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## **LEGAL ENVIRONMENT FOR THE EXPLOITATION OF THE INTERNATIONAL SPACE STATION (ISS)**

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### Abstract

This presentation focuses on the legal environment created by the Intergovernmental Agreement (IGA) and the four related Memoranda of Understanding (MOUs) for carrying out International Space Station (ISS) operation and utilisation activities, over the useful lifetime of the flight elements provided by the ISS Partners. It addresses the issues to be dealt with in the arrangements which will be concluded for enabling the various categories of users, from whatever field of activity in either the public or private sector, to exercise utilisation rights belonging in the first place to the Partner's Cooperating Agencies, while attracting funding from sources other than States' contributions. The presentation also reviews the efforts being made by the European Space Agency (ESA), on behalf of the European Partner, to prepare for efficient and effective use of the European utilisation allocation of the ISS, despite the difficulty of reconciling competing interests at both national and Agency levels. Finally, the presentation examines different aspects and implications of the new ISS exploitation programme subscribed in May 1999 by the ESA Member States concerned, the most ambitious and complex exploitation programme ever undertaken by the Agency, with the added constraint of avoiding exchange of funds between ISS Partners.

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### Introduction

The general framework put in place for cooperation on the International Space Station project comprises three layers of agreements, which are explained in detail: a multilateral intergovernmental agreement (IGA); four Memoranda of Understanding between the designated Cooperating Space Agencies; and the implementing arrangements already concluded or to be concluded over the duration of the cooperation. The general rule is that a State can exercise its control and jurisdiction only on its territory and in its air space; the IGA therefore constitutes the basis on which the signatory States are allowed to extend their national jurisdictions and controls into a facility located in outer space. Before its ratification of the IGA, a State will make sure, through adoption of appropriate legislation for example, that its national legal system is compatible with the commitments which it has subscribed in the IGA and take appropriate means to ensure that its national law can apply over the flight elements and personnel which it provides to the project.

Furthermore, in elaborating a comprehensive legal regime governing activities taking place on board the ISS, the States concerned have not created a new body of laws applying to the ISS; they have rather made links between the ISS, or more precisely its modules and personnel, and their territories so as to authorise the application of their national laws to a given situation.

## The Three-layer Legal Framework

### The Intergovernmental Agreement

On 29 January 1998, the representatives of fifteen States, i.e. the United States, Russia, Japan, Canada and eleven Member States of ESA, signed in Washington an intergovernmental agreement (referred to as the IGA) concerning cooperation on the civil International Space Station. This agreement which, when brought into force, will replace the 1988 IGA, not only formalises Russia's integration in the partnership but also confirms major changes in the Partners' contributions and a dramatic evolution of the rules put in place for this cooperation.

Carrying out a project of such magnitude requires arrangements in some fields of jurisdiction that are clearly beyond those falling under the responsibility of Space Agencies. The IGA sets out the general principles for carrying out this cooperation, including those governing the parties' conduct in outer space. It establishes "a long-term international cooperative framework among the Partners, on the basis of genuine partnership, for the detailed design, development, operation, and utilization of a permanently inhabited civil International Space Station for peaceful purposes, in accordance with international law".

The IGA makes a distinction between Partner States and Partners which is quite innovative in terms of international law; this is realised when one looks at particular responsibilities reserved for Partners and others for Partner States in the IGA. This is a distinction of particular importance for Europe. There are fifteen Partner States but only four Partners in the project because the eleven European States are

grouped, for the purpose of conducting this cooperation, under the umbrella designation of the "European Partner".

In addition to a fairly broad legal regime developed in the IGA itself for the conduct of Space Station cooperation, very innovative rules have been drafted to govern such things as the development and utilisation of the Space Station, and the management and financing of the Partners' programmes and the international programme made up of the Partners' combined contributions. Although the original concept of an integrated Space Station has been preserved in this negotiation process, many features of the cooperation have been modified, generally for the sake of underlining the genuine partnership concept, or have evolved considerably from what was envisaged at the outset.

