authored the paper "Private Enterprise and the Resources of Outer Space". They described the present situation where newcomers from the private sector become involved with outer space activities. They attempted to identify principles which can be applied to this sector, using non-space precedents like the Law of the Sea and the World Trade Organization system as examples.

8. The next paper was "Corporation and Space Law" by Prof. Jose Monserrat-Filho (Brazil). The author summarised the principles of space law in relation with the present situation of space industry. After this analysis, the author touched upon the increasing pressure from private industry and identified some basic and unavoidable rules of 'Jus Cogens' which are needed as an essential basis.

9. Then, the paper entitled "Space Commercialisation: Addressing Intellectual Property Issues" was presented by Ms. Sagee Sasikumar (India). The author analysed the present legal system and its applicability to private activities, especially in the field of intellectual property rights, and pointed out the lack of adequate regulations.

10. The next paper was "Regulation of Space Activities in Canada" by Prof. Ram Jakhu (Canada). This paper reviewed the long history of Canadian space law. The author touched upon the necessity/need of space use by Canada because of its huge size and extensive national borders that need to be guarded. The author also introduced Canadian domestic space law in all

its aspects and levels (general, civil, military, national, local, provincial). During the *discussion*, the question of protection of remote sensing data was raised. The author responded that data processed on earth was not treated as a space activity, but regulated by Canadian property-related laws. There was also some concern about disclosure of remote sensing data on the internet, like Google Watch. Some participants supported the concern from security and natural resource viewpoints and held that the releasing of data from outer space on the internet should be properly regulated. Others, however, including Prof. Hashimoto, disagreed, because the disclosure takes place under proper control of supervising countries like the USA and the suppliers accept free use of the data. Moreover, from the security viewpoint, those data have limited value because they are several years old.

11. The paper "Is a "fair return" admissible on space activities funded by the EC/EU?" was prepared by Dr. Luis Castillo Arganaras (Argentina). The author explained the constitutional reform that took place in 1994 in Argentina. Under this reform, Treaties have higher status than domestic laws and regulations. The author discussed some investment treaties under this new scheme.

12. The last paper in this session was "The Main Contents of the New Space Exploitation Promotion Act in Korea" presented by Prof. Dr. Doo Hwan Kim (Korea). The Author first gave a brief history and current situation of Korean space activities including building its own launching site. Then, the author introduced the new domestic law for space exploitation promotion, and lastly proposed establishing a Korean Space Agency.

SESSION 4 - OTHER LEGAL MATTERS II, INCLUDING LEGAL ASPECTS OF PROPERTY RIGHTS ON THE MOON"

Chairmen: Prof. Gabriella Catalano Sgrosso (Italy) and Prof. Kasuhiro Nakatani (Japan); Rapporteur Ms. Mokoto Uchitomi (Japan).

The papers presented in this session could be classified in four groups:

a) Safeguarding Humanitarian Rights:

1. Mr. Sethu Nandakumar (India) explored the concept of "common heritage of mankind in the Moon Treaty in the paper: "Common heritage of Mankind"- property rights in the wake of commercial use of the moon and other celestial bodies".

2. Prof. Gabriella Catalano Sgrosso (Italy), in her paper: "Emergency for natural Disasters – Prevention and Management", insisted that we should make use of the space system in order to prevent and manage emergencies, such as natural disasters, on the basis of international cooperation.

3. Mr. Mehmood Pracha (India) underlined the importance of the concept of "common heritage of mankind" as safeguard for developing countries in the paper: "Legal aspects of Expanding Human Presence beyond Low Earth Orbit - Safeguards for Underdeveloped Countries".

4. Dr. Liara Covert (Canada) proposed to set up a new treaty in her paper entitled "Progress toward an Asteroid Deflection Treaty".

b) Commercial activities:

5. In his paper "UN General Assembly Resolution 'Application of the concept of the 'Launching State'", Dr. Kai-Uwe Schrogl (Germany) reported the successful output by the UNCOPUOS Working Group concerning the concept of the "launching State", which resulted in UNGA Assembly Resolution 59/115 of Dec. 2004.

6. Dr. Bernhard Schmidt-Tedd and Dr. Michael Gerhard (Germany), expressed doubts about the up-to-dateness of the registration of space objects regime and the new situation in their paper "How to adapt the present regime for registration of space objects to new developments in space applications?".

c) Export control:

7. Ms Yuri Takaya-Umehara (Japan) pointed out the necessity of space arms control making use of the Registration Convention, and proposed several amendments in her paper "Enforcing the verification mechanism of the registry for space control".

8. Ms. Amal Rakibi (France), raised the problem of export control of space related dual technologies and highlighted conflicts between related domestic laws and international laws in her paper "Export Control and Dual Use of Space Technologies".

9. Ms Macha Ejova (Russia) explained the legal basis of Euro-Russian space cooperation and related export control practices in her paper "The Euro-Russian cooperation in space and Export Controls: policies and practices".

d) Expanding law in outer space:

10. The paper "Private Rules for the Commercial activities in Space: Lex Ferenda" by Prof. Souichirou Kozuka (Japan) proposed the application of private law rules for commercial space activities.

