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THE GLOBAL EXPLORATION STRATEGY: LEGAL PERSPECTIVES

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I. Abstract

The Global Exploration Strategy ("GES") is an initiative by 14 space agencies that establishes a collaborative strategy for exploring our solar system. In order to foster an environment that is conducive to private sector investment in space exploration, the GES acknowledges the need for the development of a common understanding with respect to difficult legal and policy issues such as: (1) national export control regimes and (2) intellectual property rights ("IPR") related to industrial inventions (e.g., patents, trademarks, and trade secrets). The participants in the GES established a coordination committee to implement the GES, the International Space Exploration Coordination Group ("ISECG"). The ISECG operates on a consensus basis and will focus on developing non-binding findings, recommendations, and other outputs to address critical issues for the space agencies involved in exploration activities, including the assessment of relevant legal issues. In order to start a discussion regarding the efficacy of ISECG, this paper will (1) identify and flesh out the legal challenges posed by national export control regimes and IPR protection; and (2) suggest that the ISECG explore modest and practical solutions that take full advantage of the structure established for the ISECG.

II. The Global Exploration Strategy

A. Overview

In May 2007, fourteen space agencies released *The Global Exploration Strategy: The Framework for Coordination* (the "GES"), which establishes a collaborative strategy for the robotic and manned exploration of our solar system.[1] The GES focuses on those destinations where humans will one day live and work (*e.g.,* the Moon, Mars, and near-Earth Asteroids) and recognizes that "[s]ustainable space exploration is a challenge that no one nation can do on its own."[2] Therefore, the GES seeks to build a global framework that will (1) articulate a compelling case for globally coordinated space exploration, and (2) set the stage for future international discussions on coordination mechanisms and architectures.[3]

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[1] Participants in the development of the GES included representatives from Australia, Canada, China, the European Space Agency ("ESA"), France, Germany, Great Britain, India, Japan, Russia, South Korea, Ukraine, and the United States.

[2] GES, at p. 2.

[3] *See The NASA-ESA Comparative Architecture Assessment*, (July 16, 2008)

The GES does not establish a single program but rather calls for the development of international exploration coordination tools to enhance mutual understanding among partners and identify areas for potential cooperation. As the GES explains, "[a] coordinated strategy will help individual nations with shared objectives to engage in joint projects that will maximize their return on investment."[4]

The GES indentifies the following five general themes in which space exploration provides a benefit to society:

- Theme 1: New Knowledge in Science and Technology
- Theme 2: A Sustained Presence – Extending Human Frontiers
- Theme 3: Economic Expansion
- Theme 4: A Global Partnership
- Theme 5: Inspiration and Education

It is participation of private industry in these themes that is the focus of this paper, especially with respect to Themes 1-3. Undoubtedly, industry will play an important role in future exploration from the development and manufacture of the spacecraft and equipment that will enable the sustained presence of man beyond the Earth to the exploitation of mineral resources on the Moon, Mars, and near-Earth asteroids. Therefore, implementation of the GES will require developing new and innovative technologies, many of which will come from the private sector, such as space-based resource extraction, safe habitats, human-robot cooperation, and efficient power generation and energy storage. It is also envisioned that commercial providers of crew and cargo transportation services, and telecommunications and navigation systems will play an important role in future space exploration activities.

B. Potential impediments to the full realization of the goals of the GES must be addressed

In order to foster the an environment that is conducive to private sector investment in space exploration, the GES acknowledges the need for the development of a common understanding with respect to difficult legal and policy issues such property rights and technology transfers. Within property rights and technology transfers, two principal areas of concern are: (1) national export control regimes and (2) intellectual property rights ("IPR") related to industrial inventions (e.g., patents, trademarks, and trade secrets). It is incumbent on participants in the GES to seek the consistent treatment of technology with respect national export control regimes and to help ensure that the intellectual capital of commercial participants is protected.

