The International Space Station: Legal Framework and Current Status

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I. THE INTERNATIONAL SPACE STATION

A. BACKGROUND AND CURRENT STATUS

THE DEVELOPMENT and construction of an International Space Station (ISS) began with President Reagan's announcement in 1984 that the United States of America intended to build a permanently inhabited civil space station in the earth's orbit, later labeled "Space Station Freedom." In connection with the announcement, President Reagan invited other countries, in particular Canada, Europe and Japan, to participate in the project. This invitation was subsequently accepted by several countries, including the members of the European Space Agency (ESA). Some of the countries accepting were Belgium, the Federal Republic of Germany, France, Italy, the Netherlands, Norway, Spain, the United Kingdom, Canada through the Canadian Space Agency (CSA) and the Government of Japan (GOJ).

Many years of negotiations followed, mainly between NASA (National Aeronautics and Space Administration) and the respective national space agencies, regarding the construction, development and operation of an ISS. It was not until September 1


2 For further information about ESA, see Catherine Baudin, Cooperation and International Agreements, Article XIV of the ESA Convention 28 AIR & SPACE LAW 8 (1998); see also Eilene Galloway, The Relevance of General Multilateral Space Conventions to Space Stations, in 5 SPACE STATIONS—LEGAL ASPECTS OF SCIENTIFIC AND COMMERCIAL USE IN A FRAMEWORK OF TRANSATLANTIC COOPERATION 33, 50-53 (Karl-Heinz Böckstiegel ed., 1985) [hereinafter SPACE STATIONS].
29, 1988, that the "Intergovernmental Agreement (IGA) 1988"\(^3\) was signed between NASA and the CSA, ESA,\(^4\) and in March 1989, with the GJOJ. The IGA 1988 set forth the general principles for carrying out the ISS mission.\(^5\) In addition to this multilateral agreement, several bilateral agreements (Memoranda of Understanding) were executed between NASA and the relevant national space agencies to determine and regulate the technical and administrative details of such cooperation.\(^6\)

The dramatic change in world politics in the early 1990s, and in particular the decision to include Russia in the Program, led to negotiations with Russia, and ultimately to an invitation for Russia to join the Program was extended.\(^7\) Russia had the longest experience and was most accomplished in the area of human space flights and long term operation of the Russian space station Mir.\(^8\) Upon Russia's acceptance, an agreement was soon reached to merge the Russian and American space station programs.

In July 1996, NASA and the Russian Space Agency (RSA) reached an ad referendum agreement on a Memorandum of Understanding (MOU), which made Russia a full partner in the sharing of ISS accommodations, resources, responsibilities and costs. This MOU resolved many outstanding technical and managerial issues, such as sharing common operation costs, utilization rights on board the ISS, crew make-up, and provisions relating to logistics and other services.

Renegotiations concerning the IGA 1988's terms became necessary to reflect these changes, and in December 1996, the international partners reached an ad referendum agreement on the

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\(^3\) Agreement among the United States of America, governments of Member States of the European Space Agency, the government of Japan, and the government of Canada on Cooperation in the Detailed Design, Development, Operation, and Utilization of the permanently Manned Civil Space Station, Sept. 29, 1988, 37 ZEITSCHRIFT FÜR LUFT-UND WELTRAUMRECHT (ZLW) 341 [hereinafter IGA 1988].

\(^4\) The ESA then had nine European partners, including Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain and the United Kingdom.

\(^5\) See IGA 1988, supra note 3.

\(^6\) See generally André Farand, Space Station Cooperation: Legal Arrangements, in OUTLOOK ON SPACE LAW OVER THE NEXT 30 YEARS 125 (Gabriel Lafferanderie & Daphné Growther eds., 1997) [hereinafter OUTLOOK]; see also Jürgen Reifarth, Die Nutzung des Weltraums, in HANDBUCH DES WELTRAUMRECHTS 537, 541-542 (Karl-Heinz Böckstiegel ed., 1991) [hereinafter HANDBUCH].

\(^7\) See Smith, supra note 1; see also Lewis, supra note 1.

\(^8\) See Smith, supra note 1.
IGA 1988.\(^9\) Having reached agreement on the IGA 1988 and the MOU with the RSA, NASA updated the MOUs with the other partners spelling out specific responsibilities.\(^{10}\) Finally, after almost five years of negotiations, on January 29, 1998, the representatives of the 15 member nations (USA, Russia, Canada, Japan and the eleven member states of the ESA\(^{11}\)) signed the Intergovernmental Agreement (IGA 1998).\(^{12}\)

The IGA 1998 replaces the IGA 1988, which had only entered into force for the United States and Japan, and it will soon be ratified by the Government of the Federal Republic of Germany.

The ISS represents the largest scientific and technological cooperative program in history. Drawing on the resources and scientific expertise of 16 nations,\(^{13}\) it features "unprecedented technical, managerial, and international complexity."\(^{14}\) The development, integration and operation based on the contributions of each interested partner into a single integrated station, with all of its associated supporting systems, facilities and personnel, is perhaps the most complicated and difficult international peacetime effort ever undertaken. The entire ISS will be assembled and tested for the first time in orbit, without the benefit of ground assembly and checkout.\(^{15}\) The purpose of the program is to place a unique, highly capable laboratory in lower orbit, where high value scientific research can be performed in microgravity. In addition to providing facilities where an international crew of 7 astronaut-scientists can permanently live and work in space, the ISS will provide important laboratory research facilities for performing basic research in life science, biomedical and material sciences in space, as well as space and

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\(^9\) See id.

\(^{10}\) See id.

\(^{11}\) Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland, Spain and the United Kingdom.