11. The next paper, by Mr. Declan O'Donnell (USA), proposed a common law approach for recent space activities in his paper "Astro Law as Common Law Extended into the Outer Space Territory".

12. In the last paper in this session, Prof. Stephan Hobe explained the development of the Project 2001 Plus and announced the upcoming Project 2006 in his paper: "Project 2001 Plus: Global and European Challenges for Air and Space Law at the Edge of the 21st Century".

Short *discussions* followed the presentations of the papers and the sharp remarks by Prof. Kopal, Prof. Perek and many eminent participants made the session lively and interesting.

SESSION 5 - CONVERGENCE AND PRIVATISATION IN TELE-COMMUNICATIONS: INSTITUTIONAL AND OTHER RESPONSES

Chairmen: Prof. Francis Lyall (Scotland, UK) and Prof. Toshio Kosuge (Japan); Rapporteur Sethu Nandakumar Menon (India)

1. The first paper presented was "Privatisation of Telecommunication in the developing world: A lesson learned, or a burden imposed?" by Mr. Atip Latipulhayat (Australia). The paper discussed the privatisation of the telecommunication sector in developing countries, with specific reference to Indonesia. The author explained the traditional telecommunication regime in Indonesia and its reform which began in the 1980's. The author gave various reasons which supported the reforms. For instance, inclusion of telecommunications into the WTO gave strength to regulation reform in the developing countries. The main object of the reform was to change government control from direct to in-direct control. The author was critical of the reason for reform and mentioned specific economic problems and international commitments. He was also critical of the alleged benefits that derived from privatisation of the telecommunication sector.

2. The second paper was "Convergence of telecommunication services and the problems of their regulation" by Prof. Rosa Maria Ramirez de Arellano (Mexico). The author highlighted the changes that occurred in the telecommunication sector and the impact of commercialisation on the regulation of telecommunication. She referred to the WTO and several rounds of negotiation with respect to telecommunications. Convergence in telecommunication services has existed for a long time, and the author explained the reasons and what has been happening with regards to convergence in telecommunication services. The author explained the differences in meaning of 'basic services' and 'non-basic services', and provided insight into the regulatory reforms that occurred in Mexico and several other countries. The paper concludes with eight specific points that need to be considered by countries when changing their telecommunication regulation.

3. The paper "Regulation of Access to Limited Resources in Telecommunication Sector in Europe" was prepared by Dr. Les-

ley Jane Smith and Ms. Kate Levy (Germany). The authors examined the struggle to ensure fair competition in regulating access to the limited resources in the telecommunication sector in Europe. The paper explained in great detail the purpose, structure and working process of the '2002 telecommunication package' of the EU. This package was intended to increase harmonisation between member states. The Authors described the three-tiered management hierarchy of the radio spectrum, consisting of the European Commission, the Radio Spectrum Committee and the National Regulatory Authorities, interlinked by the duty to consult and co-operate.

4. Prof. Toshio Kosuge (Japan) presented the paper, "Asian Broadband plan and its implication for bridging Digital Divide Within the framework of WSIS and international cooperation". Prof. Kosuge explained Japan's effort to implement the Asian Broadband plan to bridge the digital divide in the Asia pacific countries. Tests have already begun in Japan, Singapore and China for this project. Japan and the Asia Pacific region will benefit from further advancement of information and communication technology through the building of 'Space infrastructure' using communication satellites. The author explained the different projects pursued by Japan in this effort. Prof. Kosuge concluded that humankind will benefit from the implementation of these concepts and there is a need for an action plan to overcome international barriers.

5. The next paper was presented by Prof. Francis Lyall (Scotland, UK), entitled "Deriving more 'Common Benefit' from Space Telecommunication". Prof. Lyall wondered whether the benefit from space telecommunication could be further improved in the interest of developing countries through existing or new mechanisms within the ITU. The author make the point that the user should require to pay for the use of the 'limited natural resources' from which they make their profit, and the income from such payment should be used for the general benefit. The paper proposed that such a fee could be a one-off payment or an annual payment, or alternatively the 'fee' could be based on bids through an auction process. The author proposed that the administration of such a system should be done by the ITU as it already maintains a register and knows how to operate such a

system. The author further pointed out that in appropriate cases, these fees could be returned as subsidy from maintaining uneconomic services or for fostering developmental programmes.

6. The last paper in this session was by Prof. Carl Q. Christol on "Remote Sensing in the War against Terrorism". The paper explained the utilities of a remote sensing satellite system in the war against terrorism. The author explained that techniques employed in remote sensing have instilled caution into the plans of terrorists and have reduced their evil efforts. The paper explained the role of the Geospatial-Intelligence Agency in collecting data and protecting the wellbeing of mass movements of human beings (e.g. the 2005 Super Bowl). Prof. Christol also described the dangers of excessive restriction on the availability of sensitive information.