Recent history has shown that the inconsistent treatment of technology with respect to the application national export control regimes can lead to unnecessary delays and complications with respect to international cooperative space programs. Most notably the continued insistence by the United States Government to treat civil spacecraft as "munitions" for export control purposes has damaged the ability of U.S. companies to participate in international missions and spurred international partners to avoid the use of U.S.-origin technology. Building upon efforts that began with the International Space Station ("ISS") and other international cooperative space ventures, the GES can provide a forum with which to discuss the harmonization of export control regimes as they relate to space exploration.

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www.nasa.gov/pdf/259237main_NASA_ESA_CAA-Report.pdf

[4] GES, at p.6.

The legal issues related to IPR in space are being brought into the limelight due to the increased participation of the private sector in space activities but there remains a great deal of ambiguity. For example, none of the major international legal regimes concerning IPR protection or the international legal treaties governing the use of outer space deal directly with the issue of IPR in space.[5] Building upon the practical solutions developed for other international cooperative programs, most notably ISS, the GES is well placed to offer innovative solutions until the appropriate international legal framework can be developed.

C. The GES Coordination Mechanism can work towards practical solutions to export controls and IPR concerns

The GES called for the creation of a "coordination mechanism," now known as the International Space Exploration Coordination Group ("ISECG"), that will be responsible for the implementation of the GES. On July 10, 2008, the ISEGC held its first meeting in Montreal. During this meeting, the ISECG established a Secretariat, initially to be hosted by the European Space Agency ("ESA"), and took the initial steps towards identifying critical space infrastructure interfaces, such as between spacecraft, lunar rovers, and lunar habitats.[6]

The Terms of Reference ("ToR") for ISECG state that ISECG is intended to meet "the need [identified in the GES] to establish a voluntary, non-binding international coordination mechanism through which individual agencies may exchange information regarding interests, objectives, and plans in space exploration with the goal of strengthening both individual exploration programs as well as the collective effort."[7] The ISECG is designed to ensure that international space activities are not duplicative of each others work/investment; that results and lessons learned are shared; participation in cooperative missions (*i.e.*, bilaterally, trilaterally, and so on) is encouraged; and interoperability standards are agreed upon.[8]

The framers of the GES and the ISECG rejected the adoption of a binding ISS type of Intergovernmental Agreement ("IGA"), which could have dealt with many of the legal challenges up front in a binding manner.[9] The ISECG, instead, operates on a consensus basis and will focus on developing non-binding findings, recommendations, and other outputs to address critical issues for the space agencies involved in exploration activities, including the assessment of relevant legal issues. The ISECG is open to all space agencies which have or are developing space exploration capabilities for peaceful purposes.

While the creation of comprehensive binding IGA was rejected as unfeasible by the participants in the drafting of the GES, it is anticipated that the ISECG will work towards the development of consensus based solutions that can be readily applied to the IGAs that will be negotiated in the future between countries that anticipate cooperative ventures. This can include, as appropriate, the

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[5] Sasikkumar, *Space Commercialization: Addressing Intellectual Property Issues*, Proceedings of the 48th Colloquium on the Law of Outer Space, AIAA (2006), p. 263.

[6] *NASA: Global Exploration Strategy talks continue*, Dow Jones Factiva, July 16, 2008.

[7] ISECG ToR at 1.

[8] *See* Gibbs, Kirkham, *The Global Exploration Strategy: Developing A Framework for International Coordination and Cooperation*, Proceedings of the 50th Colloquium on the Law of Outer Space (2007), IAC-07-B3.1.08 (pp. 13).

[9] *Ibid.* at p. 12.

establishment of specialized committees, working groups or workshops that address key issues and challenges to the coordinated exploration of our solar system. With respect to national export controls and IPR issues, the ISECG could establish committees or working groups supported by appropriate experts to develop a forum in which to address these issues and develop practical solutions, such as template provisions for future IGAs. Given the broad participation of stakeholders in the ISECG, any practical solutions or recommendations developed by these committees or working groups are likely to gain wide acceptance and provide a positive influence on future exploration ventures.