A large number of changes were made in the most recent IGA to reflect the new technical reality brought about primarily by Russia's contributions but also by Europe's redesign of its original contributions to the project and its insistence on recognition of specific activities, including the periodical correction of the Station's orbit using the ESA-developed Automated Transfer Vehicle in conjunction with Ariane 5. In addition, the lead role of the United States, and almost all its original responsibilities for overall programme management and coordination, have been confirmed in this new IGA.

The IGA could be assimilated to a written constitution for Space Station Cooperation which already applies, and will apply in the next fifteen years approximately, to all the phases of this project, i.e. to design, development, operation and utilisation activities. A fundamental principle of this

constitution is stated in Article 5 of the IGA: "each Partner shall retain jurisdiction and control over the elements it registers ... and over personnel in or on the Space Station who are its nationals". The IGA has been elaborated first in the mid-80's, at a time when the Partner States were more concerned with the definition and development of their contributions - which are their obligations - rather than the operation and utilisation of the ISS, the latter being, by definition, a right envisaged for the longer term. The question could be asked, therefore, whether or not some of the Partners will feel the need to complement the rules for utilisation, with the risk of deviating somewhat from the spirit, if not the letter, of the corresponding provisions of the IGA, and in particular its legal regime.

### The Memoranda of Understanding

Also on 29 January 1998, the Head of NASA and of the Heads of the Russian Space Agency, the European Space Agency and the Canadian Space Agency respectively signed three similarly worded Memorandum of Understanding (MOU) containing detailed provisions for implementation of Space Station cooperation. NASA and the Government of Japan, representing a series of Japanese agencies charged with different aspects of the cooperation, signed their MOU on 24 February 1998. When brought into force, i.e. after the Parties notify each other that their internal procedures required for this purpose have been completed, these MOUs will replace the three original ones signed in 1988.

The four new MOUs concern the detailed design, development and operation of a manned civil Space Station. A memorandum of understanding is generally

not considered to be an agreement generating rights and obligations at international law for its signatories, although this does not exclude the possibility of remedies provided for under a Partner State's legal system being applicable on the basis of a memorandum of understanding if, for example, a party to it failed to discharge its obligations appropriately. The memorandum of understanding registers a political and moral commitment on the part of an international organisation, a government, or a constituent part of the latter, to conduct itself in a certain way. Because of their close links with the IGA, it would appear that the Space Station MOUs will have acquired the status of international agreement, as an exception to the general practice in this field.

The multilateral bodies established for the management of Space Station, such as the Multilateral Coordination Board (MCB), the top-level body in charge of coordinating the activities of all Cooperating Agencies related to the operation and utilisation of the Space Station, are provided for - strangely enough - in the MOUs, which are bilateral instruments.

In addition, any commitment made in a given MOU by a Cooperating Agency in favour of others has to be reflected in the other relevant MOUs, with this commitment "transiting", so to speak, through NASA, which is a party to all the MOUs. It is also the MOUs that define the five-year "sliding" planning process for the operation and utilisation of the ISS, including the procedure put in place by the Cooperating Agencies for approving the corresponding documentation.

### The Implementing Arrangements, and Other Arrangements

The third layer of international instruments is represented by the "implementing arrangements" referred to in Article 4 of the IGA. These arrangements, relating to implementation of the Parties' obligations or the exercise of their rights, as spelled out in the MOUs, are subject to the MOUs and thus NASA always has to be a party to them. The IGA and the four recently signed MOUs contain numerous provisions calling for the conclusion of implementing arrangements. At this stage, only one implementing arrangement has been concluded between ESA and NASA: it relates to the barter between the NASA launch of the ESA-developed Columbus laboratory, using the U.S. Space Shuttle, and the development by ESA, and delivery to NASA, of the ISS Nodes 2 and 3 and equipment to be used on board the U.S. laboratory.

Activities conducted by NASA and another Cooperating Agency within the broader framework of ISS cooperation which do not aim at implementing one of the Parties', or both Parties', rights and obligations under the IGA and MOU are generally not covered by an implementing arrangement but rather by a dedicated self-contained Memorandum of Understanding. This is the case for the ESA/NASA Memorandum of Understanding for cooperation in the X-38 project, of 7 July 1999, which covers ESA's contributions to the NASA-developed X-38 test vehicle, which is to serve as a pathfinder to the NASA Crew Return Vehicle (CRV).