REPORT OF THE GENERAL DISCUSSION

Chairman: Dr. Jasentuliyana (President IISL); Rapporteur: Dr. Martha Mejia-Kaiser (Mexico)

a) On the status of the UN Remote Sensing Principles:

- *Dr. Galloway* referred to some participants in the first session who had stressed that the UN Principles on Remote Sensing were outdated in view of today's applications. He proposed that the IISL draft a "white paper" in order to propose a balance between the various competing interests, such as business and national security. *Dr. Jasentuliyana* agreed and requested Dr. Galloway to prepare an outline to be presented to the IISL Board in March 2006. He also suggested to create a group for the drafting of this white paper.

b) On the reliability of remote sensing data, national security, and liability for distribution of remote sensing data:

- *Dr. Mejia* asked Dr. Schmidt-Tedd if "9/11" triggered the drafting of the German legislation for licensing the distribution of remote sensing data by private companies. *Dr. Schmidt-Tedd* replied that the legislation was drafted because of the forthcoming launch of a partially privately financed German remote sensing satellite with high resolution. *Dr. Mejia* expressed

doubts about the enforcement of this legislation, because remote sensing images with high resolution are already internationally available through the internet. She was of the opinion that the German legislation would only put obstacles to distributors in German territory. *Dr. Schmidt-Tedd* answered that the aim of this legislation was not to limit the distribution of data. He referred to Spot which also operates under some restrictions set by the defense ministry. He commented that the distribution of remote sensing satellite data in Germany would be no more restrictive to the industry than in other countries with similar systems.

- On the same issue, *Dr. Jasentuliyana* referred to "Google Earth", an internet site with a large collection of good quality images of the Earth. He asked how the German legislation would be enforced and how the source of information could be identified in order to apply the regulation. *Dr. Schmidt-Tedd* commented that he was aware that people have access to such information, but mentioned that for the Government it is necessary to protect security interests. He said that sensitive satellite images in "Google Watch" (e.g. of sensitive sites such as the White House) are not up-to-date but several days old. This would be of importance in times of crisis. The German legislation has been drafted to interfere as little as possible with the market, but to concentrate on very special aspects of control.

c) On export control:

- *Dr. Jasentuliyana* commented that it is important to know whether export control encourages or discourages space activities. *Dr. van Fenema* held that export control does not discourage space activities but affects international cooperation in space activities. He remarked that after an accident in the aviation sector, failures and information are shared by airlines and aircraft manufacturers. Conversely, in the space launch sector, investigations after a launch failure in one country are not shared, because of export control constraints. He was of the opinion that if we want to have safer space endeavors, we need to cooperate in sharing such investigation results.

d) On the trend of COPUOS resolutions to interpret existing space law treaties, rather than to revise and amend them:

- *Dr. Hobe* commented that the ILA was collecting evidence of State practice in several space related areas, for example registration of space objects, in order to see to what extent existing space law suits the needs of States and customers. He regretted that only soft law was created, rather than hard law.

- *Dr. Von der Dunk* pointed out that we should not underestimate existing space legislation, for example on registration. In his opinion the fact that there is an additional resolution calling for information on space objects was more useful than trying to make it a binding rule. He informed that there are several countries who submit information to the UN website about their space objects, although they have not signed the Registration Convention. He underlined that the ultimate goal is to have as much information as possible on space objects, in order to determine responsibility or liability.

- *Dr. van Fenema* referred to the Space Traffic Management session (IAA-IISL Scientific-Legal Roundtable) where the issue on the registration was brought up. He stressed that it was important to know what was moving in outer space, as precisely as possible, in order to guarantee safe space activities. He asked if we should create a more practice-oriented technical database from different national or international sources, including from the scientific community or ITU. Dr. Van Fenema was of the opinion that the Registration Convention has eroded, at least for present purposes.

- *Dr. Perek* commented that when the Registration Convention was drafted, only two countries were placing objects in outer space. He noted that at present the launching of objects is undertaken by several countries and approximately 25% of the launched space objects are not registered, including satellites of international organizations like Intelsat and Inmarsat. He underlined that it is compulsory to register cars, airplanes and ships, but pointed out that there was no interest of the international community to register space objects. He wondered whether the international community prefers to wait until someone places an object into space that is capable of executing terrorist acts. He stressed that the Registration Convention requires changes in order to contain significant scientific-technical data. Although there are other sources containing satellite pa-

rameters, he was of the opinion that the UN should be the most authoritative source of information.

e) On Space Traffic Management:

- *Dr. Schrogl* presented a report on the Space Traffic Management session, the IAA-IISL Scientific-Legal Roundtable *(see elsewhere in these Proceedings).*

- *Dr. van Fenema* reported that in this session participants had the feeling that any sense of urgency was lacking. Insurance specialists had indicated that the only means of getting a sense of urgency seems to be the occurrence of an accident.

- *Dr. Schrogl* mentioned the procedures of ITU to constantly revise and update their radio regulations. He regretted that COPUOS is a conservative and slow forum, reluctant to adopt new mechanisms and innovative legislation. He regretted that there are several international organizations elaborating regulations on different aspects of space activities, and these discussions are completely disconnected from COPUOS.