III. Export Controls

A. There is a need for the rationalization of national export controls with respect to the space exploration activities contemplated by the GES

There will always be a delicate balance between the need for the free flow of ideas and technology with respect to the commercialization of space and the legitimate needs of nations to protect their national security and foreign policy needs. If a nations export controls are overly strict, such rules risk stifling those industries responsible for developing the next generation of technology necessary to enable space exploration without an appreciable gain in national security.

All of the space faring nations participating in the GES have export controls regimes that require licenses for sensitive technologies involved in civil space activities. The United States, however, is the only one of these countries to treat civil spacecraft as "munitions" subject to control as military items through its International Traffic in Arms Regulations ("ITAR"). The other nations control sensitive civil space hardware and technologies under regimes that control items designed for civil/commercial uses but also have military applications (*i.e.,* dual use items). This disparity in the level of controls for U.S. civil space hardware and technology versus those controls for civil space hardware and technology from the other GES participants has contributed to a hesitancy among international partners to use U.S. technology and/or engage with the U.S. Government in cooperative space ventures. The ITAR is further blamed, at least in part, for the recent decline in the market share of U.S. companies in the international space market.

B. What is the ITAR?

The ITAR, which implement the Arms Export Control Act, 22 U.S.C. §§ 2778 *et seq.*, control the transfer to foreign persons of U.S. commodities and technologies listed on the U.S. Munitions List, (the "USML") 22 C.F.R. § 121. In addition to traditional military items, the USML also includes many commodities and technologies related to civil space programs, such as: (a) spacecraft (including all remote sensing satellites), (b) space launch vehicles and rocket engines; (c) missile tracking systems; (d) systems or subsystems, components, parts, accessories, and associated equipment specifically designed or modified for the foregoing; and (e) U.S.-origin technical information directly related to the foregoing. The ITAR also regulates retransfers, by foreign persons, of the foregoing items outside of the United States. Under the ITAR, almost all civil spacecraft items (and related technology) on the USML require licenses for export, unless a limited number of narrow exemptions apply.

C. Why does the ITAR apply to civil space programs?

In 1998, U.S. congressional investigations discovered that during 1996 Hughes Electronics and Loral Space and Communications illegally transferred technology to China that may have improved the capabilities of China's intercontinental ballistic missiles. The assistance was provided in the wake of the February 1996 Intelsat 708 launch failure. The most publicized investigation was that of the U.S. House of Representatives Select Committee on U.S. National Security and Military Commercial Concerns with the People's Republic of China, chaired by Representative Christopher Cox. A similar investigation led by Jesse Helms was conducted in the Senate. The Select Committee concluded that Hughes and Loral deliberately transferred technical information and know-how to China during the course of the accident investigations.

In response to the investigations and their conclusions, in Section 1513 of the 1999 National Defense Authorization Act ("NDAA") the House and Senate transferred jurisdiction over commercial satellites and satellite components exports from the Commerce Department to the State Department, and tightened restrictions allowing U.S. made satellites, satellite components, equipment, and technical information (*e.g.,* launch failure analysis).

The 1999 transfer reversed the 1996 transfer of commercial communications satellites and related items from the ITAR to the Commerce Control List ("CCL") of dual-use commodities and technology controlled by the U.S. Department of Commerce under the Export Administration Regulations ("EAR"), 15 C.F.R. §§ 730-774. (The 1996 change had put U.S. export controls in accord with those of the EU, Japan, and other Wassenaar Arrangement members, which treat commercial satellites and related items as predominantly commercial items subject to less stringent export controls than those imposed on Munitions List items.)

D. The Negative Impact of the ITAR on International Space Activities

D.1. The ITAR has negatively impacted international commercial cooperation and innovation

The reversion had a significant impact on international space cooperation and satellite programs. Because nearly every U.S. manufacturer's spacecraft involves foreign subcontractors, a foreign launch service provider (primary or back-up), foreign insurers, and/or foreign customers, multiple export authorizations are required from the outset of a spacecraft program, through launch, and continuing into investigation and resolution of on-orbit anomalies that a spacecraft may experience. Lengthy processing times and inconsistent application of the ITAR by the U.S. Department of State's Directorate of Defense Trade Controls ("DDTC") tend to dissuade non-U.S. customers from purchasing U.S. spacecraft, especially given that the time from contract execution to launch is extremely important for spacecraft customers. Further, the U.S. Government policy of not permitting the export of certain technology, such as detailed design data and concepts regarding physical engineering implementation of design methodology, engineering analysis, and manufacturing know-how, makes procurement of many U.S. spacecraft components frustrating for foreign spacecraft manufacturers.