Article 4.2 of the IGA which establishes this hierarchy between Space Station Agreements (IGA, MOUs and implementing arrangements) is silent on the

other arrangements and agreements that may be concluded between Partners for the purpose of furthering Space Station cooperation. One example of these is the Arrangement signed in 1996 between ESA and the Russian Space Agency (RSA) for the delivery by SEA to the RSA of a European external robotic arm (ERA) to be used on the Russian segment of the Space Station. It is therefore up to the parties to ensure consistency between their obligations under such unrecognised arrangements and agreements and their IGA/MOU ISS obligations.

### Utilisation of the Space Station

The basic principles for utilisation of the Station are laid down in Article 9.1 of the IGA:

"Utilization rights are derived from Partner provision of user elements, infrastructure elements, or both. Any Partner that provides Space Station user elements shall retain use of those elements, except as otherwise provided for in this paragraph. Partners which provide resources to operate and use the Space Station, which are derived from their Space Station infrastructure elements, shall receive in exchange a fixed share of the use of certain user elements."

The share of the use of user accommodations, such as pressurised laboratories, to be retained by the Partner providing that accommodation is expressed in fixed percentages in the MOUs. To be more precise, ESA will keep 51% of the user accommodation on the European Columbus laboratory and Japan's Cooperating Agency will retain the use of 51% of the user accommodations on the Japanese Experiment Module (JEM). The remaining 49% of user accommodation in Columbus

and JEM are attributed to those Partners providing infrastructure resources to ESA and Japan's Cooperating Agency (referred to in the MOUs as "the GOJ"), essentially NASA but also the CSA, which is providing the Remote Manipulator System (RMS) as an infrastructure element.

A second step in the understanding of the principles applicable to utilisation of the Station is an examination of the approach taken in the allocation of Space Station resources. An agreement has been reached between the original Partners and Russia based on the premise that Russia on the one hand and the other Partners on the other retain utilisation of their own contributions to the Station and seek to offset only those items that cross the interface. This of course has many implications with regard to the sharing of Station resources and the treatment of common operations costs involving exchanges between the Russian segment and the rest of the Station. The Partners have nevertheless laid strong emphasis on the need for the closest possible adherence to the philosophy of an integrated ISS and the rules underpinning that philosophy in the Space Station Agreements.

It was decided that, for the purposes of sharing utilisation, the Russian Partner would keep 100% of utilisation of its own modules, thereby recognising that the infrastructure element supplied to the Station by Russia for its own benefit and that of the other Partners would enable it to accumulate up to 100% of the utilisation rights in its own modules. This calculation has the advantage of avoiding a debate on the relative value of the utilisation and infrastructure elements supplied by Russia as a proportion of the Space Station as a whole. This means that the percentage agreed among the founding Partners, on the basis of 100% within the ISS excluding the Russian segment, could be retained for the purpose of sharing available

resources. The MOUs specify the precise percentage of resources to be allocated to each Cooperating Agency: for example, ESA's share has been fixed at 8.3% of the resources available for sharing on board the ISS.

Establishing a direct link between the allocation of resources and the financial responsibilities of the Cooperating Agencies, Article 9.3(a) of the ESA/NASA MOU provides that:

"NASA, ESA and the other partners will equitably share responsibilities for the common system operations costs or activities, that is the costs or activities attributed to the operation of the Space Station as a whole.... RSA will be responsible for the share of the common system operations costs or activities corresponding to the operation of the elements it provides. NASA, ESA, the GOJ and CSA collectively will be responsible for the share of common system operations costs or activities corresponding to the support of the operation of elements they collectively provide using the following approach: each will be responsible for a percentage of common system operations costs or activities equal to the percentage of Space Station utilization resources allocated to it ..."

In addition to the above-mentioned common system operations costs responsibilities, each Partner will be financially responsible for costs or activities attributed to operating and sustaining the functional performance of the flight and ground elements which it provides and the use of its user accommodations.