- *Dr. Jasentuliyana* recalled that in the past, COPUOS created general principles on international space law, but since we are going into an era which requires more technical guidance, like managing space debris, standards and recommended practices are needed, as in ICAO and other organizations. Dr. Jasentuliyana mentioned that COPUOS at present is not well-equipped to deal with this kind of regulations; the number of delegates at COPUOS is too large to deal with detailed technical issues. He regretted that the quality of the representation of States had diminished as compared to what it was at the time of the drafting of the space treaties. With COPUOS having become an inefficient international law maker, he concluded that other international organizations are taking over this regulatory role and they should be encouraged.

f) On the exploitation of space resources and property rights in space:

- *Ms. Takaya* reported that during the IAF Youth Forum, issues of property rights on celestial bodies and exploitation of space resources had been addressed, but there was no specialist to answer the various questions raised by students and young researchers. *Dr. Jasentuliyana* encouraged Ms. Takaya to or-

ganize a session on space law and policy at next year's Forum, with contributions by IISL members.

FRAMEWORK AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE FRENCH REPUBLIC FOR COOPERATIVE ACTIVITIES IN THE EXPLORATION AND USE OF OUTER SPACE FOR PEACEFUL PURPOSES

PREAMBLE

The Governments of the United States of America and of the French Republic, hereinafter referred to collectively as "the Parties" or individually as "Party";

Recognizing a mutual interest in the exploration and use of outer space for peaceful purposes;

Taking note of the long-term successful cooperation that has existed among the U.S. National Aeronautics and Space Administration (hereinafter referred to as "NASA"), the U.S. National Oceanic and Atmospheric Administration (hereinafter referred to as "NOAA"), and the Centre National d'Etudes Spatiales (hereinafter referred to as "CNES");

Recalling the Agreement Among the Government of Canada, the Governments of the 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, done at Washington on 29 January, 1998, (hereinafter referred to as the "IGA");

Considering the provisions 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, of 27 January 1967, and of other multilateral treaties and agreements on the exploration and use of outer space, to which both the Governments of the United States of America and of the French Republic are Parties;

Considering the desirability of enhanced cooperation between the Parties in human space flight, space science, Earth science, and other activities;

Expressing their satisfaction with the accomplishments resulting from cooperative activities in space exploration, science, technology, and applications, as well as their desire to continue to expand cooperation in these fields;

Desiring to establish an overall legal framework to facilitate the conclusion of Implementing Arrangements for cooperation between their Implementing Agencies;

Have agreed as follows:

ARTICLE 1 - SCOPE OF ACTIVITIES

1. The Parties shall identify areas of mutual interest and seek to develop cooperative activities in the exploration and peaceful uses of outer space and shall work closely together to this end.

2. These cooperative activities may be undertaken, as mutually agreed and subject to the provisions of this Framework Agreement (hereinafter "Agreement"), and the specific terms and conditions of Implementing Arrangements set forth pursuant to Article 2, in the following areas:

A. Exploration systems;

B. Space operations;

C. Earth observation and monitoring;

D. Science and space research; and

E. Other relevant areas as agreed between the Parties.

3. These cooperative activities may be implemented using:

A. Spacecraft and space research platforms;

B. Scientific instruments onboard spacecraft and space research platforms;

C. Sounding rocket and scientific balloon flights and campaigns;

D. Aircraft flights and campaigns;

E. Ground-based antennas for tracking and data acquisition;

F. Ground-based space research facilities;

G. Exchanges of scientific personnel;

H. Exchanges of scientific data;

I. Education and public outreach activities and;

J. Other forms of cooperation as agreed between the Parties.

4. These cooperative activities may take place on the surface of the Earth, in air space, or in outer space. The Parties intend that the activities will be performed on a cooperative basis involving no exchange of funds.

5. All cooperative activities under this Agreement shall be conducted in a manner consistent with the respective laws and regulations of each Party and in accordance with applicable international law.

6. This Agreement shall not apply to activities undertaken pursuant to the IGA or any subsequent agreement that modifies, or is concluded, pursuant to the IGA.

ARTICLE 2 - IMPLEMENTING AGENCIES AND ARRANGEMENTS

The specific terms and conditions for cooperative activities described in Article 1 shall be set forth in Implementing Arrangements between the Implementing Agencies for this Agreement. The United States of America has identified NASA and NOAA as Implementing Agencies. The French Republic has identified CNES as the Implementing Agency. Either Party may elect to designate additional Implementing Agencies for specific cooperative activities under this Agreement. In such a case, that Party shall duly notify the other regarding the designated Implementing Agency in charge of these activities through appropriate diplomatic channels.

Implementing Arrangements shall include, as appropriate, provisions, *inter alia*, related to the nature and scope of the pro-

gram and the individual and cooperative responsibilities of the Implementing Agencies, consistent with the provisions of this Agreement. The Implementing Arrangements shall refer to and be subject to this Agreement, unless the Governments agree otherwise. The Parties shall endeavor to ensure that their respective Implementing Agencies make all reasonable efforts to comply with the undertakings contained in the Implementing Arrangements.