\(^{13}\) United States (NASA), Canada (CSA), the ESA members (Belgium, Denmark (DSRI), France (CNES), Germany (DLR), Italy (ASI), Netherlands, Norway, Spain (INTA), Sweden (SSC), Switzerland, United Kingdom), Japan (NASDA), Russia (PKA) and Brazil (INPE).

\(^{14}\) See Lewis, *supra* note 1.

\(^{15}\) See id.
engineering technology development which cannot be accomplished on Earth. The ISS will be comprised of various interlocking components and modules which are currently being constructed on Earth. Once it is assembled in orbit the ISS will measure 108.6 m x 79.9 m with an overall weight of 457 tons. The actual construction plans involve different levels of participation among the member states. The final assembly will be finished by the end of the year 2004. The construction cost is estimated to be between US $60 and US $100 billion, and the cost for maintenance will be approximately US $50 billion. The ISS will be operated for a period of 10 years.

Construction of the ISS will involve a three-phase cooperative effort. The first phase will involve the US space shuttle and the existing Russian space station, Mir. The second phase involves building a bilateral U.S.—Russian space station that can be permanently occupied by three astronauts. The third phase expands phase two of the Space Station into a multinational facility by adding European, Japanese and Canadian components as well as Russian research modules.

The ESA formally committed to its current contribution in the ISS at the ESA Ministerial Meeting in Toulouse, France in October 1995. The approved contributions include:

(i) The COLUMBUS Orbital Facility (COF, formerly the APM, a laboratory module, called the Attached Pressurized Mod-

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16 Each partner is designing, developing and will be operating separate pieces of hardware, to be integrated on-orbit into a single orbital station. Mission control centers, launch vehicles, astronauts/cosmonauts, and support services will be provided by multiple partners, but will function in a coordinated, integrated fashion. See Lawrence S. DeLucas, International Space Law, 38 ACTA ASTRONAUTICA 613 (1996).

17 See id.

18 See id.; see also Jacobs, supra note 1, at 623-630; see also Jürgen Reifarth, Rechtliche Aspekte, des Übereinkommens über die Internationale Raumstation, 38 ZEITSCHRIFT FÜR LUFT-UND WELTRAUMRECHT 35, at 36-37 (1989).

19 See DeLucas, supra note 16, at 615.

20 See Smith, supra note 1.

21 See id.

22 See id.

23 See id.; see also Jacobs, supra note 18, at 621-630; see also DeLucas, supra note 16, at 613-619; see also Pat Riep-Dice, International Space Station, Creating a world-class orbiting laboratory (last modified Feb. 8, 1999) <http://www.hq.nasa.gov/off ice/pao/facts/html/FS-004-HQ.html>.

(i) with accommodations for 10 standard racks, 5 of which are allocated to European users. The COF will provide 77% of the utilization capability of the U.S. laboratory and will be the main workplace for the scientific and technological activities of the European astronauts on the ISS. Development of the COF began in January 1996 and is scheduled to be launched in late 2003.

(ii) The Automated Transfer Vehicle (ATV) for ISS logistic resupply, propellant resupply and the reboost missions, to be launched by the ARIANE 5 launch vehicle. An ATV demonstration flight is scheduled for March 2002 with the first flight of an ATV to the ISS in early 2003.

(iii) Cooperation on the X-38, which is the protoflight vehicle for the ISS Crew Return Vehicle (CRV). The ESA is considering participation on the CRV as well.

Additionally, ESA will provide capabilities to support early utilization functions and ground facilities and will in exchange receive early utilization access to the ISS and two astronaut opportunities prior to the launch of the COF. Specifically, the ESA will provide a microgravity glovebox, a minus-80 degree freezer, a scientific instrument pointing system, and ground software to support the Mission Build Facility. The ESA has also made separate arrangements with the RSA for 2 contributions to the Russian elements: the European Robotic Arm (ERA) on the Russian Science and Power Platform and the Data Management System (DMS) for the Service Module.25

The major European contributors to the Program are Germany (41%), France (27.6%) and Italy (17%).

B. THE LEGAL FRAMEWORK: AN OVERVIEW ON CURRENT LEGISLATION

The fundamental principles and relevant rulings on international space activities can be found in six treaties that comprise the so called "Law of Outer Space." These treaties include the 1967 Outer Space Treaty,26 the 1972 Liability Convention,27 the

25 See Lewis, supra note 1.
1975 Registration Convention, the 1968 Rescue Agreement, the 1984 Moon Treaty and the Intergovernmental Agreement 1998.

Article I paragraph 2 of the 1967 Outer Space Treaty provides for the exploration and use of Outer Space in accordance with public international law. Likewise, Article 2 paragraph 1 of the IGA 1998, subjects the ISS to international law. Thus, the development, construction and operation of the ISS must be seen and interpreted in the light of the aforementioned international agreements, treaties and conventions—the current law of Outer Space.

The IGA 1998, which replaces the IGA 1988, will be discussed in further detail later. First, some background information will be given on the aforementioned agreements and conventions. This is not intended to provide a complete overview or detailed analysis, but rather an introduction to the basic legal framework governing space station activities. This paper will then primarily focus on the IGA 1998 in comparison to the IGA 1988, and some selected legal aspects.


The OST 1967 is binding on all member states as public international law. Article I paragraph 2 establishes the principles of "equality of States" as the first important principle of the treaty and emphasizes that all States shall have "equally free access to

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30 Agreement Governing the Activities of States on the Moon and other Celestial Bodies, opened for signature Dec. 18, 1979, 18 I.L.M. 1434.
33 See IGA 1998, supra note 12 at 344.
34 See Reifarth, supra note 18, at 45; see also Reifarth, supra note 6, at 546; see also Galloway, supra note 2, at 38.
the Outer Space including the Moon and other celestial bodies without discrimination for the purpose of scientific investigation and use in accordance with International Law."

