The Space Station Cooperation Framework

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Introduction

On 29 January 1998 in Washington, the representatives of fifteen States - the United States, Russia, Japan, Canada and eleven ESA Member States - signed an Inter-Governmental Agreement (referred to as the IGA) concerning cooperation on the civil International Space Station. This Agreement not only formalised Russia's integration into the partnership, but also confirmed major changes in the Partners' contributions and a dramatic evolution of the rules put in place for this cooperation. On the same occasion, the head of NASA and the heads of the Russian Space Agency (RSA), ESA and the Canadian Space Agency signed Memoranda of Understanding (MOUs) containing detailed provisions for the implementation of Space Station cooperation.

International cooperation on Space Station started as a result of an invitation to friends and allies of the United States, formulated in January 1984 by President Ronald Reagan, to participate in the development and use of a permanently manned Space Station. This cooperation was formalised by the signing of a first series of international agreements on 29 September 1988. The cooperative framework established by those agreements required major restructuring because of a significant redesign of the US Space Station programme ordered by President Bill Clinton on his arrival at the White House at the beginning of 1993, and the subsequent invitation made to Russia by the original Partners to become a major player in the project.

Whilst it was originally envisaged that a fourth similarly worded MOU with the Japanese cooperating Agency would be signed only after ratification of the new IGA by the Japanese Diete, NASA and the Japanese Government, representing a series of Japanese agencies charged with different aspects of the cooperation, changed their approach and signed their MOU on 24 February 1998, thus enabling the Diete to examine this MOU together with the IGA.

The signature ceremony of 29 January 1998, which was the result of more than four years of hard-pressed bilateral and multilateral negotiations, could be characterised as a major milestone in the international partnership. 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 of the international programme made up by the Partners' combined contributions.

The Space Station Agreements

The most important influence in the shaping of all aspects of Space Station cooperation is the strong leading role of the United States in the programme from the outset. The Space Station started out as a US programme to be executed by NASA at the end of the 1970s. It acquired an international dimension for the first time with the conclusion in 1985 of three MOUs for the conducting of parallel detailed definition and preliminary design studies on the Space Station. These MOUs, dealing with what are commonly referred to as 'Phase-B' activities, were concluded between NASA and ESA, NASA and the Japanese Government, and NASA and the Canadian Ministry of State for Science and Technology (MOSST).

One year later, negotiations started on the legal framework that would apply for the full development (Phase-C/D) and exploitation (Phase-E, combining operation and utilisation) of the Space Station. Because of the expected 30-year duration (later revised to 15 years) of this project and the corresponding multi-billion-dollar envelope, it was decided not to limit the legal instruments to Agency-level MOUs, but to involve those States wishing to participate in such a project through the conclusion of an international agreement - the Space Station Inter-Governmental Agreement (IGA) - setting out the general principles for carrying out this cooperation, including those governing the parties' conduct in outer space. The IGA establishes 'a long-term international co-operative framework among the Partners, on the basis of genuine partnership, for the detailed design, development, operation, and