ARTICLE 3 - FINANCIAL ARRANGEMENTS

The Parties shall be responsible for funding their respective activities under this Agreement or any Implementing Arrangement concluded hereunder. Obligations under this Agreement and any Implementing Arrangements shall be subject to the availability of appropriated funds and to each Party's funding procedures.

ARTICLE 4 - CUSTOMS, ENTRY AND TEMPORARY RESIDENCE, AND OVERFLIGHT

1. In accordance with its national laws and regulations, each Party shall arrange free customs clearance and waiver of all applicable duties and taxes for the import or export of equipment and related goods by the Implementing Agency of the other Party or on its behalf as necessary to carry out activities under this Agreement. In the event that any customs fees or taxes of any kind are nonetheless levied on such equipment and related goods, such customs fees or taxes shall be borne by the Party levying such fees or taxes.

2. In accordance with its national laws and regulations, each Party shall facilitate the provision of the appropriate entry and residence documentation for the other Party's representatives who enter, exit and reside within its territory in order to carry out activities under this Agreement. The Parties acknowledge, however, that such representatives may be subject to certain other administrative requirements, such as badging or security procedures for access to certain facilities.

3. In accordance with its national laws and regulations, each Party shall facilitate the provision of aircraft or scientific

balloons overflight clearances as necessary in order to carry out activities under this Agreement.

ARTICLE 5 - TRANSFER OF GOODS AND TECHNICAL DATA

The Parties are obligated to transfer only such technical data (including software) and goods necessary to fulfill their respective responsibilities under this Agreement, in accordance with the following provisions, notwithstanding any other provisions of this Agreement or of any of its Implementing Arrangements.

1. All activities under this Agreement shall be carried out in accordance with the Parties' applicable national laws and regulations, including their export control laws and regulations and those pertaining to the control of classified information.

2. The transfer of technical data pursuant to an Implementing Arrangement, with regard to interface, integration, and safety shall normally be made without restriction, except as provided in paragraph 1, above.

3. All transfers of goods and proprietary or export-controlled technical data are subject to the following provisions:

A. In the event an Implementing Agency or its related entity (including but not limited to contractor, subcontractor, sponsored entity, cooperating entity) finds it necessary to transfer goods or to transfer proprietary or export-controlled technical data, for which protection is to be maintained, such goods shall be specifically identified and such proprietary or export-controlled technical data shall be marked.

B. The identification for goods and the marking on proprietary or export-controlled technical data shall indicate that the goods and proprietary or export-controlled technical data will be used by the receiving Implementing Agency or related entity only for the purposes of fulfilling the receiving Implementing Agency's or related entity's responsibilities under this Agreement, and that the identified goods and marked proprietary technical data or marked export-

controlled technical data shall not be disclosed or retransferred to any other entity without the prior written permission of the furnishing Implementing Agency or its related entity.

C. The receiving Implementing Agency, or related entity, shall abide by the terms of the notice and protect any such identified goods and marked proprietary technical data or marked export-controlled technical data from unauthorized use and disclosure.

D. Each Implementing Agency shall ensure that its related entities are bound by the provisions of this Article related to use, disclosure, and retransfer of identified goods and marked technical data.

4. All goods exchanged pursuant to any Implementing Arrangement shall be used by the receiving Implementing Agency or related entity exclusively for the purposes of that Implementing Arrangement. Upon completion of the activities under that Implementing Arrangement, the receiving Implementing Agency or related entity shall return all goods and marked proprietary technical data or marked export-controlled technical data, as directed by the furnishing Implementing Agency or related entity, unless otherwise agreed between the Implementing Agencies or their related entities.

ARTICLE 6 - INTELLECTUAL PROPERTY RIGHTS

1. For the purposes of this Article, the term "Related Entity" includes but is not limited to, at any tier, contractors, subcontractors, sponsored entities or cooperating entities of a Party and "Party" includes the Implementing Agency of that Party.

2. PATENTS

A. Nothing in this Agreement shall be construed as granting, either expressly or by implication, to the other Party any rights to, or interest in, any inventions of a Party or its Related Entities made prior to the entry into force of, or outside the scope of, this

Agreement, including any patents or other forms of protection (in any country) corresponding to such inventions.

B. Any rights to, or interest in, any invention made in the performance of this Agreement solely by one Party or any of its Related Entities, including any patents or other forms of protection (in any country) corresponding to such invention, shall be owned by such Party or, subject to paragraph 2.D of this Article, such Related Entity.

C. It is not anticipated that there will be any joint inventions made in the performance of this Agreement. Nevertheless, in the event that an invention is jointly made by the Parties in the performance of this Agreement, the Parties shall, in good faith, consult and agree, in accordance with each Party's national laws and regulations as to: a) the allocation of rights to, or interest in, such joint invention, including any patents or other forms of protection (in any country) corresponding to such joint invention taking into account, *inter alia,* their respective contributions; b) the responsibilities, costs, and actions to be taken to establish and maintain patents or other forms of protection (in any country) for each such joint invention; and c) the terms and conditions of any license or other rights to be exchanged between the Parties or granted by one Party to the other Party.