In other words, Article 1 of the OST 1967 guarantees freedom of scientific investigation, exploration, and use of space, including the moon and other celestial bodies. These activities are to be conducted in accordance with international law. Thus, Article I prohibits any discrimination of a particular State, i.e. each State is free to perform scientific research in Outer Space and to subsequently abandon it.

"Outer Space" is considered to be *res communis*—a place that is owned by no one but is free for use by everyone. Article II of the OST 1967 treaty provides that "outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."

This "free space" concept precludes any State from claiming a portion of Outer Space as a part of its national territory or under its jurisdiction. Although space may not be appropriated, all States may freely explore and use it. In some circumstances this "use" may be exclusive, provided such exclusive use does not constitute a permanent "appropriation" nor an attempt to extend state sovereignty.

Article IV of the Treaty provides for "peaceful use" of Outer Space. Initially, the USA and the former USSR disagreed as to

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38 See Wollenschläger & Hablitzel, *supra* note 36, at 874; see also Karl-Heinz Böckstiegel, *Handbuch, supra* note 6, at 268-69.
39 Regarding the question "where begins outer space" see Bin Cheng, *International Responsibility and Liability for Launch Activities, 20 Air & Space Law* 297, 298-99 (1995). Cheng’s conclusion is that there exists a rule of general international law recognizing the lowest perigee of any existing or past artificial earth satellites as marking the beginning of outer space. See *id*. According to Cheng this point may be put at approximately 100-110 KM. See also Henri A. Wassenbergh, *A Launch and A Space Transportation Law, Separate from Outer Space Law?, 21 Air & Space Law* 28 (1996).
41 See Karl-Heinz Böckstiegel, *Handbuch, supra* note 6, at 270-71.
the interpretation of the word "peaceful." While the USA understood peaceful to mean "non aggressive", the former USSR interpreted peaceful as "non military," which would exclude military personnel from outer space activities. Article IV paragraph 2 now expressly allows the use of military personnel for peaceful space activities.

Article VI establishes the so called "principle of international state responsibility" and provides:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both, by the international organization and by the States Parties to the Treaty participating in such organization.45

Under the first sentence of Article VI, the member states assumed direct international responsibility for national space activities, including space activities of non-governmental entities, which in law would not otherwise be imputable to them.46 Such non-governmental activities are to be treated as activities of the respective States themselves.47 The activities (including launching) must qualify as being "national." That is, they must be activities carried out by the State itself, its nationals, or anyone acting within the State's jurisdiction,48 including those by, or on

45 See OST 1967, supra note 26, at 209.
46 See id.
47 See Karl-Heinz Böckstiegel, Handbuch, supra note 6, at 273-75; see also Cheng, supra note 39, at 302; see also Wassenbergh, supra note 39, at 30. Wassenbergh wants the liability to rest upon the non-governmental entity deploying space activities or launching activities. See id. "The absolute and unlimited liability of the launching State should be replaced by a new international launching law, as part of a new space transportation law, applicable to private launchings." Id.; see also Henri A. Wassenbergh, International Space Law: A Turn of the Tide, 22 AIR & SPACE LAW 334, 335 (1997).
48 Including territorial, quasi-territorial and personal jurisdiction. See also Wassenbergh, supra note 39, at 30.
board ships and aircraft of a State’s national as well as activities by, or by personnel of, space objects under a State’s registry.\textsuperscript{49}

Pursuant to the second sentence of Article VI, all non-governmental activities must be authorized and continuously supervised by the “appropriate State Party.”\textsuperscript{50} It can be safely argued that there can be many State Parties involved\textsuperscript{51} in a given space activity and it will then be up to the States involved to designate one State to exercise authority and supervision or even to entrust the control to the State of registry.\textsuperscript{52} In any event the States involved will need to ensure that both the State of registry and the State of authority and control will discharge their respective duties.

With respect to government or private activities that could “cause potentially harmful interference with activities of other States, "the State, under Article IX of the treaty must “undertake appropriate international consultation before proceeding with any such activities or experiment.”\textsuperscript{53}

Articles VI and VII of the Treaty and Article II of the Liability Convention extend the concept of State “responsibility” to include the concept of “liability” for certain space activities. Notably, Article II of the Liability Convention provides for an “absolute liability” of the “launching State” for “damage caused by its space objects on the surface of the Earth or to aircraft in flight.”

The term “Space Object” designates any object that humans launch, attempt to launch or have launched into Outer Space, together with component parts of the object.\textsuperscript{54}

\textsuperscript{49} See Cheng, supra note 39, at 303; see also Cheng, supra note 36, at 161.

\textsuperscript{50} Regarding the controversy as to the identity of the appropriate State Party, see Cheng, supra note 39, at 304. See also Cheng, supra note 36, at 160; Wassenbergh, supra note 39, at 28, 30.

\textsuperscript{51} This is also supported by sentence 3 of article VI regarding international organizations, which makes clear that there can be a number of states involved.

\textsuperscript{52} See OST 1967, supra note 26, art. VIII, at 209; see also Registration Convention, supra note 28.

\textsuperscript{53} See OST 1967, supra note 26, at 210.

\textsuperscript{54} See Registration Convention, supra note 28, art. Ib; see also Liability Convention, supra note 27, art. Ib; M. Hintz, Weltraumgeg enstände, in HANDBUCH, supra note 6, at 160-63; see generally Cheng, supra note 39, at 298. “A space object is any object, and its component parts, including its launcher/booster/shuttle, etc., brought by human effort into outer space, and when such object is on its way to/from outer space (the launching period),” excluding “attempted launching” from the definition when it does not reach outer space. Wassenbergh, supra note 39, at 29; see also Galloway, supra note 2, at 40.
In accordance with Article VII, four States may be jointly and severally liable for damages caused by a space object, specifically, (i) the State that launches the space object, (ii) the State that procures the launching, (iii) the State from whose territory the object is launched and (iv) the State from whose facility the object is launched.