There is evidence that the ITAR has had a significant negative impact on the financial health of second and third tier spacecraft component suppliers in the United States. A recent Center for Strategic and International Studies report estimates that

U.S. spacecraft component manufacturers lose approximately USD 600 million per year due to ITAR restrictions.[10] This has led to questions concerning the financial security of these companies, especially manufactures of traveling-wave tubes, optical coatings, imagers, and solar cells, which are traditional sources of innovation for spacecraft development in the United States. [11] These suppliers are likely to lose more money as the European Union, citing concerns over U.S. export controls, announced that U.S. components are to be avoided wherever possible in the €3.4 billion procurement for the Galileo global satellite navigation system.[12]

The Galileo procurement is just the most recent example of the trend over the past several years for European manufacturers to actively design out U.S. subsystems and components due, at least in part, on the negative impact of the ITAR. Thus, it appears that the ITAR is speeding up the development of advanced technology outside of the United States. For example, Thales Alenia offers an ITAR-free satellite bus. The ITAR has also spurred the development of an ITAR-free European apogee motor, thruster valves, and star tracker. In addition, countries of concern to the United States (*e.g.,* China), are getting the technology they require to develop their space programs despite U.S. controls. As Mike Gold of Bigelow Aerospace stated to The Economist, "if the purpose of the ITAR is to lose billions of dollars of business, ship jobs overseas, and the Iranians and the Chinese get the same technology anyway, then mission accomplished."[13]

Despite a challenging regulatory environment, there are interesting and successful examples of cooperation in the space transportation industry. Of course, the first one that comes in mind is Atlas V, as it incorporates the Russian-made RD-180 engine, the Swiss-made fairing (the same as Ariane V), as well as a the Spanish-made vehicle equipment bay and payload adaptors. Another example is the Delta IV with its the RL-10B2 upper stage engine incorporating a French-made carbon-carbon nozzle.

D.2. Government exploration programs have likewise been negatively affected by the ITAR

The reversion has had an impact on civil government space programs as well. For instance, the $110-million 2005 Demonstration of Autonomous Rendezvous Technology ("DART") mission failure was attributed to, among other things, the ITAR. NASA failure-analysis report concluded, in part, that "insufficient technical communication between the project and an international vendor due to perceived restrictions in export control regulations did not allow for adequate insight," referring to Orbital Sciences Corporation's, the prime contractor communications with Surrey Satellite Technology, the U.K. supplier of a miniature GPS receiver. In 2005, ESA scaled back its plans to cooperate with the United States in the development of NASA's Mars rover due, at least in part, over fears that U.S. export controls could make the project "too complicated to be feasible."[14]

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[10] *Briefing of the Working Group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls*, Center for Strategic and International Studies (Feb. 2008), p. 33.

[11] *Ibid.* at 10.

[12] *Gravity is not the main obstacle for America's space business*, The Economist (Aug. 21, 2008).

[13] *Ibid.*

[14] *Ibid.*

Due in large part to the ITAR, NASA has adopted a "clean interface" approach, which encourages the development of standard interfaces that minimize technical interactions with respect to the procurement of components and instruments from international partners. Unfortunately, this approach to integration in international cooperative programs has not proved as successful as earlier efforts. Thus, a Cassini-Huygens-type mission, starting today, might not be as successful today.

The ITAR has also led to a reshuffling of the respective roles of governments participating in international civil space programs. One example is the James Webb Space Telescope. NASA scrapped initial plans for European suppliers to develop the bus in Europe and, instead, opted to use a U.S. developed bus in order to lessen the various levels of ITAR burden on the program. Thus, the integration of sensitive U.S. instrumentation would take place in the United States, limiting the transfer of U.S. technology.