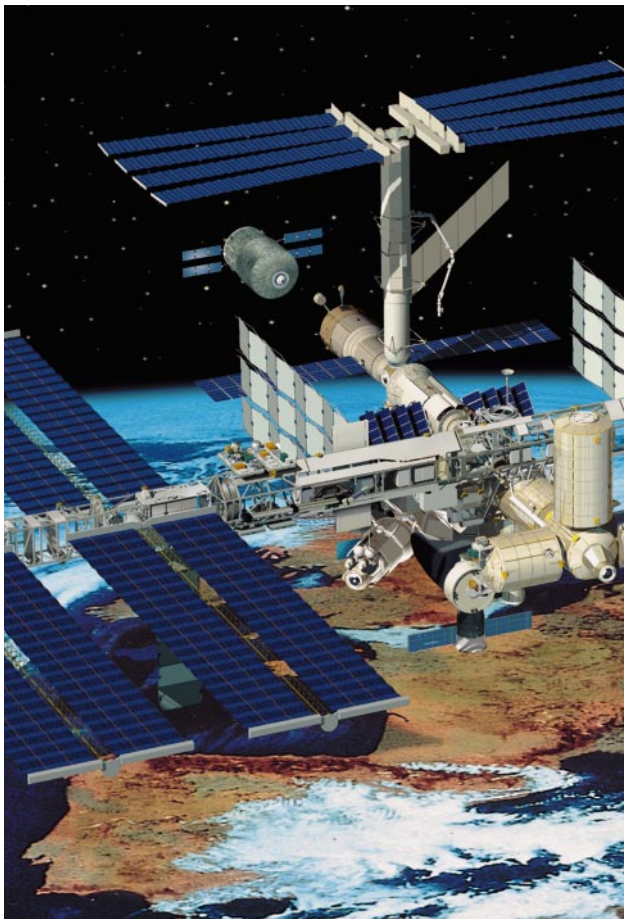


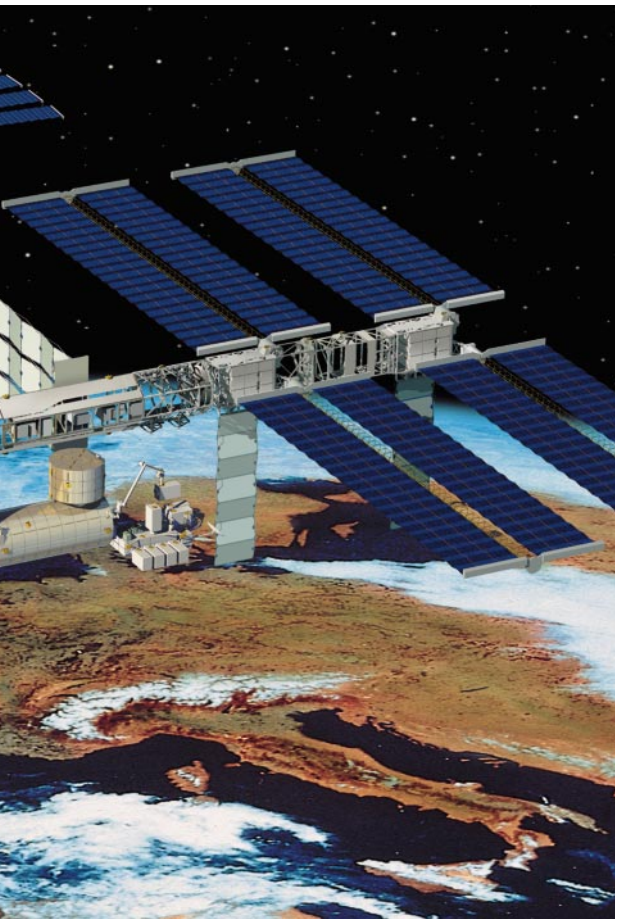
Figure 1. The International Space Station (artist's impression by D. Ducros)

utilisation 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 that is quite innovative in terms of international law, and which is of particular importance for Europe: there were twelve original Partner States, but they represented only four Partners in the project, the nine (now eleven) European States being grouped, for the purposes of conducting this cooperation, under the umbrella designation of the 'European Partner'.

An Arrangement for the application of the IGA pending its entry into force was also signed on 29 September 1988 (and again on 29 January 1998) by the IGA signatories. The text of the Arrangement merely expressed the intention of the States concerned to abide by the applicable provisions of the IGA until the time of its entry into force, provided that such provisions were compatible with their domestic legal systems. In practical terms, this Arrangement would almost exclusively concern the application of provisions pertaining to liability, the exchange of data and goods, the issuance of appropriate documentation to liaison personnel, and customs matters, i.e. those matters that could be implemented on Earth.