D. With respect to all inventions created in the performance of this Agreement and involving a Related Entity, allocation of rights between a Party and its Related Entity to such invention, including any patents or other forms of protection (in any country) corresponding to such invention, shall be determined by such Party's laws, regulations, and applicable contractual obligations.

3. COPYRIGHTS

A. Nothing in this Agreement shall be construed as granting, either expressly or by implication, to the other Party any rights to, or interest in, any copyrights of a Party or its Related Entities created prior to the entry into force of, or outside the scope of, this Agreement.

B. Any copyrights in works created solely by one Party or any of its Related Entities, as a result of activities undertaken in performance of this Agreement, shall be owned by such Party or Related Entity. Allocation of rights between such Party and its Related Entities to such copyrights shall be determined by such Party's laws, regulations, and applicable contractual obligations.

C. For any jointly authored work, should the Parties decide to register the copyright in such work, they shall, in good faith, consult and agree as to the responsibilities, costs, and actions to be taken to register copyrights and maintain copyright protection (in any country).

D. Subject to the provisions of Articles 5 and 7 (Transfer of Goods and Technical Data, and Publication of Public Information and Results), each Party shall have, for its own purposes, a non exclusive, irrevocable, royalty free right to reproduce, prepare derivative works from, display publicly and distribute to the public copies of any copyrighted work resulting from joint activities undertaken in the performance of this Agreement. Each Party has the right in addition to authorize its Related Entities to reproduce, prepare derivative works from, display publicly and distribute to the public copies of such copyrighted work for its own purposes and under its direction. Specific implementing provisions may be included, if appropriate, in the Implementing Arrangements. Mention

of the name of the author shall be acknowledged in each copyrighted work.

ARTICLE 7 – PUBLICATION OF PUBLIC INFORMATION AND RESULTS

1. The Parties retain the right to release public information regarding their own activities under this Agreement. Subject to the provisions of paragraph 3 hereafter, the Parties shall coordinate with each other in advance concerning releasing to the public information that relates to the other Party's responsibilities or performance under this Agreement. Appropriate acknowledgment shall be made by both Parties of their respective roles.

2. A. The Parties shall make the scientific results obtained under this Agreement available to the general scientific community through publication in appropriate journals or by presentations at scientific conferences as soon as possible and in a manner consistent with each Party's laws and regulations and with good scientific practices.

B. Each Party shall have for its own purposes an irrevocable, royalty free right to reproduce, prepare derivative works from, distribute to the public copies of and present publicly the scientific results included in each such publication or presentation. Each Party has the right in addition to authorize its Related Entities (as defined in Article 6) to undertake these activities for its own purposes and under its direction. The royalty free right shall exist irrespective of any copyright protection applicable to each such publication or presentation.

C. The Implementing Agencies shall include data sharing provisions in the Implementing Arrangements.

3. The Parties acknowledge that the following data or information does not constitute public information and that such data or information shall not be included in any publication or presentation by a Party under this article without the other Party's prior written permission: 1) data furnished by the other Party in accordance with Article 5 (Transfer of Goods and Technical Data) of this Agreement which is export-controlled, classified or proprietary; or 2) information about an invention of the other Party before a patent application has been filed covering the same, or a decision not to file has been made.

ARTICLE 8 - EXCHANGE OF PERSONNEL

To facilitate coordination related to activities conducted under this Agreement, the Implementing Agencies may support the exchange of a limited number of personnel, at a time and under conditions mutually agreed between them. Such arrangements may include provision of office space and administrative support at the host location. Unless agreed otherwise, salary and all other expenses shall be borne by the sending Implementing Agency for the duration of the assignment.

ARTICLE 9 – CROSS-WAIVER OF LIABILITY

With respect to cooperative activities performed under this Agreement, the Parties agree that a comprehensive cross-waiver of liability between the Parties and their Related Entities will further participation in space exploration and use. The cross-waiver of liability shall be broadly construed to achieve this objective. The terms of the waiver are set out below:

A. As used in this Article:

(1). The term "Party" means each Party to this Agreement, including their respective Implementing Agencies;

(2). The term "Related Entity" means:

(i) a contractor, subcontractor, cooperating entity or sponsored entity of a Party at any tier;

(ii) a user or customer of a Party at any tier;

(iii) a contractor or subcontractor of a user or customer or cooperating entity or sponsored entity of a Party at any tier; or

(iv) scientific investigators.

The term "Related Entity" may also apply to a State, an international organization or an agency or institution of a State, having the same relationship to a Party as described in article 9.A.2(i) through 9.A.2(iv) above or otherwise engaged in the implementation of Protected Space Operations as defined in article 9.A.6 below.

The terms "contractors" and "subcontractors" include suppliers of any kind.