## How the European Partner is organising its utilisation of the Station

### The ESA ISS Exploitation Programme

On 12 May 1999, the ministerial meeting of the ESA Council held in Brussels, the 10 ESA Member States participating since October 1995 to the ESA ISS development programme States finalised and brought into force the legal instrument setting up an ESA ISS exploitation programme, confirming that their participation in that new programme would extend until the end of the useful lifetime of the European flight elements contributed to the ISS, envisaged for 2013. This was accompanied by the participating State's subscription of the financial sub-envelope covering the two-year first step of early activities and their confirmation of a complementary provisional financial commitment for the following three-year period.

The above financial sub-envelope, and therefore the participating States' subscriptions, have been broken down between fixed and variable costs, the former being more closely related to the operation responsibilities of the European Partner, including its share of common operations costs, and the latter being related to its utilisation interests in the ISS. However, this distinction between fixed and variable costs will remain rather artificial until actual utilisation of the Station by the users of the European Partner States, from 2004 onwards.

Although it is reassuring that the start of this new exploitation programme should ensure that the corresponding activities will be carried out on a stable financial basis over the long term, it should be stressed that this recent decision was accompanied by very explicit directives given to ESA not only to make all reasonable efforts to bring this

exploitation programme within more palatable financial parameters but also to find new funding sources.<sup>1</sup> This could be explained by the rather consistent past practice of the European Space Agency of transferring technology and facilities developed under its programmes to other international organisations or private entities for the purposes of their exploitation, so as to prevent a sizeable part of ESA's budget being diverted from its core mission of research and development in the space domain. This allows ESA to largely keep out of the space-operations business and concentrate on fostering new technologies and exploration, and to ensure that exploitation is carried out in the best possible environment, commercial or otherwise.

The concern voiced by Member States' representatives at the Brussels meeting is also understandable when it is realised that the ESA ISS exploitation programme could represent a steady-state average of approximately 11% of ESA's total annual budget, with close to two-thirds of that sum being devoted to the operations side of exploitation. The Agency would then be left with no resources with which to enter into new fields of manned space activity.

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In this connection, the last paragraph of Resolution No.2 adopted by ministers assembled at the ESA Council meeting at Brussels on 12 May 1999 reads as follows: "INVITES the Director General to identify and propose the best conditions and structures for promoting efficient and effective operation and utilisation of the various infrastructure elements such as the International Space Station and launchers developed by Agency programmes, and in particular to examine the scope for industrialising exploitation of the ISS, and submit a corresponding proposal to Council by March 2000 and STRESSES the need to execute operations and utilisation activities in partnership with other European entities, such as the European Commission, or with industry, commercial users and commercial operators and to involve the various user programmes of the Agency in those activities.

Undoubtedly, the wealth of literature produced by the numerous forums that have considered various aspects of commercialisation of the ISS will be a good point of departure for ESA's own deliberation on the subject. Two aspects will be examined: (a) how to succeed in the transfer to the private sector of the largest possible portion of the operations side of ISS exploitation, from mission planning and maintenance to transport, communications and training, on the understanding that the Partner States and ESA retain their overall responsibilities under the ISS agreements, and (b) how to use a significant portion of ESA's ISS utilisation rights for development of new products and services by the private sector ranging, for example, from pharmaceutical companies and telecommunications firms to the entertainment industry and advertising agencies, through an appropriate marketing effort. Privatisation of operations could be justified only if, as expected, private companies are able to provide comparable levels of service and technical sophistication at a much lower cost. Before the Cooperating Agencies could envisage recouping some of the public's investment in the development of the ISS, their objective will be to recoup the costs directly attributable to use of the ISS facilities, then those related to maintenance of the infrastructure, referred to as "fixed cost" in the ESA programme.<sup>2</sup>

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In an article of 15 December 1998 published on the Internet by ABC News and entitled "ISS, Brought to You By", Peter N. Spotts lists the following obstacles to be cleared before commercialisation could be successful: (a) prohibitive launch costs, (b) too few flights and unacceptable lead time between applying for a flight and launch, (c) the lack of a basic price list for Space Station activities, as well as a central clearing house for proposals from the private sector.