In September 1993, shortly after the conclusion of the redesign process that confirmed the passage from the original Space Station 'Freedom' to a slimmer Space Station 'Alpha', the United States decided to involve Russia in the programme. This decision was taken for a number of reasons, ranging from the desire to benefit from Russia's wealth of experience in human space flight to foreign-policy objectives. Since the IGA and the MOUs do not contain specific clauses that would allow an expansion of the partnership through a simple accession of new States to the Space Station Agreements, there was a need for the Partners to agree on an acceptable procedure to provide for the inclusion of Russia in the partnership. The absence of an accession clause from which States other than Partner States (i.e. signatories of the IGA) could benefit is easily explainable, since Space Station cooperation is a closed partnership in which each Partner's contribution has to be integrated coherently into the Space Station itself. After consultations among the Parties to the IGA, the Partners invited Russia on 6 December 1993 to join the partnership and initiate negotiations within the framework established by the Space Station Agreements. Russia accepted the invitation on 17 December 1993 and negotiations started in April 1994 after the Partners and Russia had discussed a number of basic rules for facilitating the conduct of these negotiations.

It should be stressed that Article 26 of the 1988 IGA provided that 'this Agreement may be amended by written agreement of the Partner States for which this Agreement has entered into force'. This would have limited the negotiations for amending the IGA to the United States and Japan, since the 1988 IGA was in force for those two Partner States only. For obvious reasons, this limitation imposed by Article 26 did not prevent the start of negotiations between the four original Partners and Russia, in April 1994, and it took a dozen one-week rounds of negotiations over a period of two and a half years to reach an understanding among all the interested Parties on the text of a new IGA. The negotiations started on the basis that the 1988 IGA should be amended through a Protocol, adopting a minimalist approach under which only those changes strictly necessary to accommodate Russia's arrival in the partnership would be made, so as to ensure a certain continuity in the legal instruments. However, halfway through the negotiations, in view of the scope of the amendments being considered, the negotiating teams recommended that the original IGA be replaced by a new one, the Protocol route being judged impracticable.



From mid-1994 to mid-1997, NASA and the RSA also drew up an MOU, similar in structure to those concluded by the other Cooperating Agencies in 1988, which were amended in parallel to take into account all of the new characteristics of the programme. 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.

The original Partners could justify their acceptance of a number of IGA and MOU provisions confirming the lead role of the United States in the international programme not only because of the overwhelming importance of its contribution to the programme, but mainly because of the need to provide for a clear line of command and control in this endeavour. Throughout the negotiation process, on the strength of its long experience of long-duration human space flight, Russia pressed for recognition in the Space Station Agreements of a role that would reflect both the qualitative and quantitative importance of its contributions to the programme. In the re-negotiation of the IGA, this overarching Russian requirement was a factor as important as the US leadership had been during the original IGA negotiations of 1986-1988 in establishing a particular balance between the Partners, this being accomplished without prejudice to the genuine partnership concept. As a result of the most recent negotiations, the lead role of the United States, and almost all of its original responsibilities in the programme's overall management and coordination, have been confirmed in the IGA. However, a large number of changes were made 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 that specific activities, including the periodical correction of the orbit of the Station using the ESA-developed Automated Transfer Vehicle (ATV) in conjunction with Ariane-5, be recognised.

The new IGA is still consistent with the closed partnership approach. Any expansion of the partnership to include new Partner States, or any significant evolution of the international programme to involve the Partners in new missions, will require fresh negotiations among the Partners, a process that has proved to be time-consuming in the past.

The multilateral Inter-Governmental Agreement

Because of its lead role in the project, the United States decided that the State-level commitments related to Space Station cooperation had to be registered through a series of bilateral instruments to which it would be a party. It was only halfway into the original IGA negotiations, in the summer of 1987, that the United States agreed with the other States involved in the negotiations that the IGA should be a multilateral instrument.