(3). The term "damage" means:

(i) bodily injury to, or other impairment of health of, or death of, any person;

(ii) damage to, loss of, or loss of use of any property;

(iii) loss of revenue or profits; or

(iv) other direct, indirect, or consequential damage.

(4). The term "launch vehicle" means an object or any part thereof intended for launch, launched from Earth into air space or outer space, or returning to Earth which carries payloads or persons, or both;

(5). The term "payload" means all property to be flown or used on or in a launch vehicle; and,

(6). The term "Protected Space Operations" means all activities pursuant to this Agreement, or any Implementing Arrangement concluded hereunder, including launch vehicle activities and payload activities on Earth, in outer space, or in transit between Earth and air space or outer space in implementation of this Agreement. It includes, but is not limited to:

(i) research, design, development, test, manufacture, assembly, integration, operation, or use of launch or transfer vehicles, payloads, or instruments, as well as related support equipment and facilities and services; and

(ii) all activities related to ground support, test, training, simulation, or guidance and control equipment and related facilities or services.

The term "Protected Space Operations" excludes activities on Earth that are conducted on return from space to develop further a payload's product or process for use other than for activities in implementation of this Agreement.

B. (1). Each Party agrees to a cross-waiver of liability pursuant to which each Party waives all claims against any of the entities or persons listed in sub-paragraphs (i) through (iii) below based on damage arising out of Protected Space Operations. This cross-waiver shall apply only if the person, entity, or property causing the damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations. The cross-waiver shall apply to any claims for damage, whatever the legal basis for such claims, including but not limited to delict and tort, and contract, against:

(i) the other Party;

(ii) a Related Entity of the other Party;

(iii) the employees of any of the entities identified in sub-paragraphs (i) and (ii) immediately above.

(2). In addition, each Party shall extend the cross-waiver of liability as set forth in sub-paragraph 9.B.1 above to its own Related Entities by requiring them, by contract or otherwise, to agree to

(i) waive all claims against the entities or persons identified in sub-paragraphs 9.B.1(i) through 9.B.1(iii) above,

(ii) require that their Related Entities waive all claims against the entities or persons identified in sub-paragraphs 9.B.1(i) through 9.B.1(iii) above.

(3). For avoidance of doubt, this cross-waiver of liability shall be applicable to claims arising from the Convention on International Liability for Damage Caused by Space Objects, which entered into force on 1 September, 1972 (Liability Convention), where the person, entity, or property causing the damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations.

(4). Notwithstanding the other provisions of this Article, this cross-waiver of liability shall not be applicable to:

(i) claims between a Party and its own Related Entity or between its own Related Entities;

(ii) claims made by a natural person, his/her estate, survivors, or subrogees for bodily injury, other impairment of health or death of such natural person, except where a subrogee is a Party or an agency of a Party;

(iii) claims for damage caused by willful misconduct;

(iv) intellectual property claims;

(v) claims for damage resulting from a failure of the Parties to extend the cross-waiver of liability as set forth in sub-paragraph 9.B.2 or from a failure of the Parties to ensure that their Related Entities extend the cross-waiver of liability as set forth in sub-paragraph 9.B.2; or

(vi) contract claims between the Parties based on express contractual provisions.

(5). Nothing in this Article shall be construed to create the basis for a claim or suit where none would otherwise exist.

(6). In the event of third-party claims for which the Parties may be liable, the Parties shall consult promptly to determine an appropriate and equitable apportionment of any potential liability and on the defence of any such claims.

ARTICLE 10 – REGISTRATION OF SPACE OBJECTS

In Implementing Arrangements involving a launch, the Implementing Agencies shall agree as to which shall request its Government to register the spacecraft as a space object in accordance with the Convention on the Registration of Objects Launched into Outer Space of 14 January, 1975 (the Registration Convention). Registration pursuant to this Article shall not affect the rights or obligations of either Party under the Liability Convention.

11 – CONSULTATIONS – SETTLEMENT OF DISPUTES

1. The Implementing Agencies shall consult, as necessary and appropriate, to review the implementation of cooperative activities conducted in accordance with this Agreement and to exchange views on potential areas of future cooperation.

2. In the event questions arise regarding the implementation of cooperative activities conducted in accordance with this Agreement, the appropriate program managers of the Implementing Agencies shall endeavor to resolve the questions. If they are unable to come to an agreement, then the matter shall be referred to a more senior level of the Implementing Agencies or to their designated representatives for cooperative resolution.

3. Any disputes arising under any Implementing Arrangements shall be settled amicably by the Implementing Agencies.

4. If the Implementing Agencies are unable to settle the dispute, either may request that the Governments consult with each other on the dispute to reach an amicable resolution.

ARTICLE 12 - EFFECT ON OTHER AGREEMENTS

This Agreement shall not prejudice existing agreements between the Parties, or the ability of the Parties to conclude other agreements or arrangements regarding matters outside the scope of this Agreement, as mutually agreed. This Agreement shall be without prejudice to cooperation of either Party or its Implementing Agencies with other states and international organizations.