Pursuant to Article VIII, although a State cannot use a Space Station to make claims of sovereignty, the State on whose registry an object launched is carried, shall retain the jurisdiction and control over such object and over any personnel thereof while in Outer Space or on a celestial body.

Finally, Article XIII defines the scope of the treaty as being applicable to “all activities of the member states during the exploration and use of outer space, including the moon and other celestial bodies.” In relation to the general international law (leges generales), the provisions of the Outer Space Treaty are considered leges speciales.

2. The Liability Convention of 1972

As mentioned, Article II of the Liability Convention 1972 extends the concept of State “responsibility” to the concept of State “liability.” Moreover, it imposes “absolute liability” on a launching State for damages caused by its space objects on the surface of the Earth or in the air, except to the extent to which such damage has been caused by the gross negligence on the part of the victim or the claimant State. Pursuant to Article III, liability for damage done elsewhere rests on fault. For this purpose Article I defines “damages” as “loss of life, personal injury or other impairment of health, or loss of or damage to property.”

The Liability Convention 1972 applies only to “launching States” as defined as “(i) a State which launches or procures the

55 See Cheng, supra note 39, at 306, 310.
56 If more than one State is involved, it is presumed that their liability will be joint and several (“internationally liable”), the OST 1967, however, is not explicit. Likewise, it is unclear whether this liability is absolute or based on fault.
57 OST 1967, supra note 26, at 211.
58 See Wollenschläger & H. Hablitzel, supra note 36, at 874.
59 Liability Convention, supra note 27.
60 See Peter Malanczuk, Haftung, in HANDBUCH, supra note 6, at 764, 782.
61 See Liability Convention, supra note 27, at art. VI, para. 1.
62 See id. at 190.
63 Id. at 189.
launching of a space object, or (ii) a State from whose territory or facility a space object is launched.\textsuperscript{64} For this purpose, "launching" includes attempted launching.\textsuperscript{65} If two or more States jointly launch a space object, they are jointly and severally liable for any damage.\textsuperscript{66} These provisions also apply to any "international intergovernmental organization." The States involved must determine which one shall register the object launched.\textsuperscript{67}

The Liability Convention 1972 grants neither rights nor responsibilities to the private sector. If nationals of a launching State cause damage to the nationals of another State, the damaged party may have its government present a claim for compensation to the government of the launching party.\textsuperscript{68} The Liability Convention 1972 does, however, acknowledge the right of individuals to pursue remedies outside the Convention.\textsuperscript{69}

Articles X through XIX provide for a system of compulsory third-party settlement of disputes, although, unless otherwise agreed, the final award is not binding upon the parties.\textsuperscript{70}

3. The Registration Convention of 1975\textsuperscript{71}

It was in the early 1960s when, due to the steadily increasing number of space objects launched into Outer Space, the need for a public registry prompted the UN General Assembly to adopt resolution 1721 (XVI). This resolution requests launching States to furnish relevant information regarding objects launched into Outer Space. In 1974, after several years of satisfactory practice in registering launched space objects, the Gen-

\textsuperscript{64} See id. at 189.
\textsuperscript{65} Id.
\textsuperscript{66} See Bin Cheng, Space Objects and their Various Connecting Factors, in Outlook on Space Law Over the Next 30 Years 203, 212-14; see also Galloway, supra note 2, at 39; Cheng, supra note 39 at 307; see also Handbuch, supra note 6 at 783.
\textsuperscript{67} See Liability Convention, supra note 27, at 192; see also Registration Convention, supra note 28, at 17; see also Wassenbergh, supra note 39, at 30; Galloway, supra note 2, at 39.
\textsuperscript{68} See Liability Convention, supra note 27, at 191; see also Space Stations and the Law, supra note 42, at 22.
\textsuperscript{69} Article XI (para. 2) of the Liability Convention 1972 states: "Nothing in this Convention shall prevent a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agencies of a launching State." See Liability Convention, supra note 27, at 192. Thus, the private entity remains liable to third parties under general national law, e.g. contract law, tort law etc.
\textsuperscript{70} See id. at 191-93.
\textsuperscript{71} See Registration Convention, supra note 28.
eral Assembly adopted the Registration Convention and opened it for signature. It finally entered into force on September 15, 1976.72

As pointed out, Article VIII of the OST 1967 says that a State on "whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object and over any personnel thereof, while in outer space or on a celestial body." This principle has also been adopted in the Registration Convention 1975.73 Thus, the primary importance of the Registration Convention 1975 lies in the fact that a State or organization acknowledges its responsibilities by registering the object.74 Although it is desirable to have a complete registry of all objects launched into outer space, States are still reluctant to register. Often States delay registering or do not register completely.75 The registration under the Convention gives answers as to what objects are in outer space but does not give information on where those objects can be found.

Article II paragraph 2 of the Registration Convention 1975 provides that when there are two or more launching States, they shall jointly determine which shall register the object.76 Finally, it can be safely argued that the 1975 Registration Convention needs greater recognition by the launching States in order to guarantee a safe and better controlled outer space.