Furthermore, in view of the relative urgency of the matter dictated by programmatic imperatives, the US negotiators also decided that the IGA would be an 'Executive Agreement' which, under US constitutional practice, does not require ratification by the Senate (the IGA still requiring each Partner State to deposit its instruments of ratification), thus being a more expeditious process. Following the Executive Agreement route should not in itself affect the nature of the commitment made by the US Government to the other Parties to the IGA. This IGA still generated rights and obligations for its signatories under international law, as would any other type of international agreement. However, this course of action somewhat limited the room for manoeuvre available to the US negotiators, as they had to make sure that commitments entered into through the IGA were always consistent with the relevant

provisions of US law, or that there was a possibility for the United States to apply its law when discharging a number of its obligations. In other words, the US negotiators were not in a position to agree with language that would require changes to US laws. The requirement spelt out in Article 15 of the IGA that financial obligations are subject to a Partner's funding procedures and the availability of appropriated funds, which is a rarity in international law, was also imposed as a result of the application of US laws making such a requirement mandatory in certain circumstances. Because of the need to exercise caution in the drafting of the IGA, one would assume that the IGA would also be consistent with the current applicable laws and regulations of all the Partner States. However, this may not always be the case and this makes it worthwhile to look briefly into the matter of ratification.

Ratification of the IGA

The 1988 IGA provided that the Agreement would enter into force following its ratification by the United States and another Partner. Japan was the first Partner to deposit its instrument of ratification, in 1989, and the IGA entered into force in January 1992 upon ratification by the United States. Although seven European Partner States ratified the IGA between 1989 and 1992, the Agreement never entered into force for the European Partner as a whole - nor for the European States individually for that matter - because the specific condition expressed in the IGA for this purpose (that the aggregate of the contributions of the States having ratified should represent 80% of the ESA Columbus Programme's financial envelope) was never fulfilled. Canada did not deposit its instrument of ratification of the 1988 IGA essentially because of delays encountered in the preparation and presentation to Parliament of the required legislation. With the new Agreement signed on 29 January 1998, the ratification process has to be restarted on the basis of new conditions: this IGA will enter into force once the instruments of ratification of the United States, Russia and Japan are deposited, at which time it will replace the 1988 IGA. Thereafter, the IGA will enter into force for the European Partner as a whole after its ratification by four European Partner States and following receipt by the Depository of a formal notification to this effect by the Chairman of the ESA Council.

Before depositing its instrument of ratification, a State must follow an internal procedure, as dictated by its own constitutional practice, to make sure that the international obligations outlined in the Agreement are transposed into domestic law, or at least are not incompatible with domestic law. For example, Germany has incorporated the whole text of the 1988 IGA into its national laws and, as a consequence, any provision in existing German laws that was not compatible with the IGA would be deemed inapplicable for the purpose of Space Station cooperation. At the other extreme, the United Kingdom deposited its instrument of ratification without any prior regulatory or legislative action. It was envisaged that the Department of Industry would be responsible for drafting the necessary amendments to existing laws and regulations before the European pressurised laboratory was launched. These amendments will not be all encompassing, but will target only those provisions that are incompatible with Space Station cooperation.

The Memoranda of Understanding

As a second layer of international instruments, four bilateral MOUs concluded between NASA and the Cooperating Agencies of the European Partner and Canada respectively, on 29 January 1998, and NASA and the Japanese Government on 24 February 1998 will enter into force only after the Parties notify each other that their internal procedures required for this purpose have been completed. The four new MOUs concern the detailed design, development and operation of a manned civil Space Station. An MOU is generally not considered to be an agreement generating rights and obligations in 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 such an MOU if, for example, a party to it failed to discharge its obligations appropriately. The MOU is considered to be a type of arrangement that 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 agreements, as an exception to the general practice in this field.

It is interesting to note that the multilateral bodies to be established for the management of the 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 Station's operation and utilisation, are provided for in the MOUs, which are bilateral instruments between NASA and each of the other Cooperating Agencies. The pattern of cooperation put in place through the MOUs has been referred to as the 'hub and spoke' approach, similar to the

pattern adopted for air transport in a number of countries. In this particular instance, NASA is the hub and all of the other cooperating agencies are 'spokes': the consequence of such a pattern is, for example, that a 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 party to all of the MOUs.