The ITAR will also have severe consequences for any future missions that involve China. China is subject to an arms embargo by the United States and, therefore, it is the policy of the United States to deny any licenses for the export of any items to China or Chinese nationals under the ITAR.[15]

The U.S. proved willing to provide some import concessions with respect to export controls in connection with ISS largely due to the presence of significant political will. Article 19 of the ISS IGA contains detailed provisions with respect to the ISS partners' responsibilities with respect to the transfer of technology related to the development, manufacture, and operation of the ISS. Consistent with its obligations under the ISS IGA, the U.S. Government determined that the ISS itself should be subject to the "dual use" controls under the EAR. While this has lessened tensions with respect the building and operation of the ISS, the U.S. Government reserved certain sensitive technology under the ITAR, leading some to question the safe operation of the ISS given the continued need to obtain export authorizations under the ITAR.[16]

E. Recent reform efforts have provided some procedural relief but more work is needed

The past year has seen intense industry lobbying for export control reform led principally by the Coalition for Security & Competiveness (whose members include the Aerospace Industries Association and the Satellite Industries Association). In response, the U.S. President issued National Security Presidential Directive ("NSPD") 56 in January. The Directive builds upon efforts by the DDTC to improve the defense licensing process.[17] DDTC efforts in support of the Directive have significantly improved license processing times. A year ago technical assistance agreements were taking about 6 months to process, which caused an enormous to industry. Recently, DDTC's Missiles and Space Division reported that technical assistance agreements are now being processed in approximately 35-47 days.

Unfortunately, the political climate in the United States at the moment does not

[15] *See* 22 C.F.R. § 126.1(a).

[16] *Gravity is not the main obstacle, supra.*, note 12.

[17] NSPD 56 mandates: (1) Additional financial and intelligence resources to support the licensing process; (2) that license application must be acted upon within 60 days, unless there is a strong reason for additional time; (3) that DDTC update its electronic licensing system, D-TRADE; (4) removes the requirement that third country nationals sign NDAs; (5) the creation of an interagency dispute resolution mechanism for the commodity jurisdiction process.

appear ripe for dramatic substantive reform. There does, however, appear to be a movement spear headed by the U.S. National Security Space Office to update the USML to remove spacecraft technologies that are not considered critical to national security.[18] Even this limited change, could go a long way in making the U.S. export controls on spacecraft more consistent with its international space partners.

F. The ISECG should consider the creation of permanent committee or working group to address potential impediments caused by national export controls

National export control regimes have the potential to impede international space exploration activities, especially when such regimes are not applied consistently among partner nations. As described above, the ITAR is one such regime that has been applied to civil spacecraft in a manner that is inconsistent from that of the other participants in the GES.

While export controls are national security laws that remain the province of national policy, the ISECG can provide a forum to discuss the unique issues related to international space exploration. For example, discussions could be held to develop a consensus with respect to the level of control appropriate to emerging space exploration technologies. In such a forum the burden would be on the United States or other nations proposing the imposition of military technologies to articulate the reasons for doing so. This would be complementary to the reform efforts underway in the United States focused on defining the military critical technologies warranting strict controls. Such a forum could also help stimulate political will that has proved critical in other projects, such as ISS and the Soyuz-launcher at the Guiana Space Center.[19] Such a forum could also work toward the creation of template IGA provisions related to export controls (e.g., based on past projects such as Article 19 of the ISS IGA) that could be adopted, rejected, or modified for future project specific IGAs. Although not binding, such a forum could prove useful to discuss these issues and develop potential solutions.

IV. Intellectual Property Rights Issues

A. IPR protection requires the application of national jurisdiction

A.1. International space law and IPR protection

Commercial participants may be discouraged from participating in international space exploration activities, unless an adequate legal framework exists that offers protection of their intellectual property. Under current IPR regimes, this protection comes in the form of a state grant of title, under which the grantee enjoys the exclusive right, though limited in scope, duration, and geographical reach, to exploit and benefit from its invention.[20] This protection can come in the form of patents, trademarks, trade secrets, etc., which permit the holders of such rights to prevent others from using them without authorization.