4. The Intergovernmental Agreement of September 28, 198877

a. Object

Pursuant to Article I paragraph 1 of the IGA 1988, the object of the agreement is "to establish a long-term international cooperative framework among the Partners, on the basis of a genuine

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72 See id.
73 Id. at 209.
74 See Reifarth, Handbuch, supra note 6, at 275-76.
75 See Perek, The 1976 Registration Convention, 3 Zeitschrift für Luft-und Weltraumrecht (ZLW) 353 (1998); see also Cheng, supra note 66, at 205.
76 For the problem of "jurisdiction and control" as a result of Article II of the Registration Convention 1976, see Christian Patermann, Registration, jurisdiction, control and ownership of elements of the Space Station, Venezia, Apr. 22-24, 1986, European Conference "Cooperation in the International Space Station System." See also Cheng, supra note 66, at 214-15. Cheng thinks that the initial principle of "jurisdiction and control should go with registration" has "completely been subverted, by allowing States engaged in joint launching to make more or less what arrangement they want, separating, if they wish, registration from jurisdiction and control."
77 See IGA 1988, supra note 3.
partnership, for the detailed design, development, operation, and utilization of a permanently manned civil Space Station for peaceful purposes in accordance with international law."

b. Genuine Partnership—Peaceful Use

During the negotiations of the IGA 1998, the European member states emphasized the importance of a "genuine partnership" between Europe and the U.S. involving adequate participation of the European Partners in the direction and organization of the Program, access to the Station and technology-transfer, provisions regarding dispute resolution and European responsibility for the elements provided by the European member states. Furthermore, the civil character and peaceful use of the Station was of primary importance.

c. International Law

According to Article II paragraph 1, Space Station activities are subject to "international law, including the Outer Space Treaty, the Rescue Agreement, the Liability Convention and the Registration Convention."

d. No Appropriation

In order to clarify, Article II paragraph 2 (c) returns to the contents of Article II of the Outer Space Treaty 1967, which includes the prohibition of national appropriation over Outer Space or any portion of Outer Space ("freedom of Space").

e. Registration, Jurisdiction and Control

Article V paragraph 1 refers to the fundamental idea—already set forth in Article VIII of the Outer Space Treaty 1967 and Article II of the Registration Convention—of proper responsibility and independence of each respective Partner for the elements launched. It also provides for registration of the same. Article V paragraph 2 expressly states that each Partner, in accordance with Article VIII of the Outer Space Treaty and Article II of the Registration Convention, shall retain jurisdiction and control over the elements it registers in accordance with paragraph 1

78 See Reifarth, supra note 18, at 38.
79 See id.
80 IGA 1988, supra note 3, at art. II, para. 1.
81 See id. at art. II, para. 2(c).
82 See id. at art. V, para. 1.
and over personnel in or on the Space Station who are its nationals. According to Article V paragraph 2, the “exercise of such jurisdiction and control shall be subject to any relevant provisions of the IGA 1988, the MOUs, and implementing agreements, including relevant procedural mechanisms established therein.” Article V is structured to provide a legal basis, and clearly determines the legal jurisdiction and responsibility of each participant in the Program. It should be mentioned that Article V follows the principle of “jurisdiction and control” already established in Article VIII of the OST 1967 and thereby guarantees that, although an actual superiority may exist, no conclusion can be drawn as to the legal relation.

f. Management

Article VII provides for a complex management structure, whereby each member state shall be responsible for the management and direction of its own programs. The United States, acting through NASA, shall have overall responsibility for the coordination and direction of the Space Station, system engineering, integration and safety, unless otherwise provided in the MOUs and implementing agreements. Furthermore, management bodies shall be established “which shall plan and coordinate activities affecting the design and development of the Space Station and its safe, efficient and effective operation and utilization . . . . decision-making by consensus shall be the goal.”

g. Utilization

Article IX regulates the allocation of different user elements and utilization resources between, as well as the duties and

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83 See id. at art. V, para. 2. According to Article XXII this also applies in respect to criminal jurisdiction. The U.S., in addition, may exercise criminal jurisdiction over criminal acts committed by a “non-U.S. national which endangers the safety of the manned base or crew members,” provided that before the prosecution consultations have taken place and an agreement has been reached between the U.S. and the Partner State whose national is being charged. See id. at art. XXII, para. 2.

84 See id. at art. V, para. 2.

85 See HORST BITTLINGER, HOHEITSGEWALT UND KONTROLLE IM WELTRAUM 60-66 (1988); see also Reifarth, supra note 18, at 46; see also Reifarth, HANDBUCH, supra note 6 at 548.

86 See Reifarth, HANDBUCH, supra note 6, at 541-43.

87 Program Coordination Committee (PCC), Space Station Control Board (SSCB).
rights of, the partners. Specifically, Article IX paragraph 8 establishes the right of each partner to use and select users for its allocation for any purpose consistent with the object of the ISS, MOUs and implementing agreements.

In order to protect the other partners, Article IX paragraph 8(a) requires the prior notification and consent of all partners of proposed use by a non-partner of private entity.\(^8\) Pursuant to Article IX paragraph 8 (b), a Partner providing an element shall determine whether a contemplated use (by it or a Non-Partner) is for a “peaceful purpose.” If it concludes that the use is not for a peaceful purpose, it may prohibit such use.\(^9\)

h. Cross-Waiver of Liability

The objective of Article XVI of the IGA 1988 is to encourage cooperation and participation in the exploration, exploitation, and use of the Outer Space and therefore to establish a broad cross-waiver of liability by the Partner States and related entities involved. Through Article XVI the Partner States established an exclusion of liability for all participating entities in Space Station activities, including the Partners of the IGA 1988, the Space Agencies and related entities and industry. The scope of Article XVI covers all “Protected Space Operations,” which include all activities or actions related to the Space Station cooperation, unless caused by wilfull misconduct, and claims made by natural persons for injury or death, claims between a Partner State and its own related entity or entities and intellectual property claims.