### Legal aspects of commercialisation of ISS utilisation

From a legal standpoint, many questions will have to be examined before proposals for commercialisation of a significant share of the European Partner's ISS utilisation rights are formulated. First, there is a need to see how this relates to the current opening being made in ESA towards a commercial approach and if ISS commercialisation could be part of this exercise. To illustrate this opening, it is recalled that the new ESA industrial policy, which will be definitely in place by mid-2001 at the latest, calls for (a) special initiatives to support the Small and Medium-sized Enterprises (SMEs), (b) the establishment of public/private partnerships, and (c) an emphasis put on competitiveness in the Agency's dealings with industry. In addition, Council has decided to authorise ESOC, the ESA establishment located in Darmstadt, to market its satellite operation and control services, under certain conditions. It is generally assumed at this stage, since nobody has precisely challenged this point, that the ESA Convention is flexible enough to accommodate new practices for carrying out the Agency's activities, even those borrowed from a commercial environment, provided that detailed rules be adopted by Council and the competent Agency delegate bodies.

Second, there is a need to determine if the World Trade Organisation's rules have any impact on commercialisation of ISS utilisation in Europe, in particular with regard to the European Union's (E.U.) particular responsibilities in this field. At the European level, the question whether or not ESA's project to commercialise part of its share of ISS utilisation, and the manner it wishes to carry out this project, are compatible with E.U. rules applicable to the commercial field, for example competition rules, State aids, anti-trust and public procurement rules, is

worth serious consideration. All the above is to be seen in the context of an explicit delegation agreed by the European Partner States, of which 9 out of 11 are E.U. Member States, in a multilateral intergovernmental agreement (the IGA), to delegate to ESA exercise of their rights and discharge of their obligations related to Space Station Cooperation.

Finally, it would be useful to see how much additional harmonisation is required among the Cooperating Agencies, formally, through the development of new written rules, or otherwise, on the rules governing commercialisation of ISS utilisation, so as to avoid that any given partner enters into commercial practices which would be detrimental to the interests of the others. In this connection, it is recalled that Article 12 of the IGA, which is the most explicit commercial rule already included in an ISS agreement, provides that a Partner offering space transportation services shall not practice a discriminatory pricing policy among the other Partners, although this would leave open the possibility for a Partner to apply a more favorable pricing policy to its own users.

### ISS Utilisation by the European Partner

A part of the development programme decided upon in October 1995 and currently being implemented is devoted to preparations for European utilisation of the Space Station. In this connection, ESA has already issued "Announcements of Opportunity" (AOs) addressed to potential European ISS users in different fields of research and development for the purpose of collecting proposals for experiments to take place on the ISS. Since utilisation rights will not formally start accruing to ESA until the Columbus Laboratory is verified in orbit, an event currently scheduled for 2004, in January 1997 ESA concluded with NASA a

barter arrangement that will provide ESA users with utilisation opportunities as early as 2001 and 2002, on board the U.S. laboratory, in exchange for the provision by ESA of specialised laboratory equipment.

It has already been decided that European utilisation of the ISS will be organised in consecutive phases, so as to allow for necessary adjustments due to changes in the programme, the need to inject some flexibility into the actual implementation, experience gained and promotional aspects. The first utilisation phase will be based on the early utilisation opportunities secured from NASA as just mentioned. An annual European utilisation plan will be submitted for approval to the Manned Space Programme Board, the ESA delegate body in charge of manned programmes. This plan, covering the totality of the share of ISS utilisation accruing to the European Partner, will be prepared by a recently created working and advisory body called the European Utilisation Board (the EUB); this preparation will include a review of proposals by experts in the field and prioritisation of proposals according to a number of recognised criteria.