Not only do existing international space agreements not directly address the issue of IPR in space,[21] they leave open

[18] *Gravity, supra.*, note 12.

[19] See Ejova, *Euro-Russia Cooperation in Space and Export Control: Policies and Practices*, Proceedings of the 48th Colloquium on the Law of Outer Space (2005), IAC-05-E6.4.13 (p. 399).

[20] L. Malager, M. Malagar, *International Law of Outer Space and the Protection of Intellectual Property Rights*, Boston Univ. Int'l. L. J.L. (Fall 1999), at p. 350.

[21] *See* Sasikumar, *supra.*, note 5.

important questions concerning national sovereignty. Without some degree of sovereignty there can be no jurisdiction over IPR. The Treaty on Principals Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (the "1967 Outer Space Treaty"), the principal treaty governing space exploration, provides that "[o]uter space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[22]

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the "Moon Treaty") also provides a similar prohibition against claims of sovereignty and goes even further by prohibiting all forms of property rights and stating that "the moon and its natural resources are the common heritage of mankind."[23] The concept of the common heritage of mankind is not well defined but appears to imply the creation of a legal regime to make sure that the proceeds from space exploration are shared equally between space faring and non-space faring nations.[24] Uncertainty concerning the application of this principal and its potential chilling effect on private investment, contributed to the failure of the Moon Treaty to become generally accepted.

Even though national appropriation of outer space is prohibited by the 1967 Outer Space Treaty, the 1967 Outer Space Treaty does provide States with support in connection with the application of jurisdiction in connection with the application of national IPR laws. First, Article VI provides that States remain liable and responsible for national actions undertaken in space, whether or not such activities were conducted by governmental or non-governmental actors. This means that States have a duty to control and supervise the activities of private actors in space undertaken of spacecraft or facilities that are carried on the registry of such nation States under the 1975 Convention on Registration of Objects Launched in Outer Space. Second, Article VIII provides that States retain control and jurisdiction over spacecraft launched on their registries.

A.2. The U.S. Patents in Space Act provides for quasi territorial effect in space on space craft carried on the registry of the United States

Efforts have been made on a national level to address the unique nature of IPR protection in outer space. Consistent with the 1967 Outer Space Treaty, the United States became the first country to enact a law that specifically links national IPR laws to activities in outer space. In 1990, the United States Congress enacted the Patents in Space Act in an effort to encourage private investment in space activities by ensuring that the investments of U.S. inventors will be protected.[25] The Patents in Space Act purports to do this by extending U.S. jurisdiction with respect to patents to space

[22] Article II of the 1967 Outer Space Treaty.

[23] *See* Article XI of the Moon Treaty. Only nine nations ratified the Moon Treaty, none of whom are space faring nations, which calls into question its validity. *See* P. Tobias, *Opening the Pandora's Box of Space Law,* 28 Hastings Int'l & Comp. L. Rev. 299 (Winter 2005), at p.305.

[24] *See* S. Nandakumar, *"Common Heritage of Mankind" – Property Rights, in the Wake of Commercial Use of the Moon and Other Celestial Bodies,* Proceedings of the 48th Colloquium on the Law of Outer Space (2005), IAC-05-E6.4.02.

[25] 35 U.S.C. § 105 (Inventions in Outer Space). *See* J. Shoemaker, *The Patents in Space Act: Jedi Mind Trick or Real Protection for American Investors on the International Space Station,* 6 J. Intell. Prop. L. 395 (Spring 1999), at p. 398.

objects that are carried on the registry of the United.

The Patents in Space Act provides that inventions made, used, or sold in outer space on objects under the jurisdiction or control of the United States, shall be considered made, used, or sold in the United States, unless otherwise agreed to by an international agreement. Thus, the United States has attempted to extend the jurisdiction of its IPR laws, including protecting investors from infringement, to activities in outer space by in essence making U.S. registered space objects U.S. territory for this limited purpose.