In accordance with Article XVI paragraph 3(a), each Partner State waives all claims based on damages arising out of “Protected Space Operations” against any of the participating entities or persons defined in Article XVI paragraph 2 (a) through (f). To prevent uncertainty, Article XVI paragraph 3 (c) clarifies that the cross-waiver of liability also applies to the Liability Convention, provided the damage is directly related to “Protected Space Operations.” With respect to a claim by “third parties” arising under the Liability Convention, Article XVII paragraph 2 provides that the Partners shall immediately start

\(^8\) In this respect paragraph XI clarifies that “an ESA member state that was an ESA member state at the time of the signature of the IGA 1988” by the United States, which occurred on September 29, 1998, shall not be considered a Non-Partner. See IGA 1988, supra note 3, at art. VII, para. 5.

\(^9\) See Reifarth, supra note 18, at 42.
consultations on any potential liability, apportionment and defense of such claim.

Articles XIX and XX regulate the exchange and treatment of data and goods. They also establish the obligation of each Partner to encourage and facilitate the transfer and to provide all Partners with necessary technical data and goods in connection with the Space Station cooperation, unless the transfer would be in contravention of national laws and regulations. Article XXI deals with intellectual property issues which will be discussed separately;\(^9\) Article XXII deals with criminal jurisdiction.

5. *The Intergovernmental Agreement of January 29, 1998*\(^{91}\)

a. General

As a consequence of the major political motivation which led, *inter alia*, to the renegotiation of the IGA 1988 and the invitation to Russia to participate in the Program, the general character of the IGA 1988 has changed, while legal matters remain basically unchanged.\(^92\) The IGA 1988 had created a framework for participation in the U.S. space station. The concept of the new agreement is that of a truly international joint project in which partners contribute to the program on an equal basis, with the U.S. having special responsibility for the overall coordination.\(^93\) A brief summary follows on the major changes to the IGA 1988.

b. Changes and modifications

1. *Object and Scope*

   Article I paragraph 2 of the IGA 1988 intended a "U.S. core Space Station" with elements produced by the other Partners around such a core Station in order to create an "international Space Station complex with greater capabilities." The IGA 1998 creates "an integrated International Space Station." The foundation elements for the ISS are now produced by the U.S. and Russia, as well as by other Partners. The United States is entitled

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\(^9\) See infra Section 6(b).


\(^92\) For example, Article II (International Rights and Obligations); Article X (Operation); Article XI (Crew); Article XVII (Liability Convention); Article XXI (Intellectual Property); Articles XIX and XX (Exchange of Data and Goods; Treatment of Data and Goods in Transit), Articles V and VI (Registration; Jurisdiction and Control; Ownership of Elements and Equipment).

\(^93\) See Nagel, *supra* note 12, at 145, 149.
to exercise a leading role in terms of management and coordination.

2. Management

Accordingly, Article VII paragraph 1 establishes the principle that the management of the ISS will take place on a multilateral basis. The Partners, acting through their respective national space agencies, will participate in and discharge responsibilities of the management bodies. Pursuant to Article VII paragraph 2, NASA will be responsible for the overall Program management and coordination, the overall system engineering, safety requirements and plans, and the planning for and the coordination of the execution of the overall integrated operation of the ISS.94

3. Utilization

As a general rule Article IX states that utilization rights are derived from Partner provision of user elements. In addition, Partners that provide infrastructure elements may acquire utilization rights for elements that belong to other Partners. In order to protect the Partners, Article IX paragraph 3 (a) requires prior “notification and timely consensus” among all Partners regarding the use of certain elements by non-partners. For this purpose, ESA Member States shall not be considered non-partners. Compared to the IGA 1988, future ESA Member States may therefore be directly involved in the ISS.

4. Transport

While the IGA 1988 provided for NASA's Space Transportation System95 as the baseline launch and return transportation system, Article XII of the IGA 1998 has been modified. With the exception of Canada, each Partner may now use its own (government or private) transportation system.96

5. Cross-Waiver of Liability

Russia's cooperation with Kazakhstan and, in particular, its use of the launching facilities in Baikonur, necessitated a modified definition of the term “related entities” in order to extend

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95 U.S. Space Shuttle.
96 See IGA 1998, supra note 12, at art. XII, para. 1. The pertinent systems include: ESA: ARIANE 5; USA: Space Shuttle; Russia: Proton and Soyuz; Japan: H-II.
the applicability of cross-waiver of liability to such cooperating countries. The IGA 1998 reflects this necessity by adding a subparagraph to Article XVI paragraph 2(b) providing that "related entities" shall also comprise States or agencies or institutions of a State having the "same relationship" to a Partner State as described in Article II(b)(1) through (3) or otherwise engaged in the implementation of "Protected Space Operations" as defined in Article XVI paragraph 2(f).

The demand of the United States led to a further modification in Article XVI paragraph 3(d) which defines the particular cases in which the cross-waiver shall not be applicable. Pursuant to Article XVI paragraph 3(d), the cross-waiver of liability is not applicable to "claims made by a natural person, the estate, survivors or subrogees for bodily injury, other impairment of health . . . or death" unless the claim has been subrogated to the Partner State. The general cross-waiver of liability shall apply in these cases.

6. Criminal Jurisdiction

Article XXII has been the subject of intense political discussion. Pursuant to Article XXII paragraph 2, in addition to the execution of criminal jurisdiction over its respective nationals, affected Partner States may now exercise criminal jurisdiction over nationals of a Partner State whose misconduct in orbit "(a) affects the life or safety of a national of another Partner State or (b) occurs in or on or causes damage to the flight element of another Partner State," provided that consultations concerning the prosecutorial interest of the affected Partner State have taken place and the latter, within 90 days, does "concur" or "fails to provide assurances that it will submit the case to its competent authorities for prosecution."