More detailed utilisation rules will be developed in the framework of ESA over the coming years so as to regulate the specific conditions for user access, including access by space programmes carried out by individual ESA Member States, and third-party users, which comprise industrial and commercial users. These rules will also address such matters as: (a) the allocation of resources to different disciplines among the various user categories, (b) the procedure for issuing Announcements of Opportunities, (c) the criteria to be applied in the selection of facilities, experiments and investigations aboard the ISS, (d) the means of protecting the intellectual property rights of the different categories of users, (e) the



information and data access policy and (f) the charging policy to be applied to users originating from ESA Member States other than those participating in the programme and to third parties. Finally, ESA will need to ensure the coordination of the European utilisation plan with those of the other Cooperating Agencies, consistent with applicable MOU procedures.

### Arrangements between the users and the Cooperating Agencies

As we have seen, the IGA and MOUs have established the broad framework for the basic rules which Partner States have agreed to apply to all Space Station-related activities, including utilisation activities. However, one could say that this legal framework is fairly general and permissive and, except for two elements mentioned below, does not impose any specific condition to the Cooperating Agencies in their dealings with potential users, in particular in relation to the protection of these users' intellectual property rights. In dealing with potential users of Space Station facilities, the interested Cooperating Agency shall include in the corresponding contractual arrangements (a) the cross-waiver of liability outlined in Article 16 of the IGA so as to ensure, on the basis of reciprocity, that the user is protected against claims that could be presented by the other Space Station Partners or their respective related entities,<sup>3</sup> and (b) an explicit obligation for the user to provide the Cooperating Agency with sufficient data on the payload or experiment it intends to provide so that the Agency will be able to discharge its own obligations towards the partnership with regard to that

payload or experiment, including those related to integration and safety and the determination related to the use of the ISS for peaceful purposes.

As far as protection of Space Station users' intellectual property rights is concerned, it should be mentioned that Article 19 of the IGA contains rules and procedures, related to markings, to protect against any retransfer to third parties of any data or goods which a Cooperating Agency is obligated to provide to another Agency if such data or goods are protected for proprietary or export control purposes.

Also, Article 21 of the IGA, on Intellectual Property, establishes that patent laws of the Partner State having provided the flight element in which an invention has taken place shall apply to the patenting of that invention and also establishes a number of assumptions in case of claims, before a European jurisdiction, for patent infringement; these rules are very general, and essentially procedural, and do not affect the nature of the arrangements that can be made between a Cooperating Agency and its sponsored user for the sharing of benefits accruing from an invention resulting from Space Station work. It can be assumed that in most instances the invention resulting from the experiment will be identified or made from raw data after the experiment or payload is returned to Earth. Therefore, the invention will be patented in accordance with the rules applicable in the corresponding State.

### Conclusions

The rules established for Space Station cooperation will contribute to a certain emancipation - from a legal standpoint and compared with the current situation in which only the United States and Russia have the technical means and expertise to send a

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This, however, shall not prejudice the liability regime to be negotiated between the user and the sponsoring Cooperating Agency, although there also a cross-waiver of liability seems to be the relevant approach.

human being into outer space - of the Cooperating Agencies of Europe, Japan and Canada in their manned space activities. This emancipation will have a beneficial impact on all aspects of these activities. The development of Space Station rules will be a challenging task for the European Partner States, in particular because it calls for an effort of harmonisation between their national laws and regulations applicable to one aspect or another of Space Station cooperation.

As with almost all aspects of Space Station cooperation, more work lies ahead for the Cooperating Agencies after the signature of the new Space Station Agreements in January 1998. In particular, the Code of Conduct for the astronauts provided for in Article 11 of the IGA, which is not technically an implementing arrangement but could be seen as having a legal status somewhat similar to that of the IGA and the MOUs, is the most urgently needed document, and also a very complex one, yet to be developed by the Partners. In addition to the forthcoming negotiations between the Cooperating Agencies on various legal instruments called for in the IGA and the MOUs, these Agencies will have to develop individually not only their detailed utilisation rules but also their own approach, and the corresponding policies and rules, for proceeding with what has been referred to as the industrialisation of the exploitation of the ISS. This expression applies to a combination of privatisation of the bulk of ISS operations and commercialisation of a significant part of the available utilisation capacity offered by the Station.