Mention should be made of the third layer of international instruments represented by the 'implementing arrangements' referred to in Article 4 of the IGA. These arrangements are subject to the MOUs and thus NASA should always be a party to an implementing arrangement. The IGA and the four recently-signed MOUs contain numerous provisions calling for the conclusion of implementing arrangements, and in that sense the IGA and MOUs constitute only the tip of the iceberg of the legal instruments that need to be put in place by the Partner States and the Cooperating Agencies. 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 can be concluded among Partners for the purpose of furthering Space Station cooperation. One example of other agreements is the MOU concluded in 1990 (and amended in 1997) between NASA and the Italian Space Agency (ASI) for the development by ASI of the Mini Pressurised Logistics Module (MPLM), which under the MOU is a NASA-provided element to the Space Station. Another example of an arrangement not provided for in Article 4.2 of the 1988 IGA, which is related to Russia's arrival in the partnership as described below, is an arrangement signed in 1996 between ESA and the RSA for the delivery by ESA of a European Robotic Arm (ERA) to be used on the Russian segment of the Space Station.

Legal regime governing Space Station cooperation

A number of Articles in the IGA have been designated as constituting the legal regime of the cooperation. The IGA and the other instruments signed on 29 January 1998 establish the basic rules for operation of the 'genuine partnership' and provide a list of each Partner's contributions.The IGA states that this cooperation should be carried out in accordance with international law, a reference encompassing not only the rules elaborated in the various conventions listed in the IGA preamble, but also the rules generated by all other recognised sources of international law.

It should be stressed that the drafters of the IGA have not outlined a set of homogeneous rules that would apply only in or on the Space Station, but rather, in dealing with a number of specific legal issues, they have tried to establish