7. Entry into force – Operative effect

According to Article XXV paragraph 3(c), any prospective ESA Member State may accede to the IGA 1998 by simply "depositing its instruments of accession with the Depositary," with-

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97 See Nagel, supra note 12, at 143.
98 See IGA 1998, supra note 12, at art. XVI, para. 2(a).
99 See Nagel, supra note 12, at 147.
100 See IGA 1988, supra note 3, at art. XXII, para. 2.
101 IGA 1998, supra note 12, at art. XXII, para. 2.
out approval of the other Partner States. Finally, Article XXVI determines that the IGA 1998 shall become "operative" as between the U.S. and Russia on the day they deposit their relevant instruments of ratification, acceptance, or approval. In order to continue the cooperation on the ISS until actual entry into force of the IGA 1998, an agreement has also been signed between the Partners, determining that the IGA may be applied before entry into force, provided the application is not contrary to the relevant national laws and regulations.

6. Selected Legal Aspects

a. Private Launching and State Liability

In light of the steadily growing number of space activities and especially due to the shift from State to private involvement in space station programs, there is a question as to whether the current system of direct State liability for private space activities, established in Articles VI and VII of the OST 1967 and Article II of the Liability Convention, is still appropriate. The need to privatize, commercialize, and promote Outer Space activities by non-governmental entities along with the introduction of new international legal instruments has been addressed. To satisfy this request, the drafting of internationally agreeable and standardized requirements for non-governmental entities that intend to become active in Outer Space will be necessary. National legislation should therefore be enacted in that respect. The necessity for non-governmental entities that commercially participate in and benefit from space activities to

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See id. at art. XXV, para. 3(c).

103 It is so far unclear how to differentiate between "enter into force" and "become operative." See Nagel, supra note 12, at 147.

104 See Article XXV paragraph 3 (a): "This Agreement shall enter into force on the date on which the last instrument of ratification, acceptance, or approval of Japan, Russia and the United States has been deposited . . . . (b) It shall enter into force for the European Partner after ratification of at least four signatory or acceding States and respective notifications." IGA 1998, supra note 12, at art. XXV, para. 3(a).

105 See Karl-Heinz Böckstiegel, Space Stations, supra note 2 at 109.

106 See, e.g., Wassenbergh, supra note 39; see also Karl-Heinz Böckstiegel, Commercial Use of Space Stations - The Legal Framework of Transatlantic Cooperation 217-22 (1986).

107 See generally Karl-Heinz Böckstiegel, Handbuch, supra note 6, at 293-97, 305-06, 296. The State may have a recourse, i.e. a claim for compensation against the private entity that undertakes the launching under national law (existing or to be enacted). In case of absolute liability, especially in Germany and in other European countries, for example under the provisions that transform the EU princi-
accept and respond to their own international liability\textsuperscript{108} is mandatory in order to unburden the "launching State"\textsuperscript{109} and cannot be seen apart from, but only in the context of and directly related to the business opportunities that this new market represents to the private sector. How to split such responsibility and which aspects should remain with the relevant State in terms of supervision may be debatable, but at least the economic responsibility and potential liability for damages to third parties resulting from private launch activities should be imposed on the private entity.\textsuperscript{110}

b. Protection of Inventions – Intellectual Property in the Outer Space

As a result of increasing international industrial space cooperation and the future commercialization of prospective technical inventions in Outer Space, and specifically in view of the planned International Space Station, the protection of technical innovations (by means of patents, copyrights, trademarks, etc.) and proprietary rights in space activities, including issues regarding technology transfer, is essential. A short introduction shall be given on existing patent law regarding the protection of inventions made in Outer Space.\textsuperscript{111}

Article XXI of the IGA 1998 provides for the protection of intellectual property in Outer Space. For this purpose, Article XXI paragraph 2 determines that "an activity occurring in or on a Space Station flight shall be deemed to have occurred only in the territory of the Partner State of that element's registry."

Thus, the inventions shall be deemed to have occurred within the jurisdiction of the Partner State which registered the relevant element. In regard to elements registered by the ESA, each

\begin{footnotes}
\footnote{Contractual, tort, and products liability.}
\footnote{See Wassenbergh, \textit{supra} note 39, at 28.}
\footnote{See Wassenbergh, \textit{supra} note 43, at 179-82; see also Wassenbergh, \textit{supra} note 47, at 334.}
\end{footnotes}
European Partner State "may deem the activity to have occurred within its territory."112

Article XXI paragraph 2 returns to the principle of "registry" and "jurisdiction"113 as the link and connecting point, already established in Article VIII of the OST 1967 and Article II of the Registration Convention.114 Each Partner thereby extends the applicability of its national Patent Law to the relevant element in Outer Space provided by it.115 Article XXI thereby guarantees the protection of inventions through the granting of a patent title to the relevant country of registration, but at the same time limits these rights, including enforceability, to the territory of the relevant country that issued the respective grant for the patent. This may lead to a lack of protection of the relevant patent if the latter is used on user elements that are registered under a different jurisdiction.

Article XXI paragraph 2 ensures that this concept will apply notwithstanding any participation of a Partner State, its cooperating agency, or related entities in an activity occurring in or on any element belonging to another Partner. In other words, the mere participation of one Partner aboard another Partner's flight element does not affect the jurisdiction of such Partner regarding the principal activity and potential inventions.