At best, however, the Patents in Space Act represents a partial solution for U.S. national missions in that it does not directly address the issues that arise in international space exploration missions. A comprehensive approach that address the unique aspects of IPR in outer space and that stitches together the various national IPR and international IPR regimes is needed.

A.3. The IPR provisions of the ISS IGA represent a practical approach to IPR protection in the absence of a comprehensive legal framework

Article 21 (Intellectual Property) of the ISS IGA contains several provisions intended to protect existing intellectual property from infringement and to provide some clarity over jurisdiction with respect to inventions made aboard the ISS. In addition, Article 16 specifically excludes IPR claims from the cross-waiver of liability requirements of the IGA making infringement claims possible.

The ISS IGA provides that each partner retains jurisdiction over the elements that it provides to ISS.[26] Therefore, each ISS partner that contributes research modules to the ISS retains jurisdiction over IPR claims that result from activities undertaken in such modules. Any claims for infringement would be made according to that Party's national legal regime for intellectual property.

Article 21 of the IGA addresses the issue of the country of invention for discoveries made onboard ISS. The second paragraph of Article 21 provides that inventions are generally deemed to have been made in the country that retains jurisdiction over the module in which the invention was made.[27] For example, an invention made on the Kibo Laboratory will be deemed to have been made in Japan. The purpose of this provision is to determine the location of invention and does not prevent the filing of patents in multiple countries. The county of invention provisions of Article 21 are qualified by the third paragraph of Article 21 that prohibits partner States from applying any invention secrecy laws to prevent nationals from another nation to seek patent protection in other partner State, so long as such other partner State has adequate laws to protect information that is either classified or protected for other national security reasons (e.g., export controls).

The ISS IGA also contains marking procedures for identifying proprietary data that are intended to aid in the identification of and protection of IPR.[28]

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[26] Article 5 (Registration, Jurisdiction, and Control), ISS IGA.

[27] Article 21 provides that for ESA registered modules "any European Partner State may deem the activity to have occurred within its territory." Paragraph 4 of Article 21 also limits the recovery for the IPR infringement claim in multiple European partner countries.

[28] Article 19 (Exchange of Data and Goods), Paragraph 3(b), ISS IGA.

B. Until a comprehensive legal frame work is developed that takes into account the unique aspects of IPR is outer space, the ISECG can provide an important forum to advance the protection of IPR

Until a comprehensive legal regime can be developed to address the protection of IPR in space exploration activities, space faring nations will need to continue to use existing legal regimes and IGAs to assure the adequate protections for commercial participants. The ISECG can assist in this process by establishing a permanent committee or working group to address IPR issues. Appropriate experts from participating space agencies should be invited to participate in such a committee or working group.

While the creation of a binding IGA was rejected in the establishment of the ISECG, the IPR committee or working group could work towards the drafting of template IPR provisions for future project specific IGAs. These template IPR provisions could be based on the lessons learned from previous IGAs (e.g., the ISS). The participation of all ISECG members in the development of these template provisions would contribute to consensus based solutions that would address the interests of all members. Space agencies would then be free to accept, reject, or modify these template provisions to suit the needs of individual space exploration missions. Each project would not be forced to reinvent the wheel.

The IPR committee or working group could also provide a forum to identify more comprehensive reforms. While the non-binding nature of the ISECG does not appear to hold much promise towards resolving these issues on its own, such a committee or working group could prove useful in making recommendations concerning potential solutions and identifying the appropriate forums in which to address IPR issues in a binding manner.

V. Conclusion

The establishment of the GES presents a wonderful opportunity to address the potential legal impediments to the exploration of our solar system. The ISECG creates an important, although non-binding, forum in which to address the negative impact of national export control regimes and uncertainties with respect to IPR protection in outer space. Given the non-binding nature of the ISECG, we believe that the ISECG should concentrate on those potential solutions that are best suited to its structure. This includes the development of practical tools (e.g., template IGA provisions) and providing forums to identify potential solutions.