ARTICLE 13 - AMENDMENTS

This Agreement may be amended or extended through mutual written agreement by the Parties.

ARTICLE 14 – ENTRY-INTO-FORCE AND DURATION

1. Each Party shall notify the other of the completion of all internal procedures necessary for the entry into force of this Agreement, which shall enter into force on the date of the last notification.

2. This Agreement shall remain in force for ten (10) years unless terminated in accordance with Article 15. Thereafter, it shall be extended automatically for additional five-year periods, unless one Party gives the other Party six months written notification of its intention not to extend the Agreement.

ARTICLE 15 - TERMINATION

1. Either Party may terminate this Agreement by providing at least six months written notice to the other Party.

2. Notwithstanding the termination or expiration of this Agreement, its provisions shall continue to apply to any Implementing Arrangements in effect at the time of termination or expiration, for the duration of such Implementing Arrangements.

3. Notwithstanding the termination or expiration of this Agreement, the obligations of the Parties set forth in Articles 5, 6, and 9 of this Agreement (concerning Transfer of Goods and Technical Data, Intellectual Property Rights, and Cross-waiver of Liability) shall remain in effect.

Done in Paris, this day of January, 2007, in duplicate, in the English and French languages, both texts being equally authentic.

FOR THE GOVERNMENT OF THE UNITED STATES OF AMERICA :

FOR THE GOVERNMENT OF THE FRENCH REPUBLIC :

SPACE LAW AND RELEVANT PUBLICATIONS

Macey L. Edmondson[1]

A. CASE LAW

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Sompong Sucharitkul, *Liability and Responsibility of the State of Registration or the Flag State in Respect of Sea-going*

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[1] Macey L. Edmondson is a University of Mississippi School of Law, Law Library, public service librarian and legal research instructor.

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C. PERIODICAL MATERIALS

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ERRATA

Footnote 10 in Dr. P.P.C. Haanappel's article, *A Competitive Environment In Outer Space*, 32 J. SPACE L. 1 (2006) was erroneously stated. It should read:

[10] *See also* F.G. VON DER DUNK, PRIVATE ENTERPRISE AND PUBLIC INTEREST IN THE EUROPEAN "SPACESCAPE", TOWARD HARMONIZED NATIONAL SPACE LEGISLATION FOR PRIVATE SPACE ACTIVITIES IN EUROPE, 249-253 (1998).

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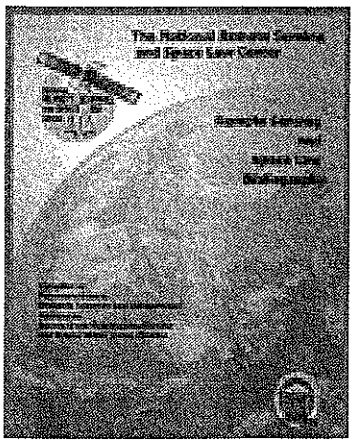

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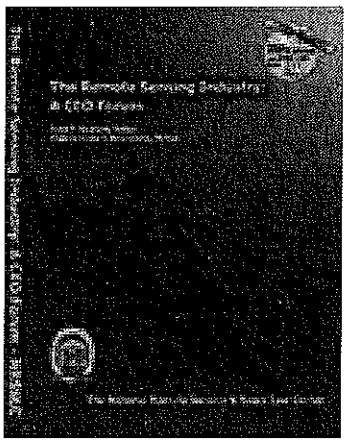

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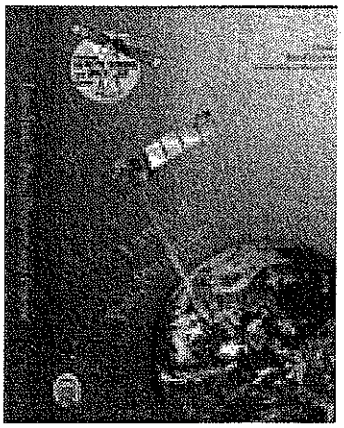

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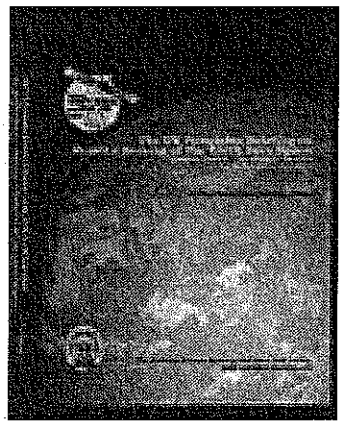

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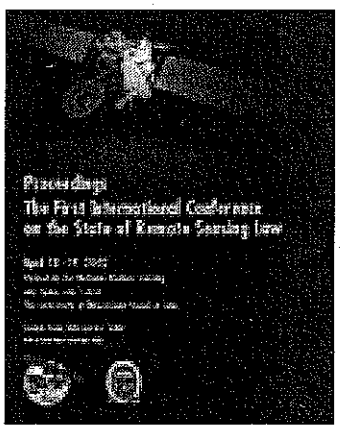

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