Article XXI paragraph 3 limits the broad range of applicability of U.S. Patent Law to inventions made by non-nationals in U.S. territory.116 Pursuant to paragraph 3, a Partner State shall

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112 The territory is the one of the signatory states of the IGA; The Federal Republic of Germany has ratified the IGA 1988 in such a way that the activities which are carried out on board of the European Module will be considered, for the purpose of its national legislation, as occurring in German territory, see Article 2 of the law of July 13, 1991 ratifying the IGA 1988. See also A. M. Balsano, Space Technology and Intellectual Property, 20 AIR & SPACE LAW 177(1995).

113 For the country of citizenship of the astronaut that creates the inventions and an "international Space Patent," see Charles B. Meyer, Protecting Inventors' Rights Aboard an International Space Station, 70 J. PAT. & TRADEMARK OFF. SOC'Y 332, 347-50 (1988); see also Knut Focke, Manned Space Stations—Legal Issues, 39 ZEITSCHRIFT FÜR LUFT-UND WELTRAUMRECHT (ZLW) 93 (1990).


115 This is not in contravention of the territoriality principle, since a manned space object falls within the sovereignty of a State, analogous to the principle of extension of sovereignty and jurisdiction to ships and aircraft. See id. at 9; see also HANDBUCH, supra note 6, at 299-301.

116 According to U.S. Patent Law, foreigners that make an invention in the United States must first register the invention in the United States. See Reifarth, supra note 18, at 49.
not apply its national laws concerning secrecy of inventions if this prevents the filing of a patent application in another Partner State that provides for the protection of the secrecy of patent applications containing secret information (reciprocity).

Article XXI paragraph 4 considers the special situation of the ESA Partner States, where the protection of intellectual property rights may exist simultaneously in several States and determines that intellectual property that is protected in more than one European Partner State shall not give "the right to recover in more than one such State for the same act of infringement of the same rights in such intellectual property which occurs in or on an ESA registered element."

As a corollary, the owner of an intellectual property right may only bring an action for infringement in one particular State.

Pursuant to Article XXI paragraph 6, the mere temporary presence in the territory of a Partner State does not create the right for any proceedings for patent infringement.

The application of Article XXI of the IGA leaves open questions regarding such things as the protection of international patent rights during utilization, especially during joint activities aboard the ISS, and the issue of technology transfer. The need to harmonize international patent laws is imperative. \(^1\) Clarity and certainty in the application of intellectual property law to secure proprietary rights in space activities are essential in order to give private industry the confidence necessary to develop activities and to ensure the commercialization of Outer Space. \(^2\)

**Outlook and Closing Remarks**

Tremendous progress has been made on this international partnership. In late 1999, an international crew of three astro/cosmonauts will begin living aboard the ISS, starting a permanent human presence aboard the outpost. The crew has been in training for the mission since late 1996 and includes Flight Engineer Sergei Krikalev, a Russian cosmonaut, Soyuz Commander Yuri Gidzenko, also a Russian cosmonaut, and ISS Commander Bill Shepherd, a U.S. astronaut.

But the ISS Program continues to face significant challenges. Budgetary constraints, especially in times of economic instability of the global markets as well as cultural and national differences

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1. See Meyer, supra note 113, at 345; see also Balsano, supra note 112, at 182.
2. See Balsano, supra note 112, at 182-83 and note 14 with further literature regarding the subject matter.
demand all efforts of the participating Partners to build and operate the ISS on schedule, and to maintain a global interest and commitment to the Program. The extent to which the Program depends on Russia is quite substantial and represents a significant Program risk. Russia’s ability to meet its commitments in lieu of its economy and politics is a major issue today and also depends on the Partners involved. The construction of the Russian Service Module\textsuperscript{119} as the third major element of the ISS, which will provide propulsion and attitude control to the initial station vehicle, significantly threatens the Station plan.\textsuperscript{120} The latest Russian financial and political crisis further slowed the Russian activities and has led to a NASA rescue package, which would pay Russia US $660 million over the next four years in order to help the bankrupt Russian Space Agency complete crucial hardware for the ISS.\textsuperscript{121}

After a series of meetings that concluded in the beginning of October 1998 with a meeting of representatives from all international partners in Moscow, it was confirmed that the launches of the first ISS components, the Zarya module ("Daybreak") and the Unity module, remain on schedule.

Accordingly, the "Zarya" module was launched on November 20, 1998, from the Baikonur Cosmodrome, Kazakhstan, and the "Unity" module was launched on the U.S. Space Shuttle Endeavour on December 4, 1998 from the Kennedy Space Center, Florida, to begin the orbital construction of the ISS. The international Partner Representatives and members of the SSCB reviewed plans for launch of the Russian-provided Zvezda ("Star") Service Module, the Station's early living quarters and cornerstone of Russia’s contributions to the ISS. The Service Module shall also provide control of the station until the arrival of the U.S. Destiny laboratory in the year 2000. Its official launch date is now scheduled for November 12, 1999, from the Baikonur Cosmodrome in Kazakhstan\textsuperscript{122}

Once the third component is added in 1999, the Station will become functional. The chances, however, that the Partners

\textsuperscript{119} But also the Logistics Transfer Vehicle and the Science Power Platform.

\textsuperscript{120} See Craig Covault, Russian Service Module Threatens Station Plan, AVIATION WK. \& SPACE TECH., Sept. 23, 1996, at 20-21; see also Smith, supra note 1, at 2.

\textsuperscript{121} See Joseph C. Anselmo, NASA Plans $660-Million Station Bailout for Russia, AVIATION WK. \& SPACE TECH., Sept. 21, 1998, at 26-27.

will have to further refine the Station’s assembly sequence are high.

The ISS Program is currently creating the mechanism and process that will be used by future international civil cooperative activities in all fields. When the ISS is successful, it will serve as a catalyst and pathfinder for future international cooperative scientific ventures and will provide a gateway to international exploration of deep space and other planets.