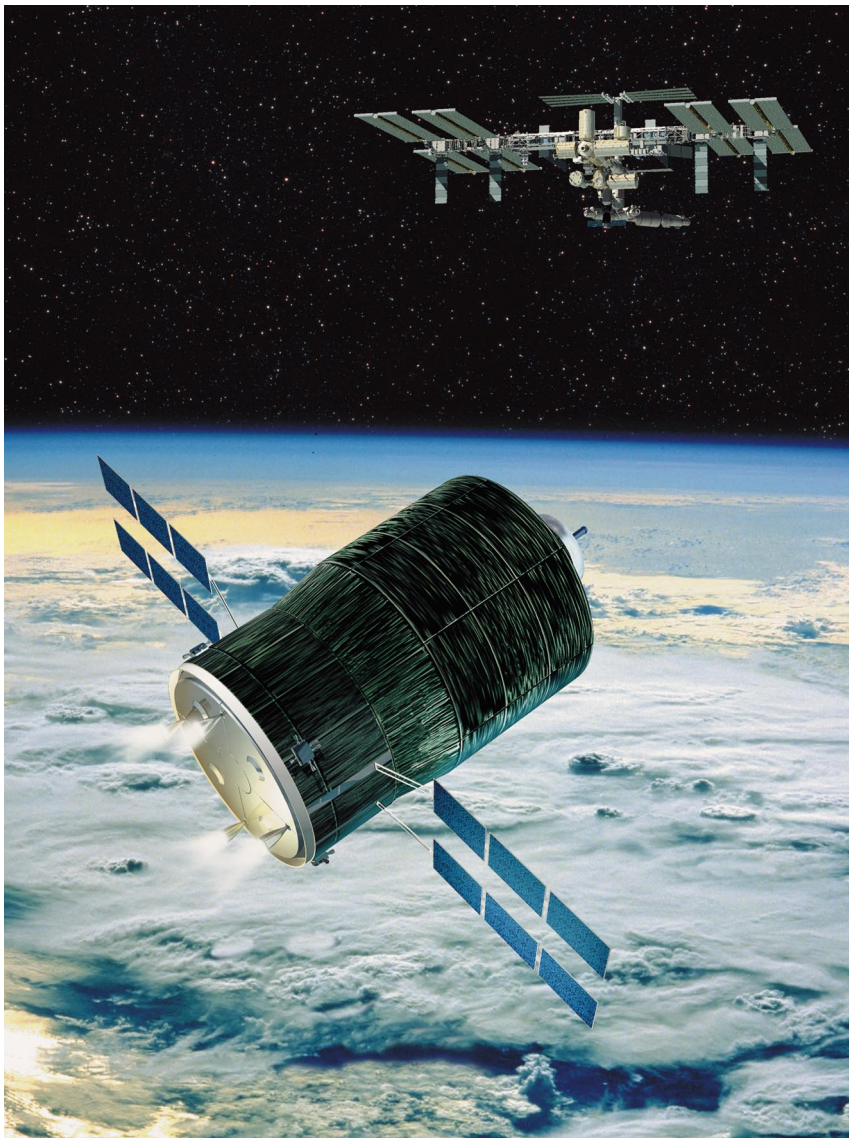


Figure 2. The Automated Transfer Vehicle (ATV) (artist's impression by D. Ducros)

the necessary links between: (a) the different parts of the Station, these being the flight elements provided by each of the Partners, and the personnel, and (b) the jurisdiction exercised by the Partners on their own territory. In other words, the set of rules constituting the legal regime is aimed generally at recognising the jurisdiction of the Partner States' courts and consequently allowing for the application of substantive national law in such areas as criminal matters, civil matters, including liability issues, and administrative matters, which cover among other things the protection of intellectual property rights and the exchange of data and goods. It goes without saying that such an approach may generate conflicts of jurisdiction in particular instances, but the IGA's drafters were confident that they would be resolved through the application of existing

rules and procedures developed for other types of human activity.

At the heart of the legal regime set up for Space Station cooperation, Article-5 establishes that 'each Partner shall retain jurisdiction and control over the elements it registers in accordance with paragraph 1 above and over personnel in or on the Space Station who are its nationals'. It was essential for the drafters of the IGA to establish such a basis for jurisdiction because a number of States participating in this project which adopt a very restrictive attitude to the extraterritorial application of their laws, notably Canada, needed to invoke the specific provisions of an international agreement to justify the extension of their national jurisdiction to the flight elements they would be providing. At the other end of the spectrum, the United States felt that this jurisdictional basis would be needed in order to make room for certain exceptions - those resulting from negotiations with the other Partner States - to the blanket application of United States' jurisdiction over the Space Station.

A potential problem raised by the current wording of Article 5, for which no solution is being offered at this point, but which is likely to be considered further by the Partners concerned through appropriate legal means if and when it materialises, is the exercising of jurisdiction over personnel provided by one of the Partners who are not nationals of the corresponding Partner State or who are nationals of more than one Partner. Also relevant in this context is the distinction between members of the Space Station crew complement and other astronauts visiting the Station for a limited time, for example in a capsule docked with the Station during a crew rotation, when they will be subject to the exercise of jurisdiction provided for in Article 5. Past experience suggests that these visitors will quite often not be nationals of the Partner States that send them to the Space Station.

The utilisation of the Space Station

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

'Utilisation rights are derived from Partner provision of user elements, infrastructure elements, or both. Any Partner that provides a Space Station user element 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 these accommodations is expressed in fixed percentages in the MOUs. To be more precise, ESA will retain 51% of the user accommodations on its European pressurised laboratory, and Japan's Cooperating Agency will retain the use of 51% of the user accommodations on its Japanese Experiments Module (JEM). The remaining 49% shares of user accommodation in the COF and the 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 CSA which is providing the Remote Manipulator System (RMS) as an infrastructure element.

A second step in the understanding of the principles applicable to the Station's utilisation is an examination of the approach taken in the allocation of Space Station resources. Firstly, 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 Alpha segment composed of elements provided by the other four Partners. The Partners have nevertheless laid strong emphasis on the need for the closest possible adherence to the philosophy of an integrated International Space Station and the rules underpinning that philosophy in the Space Station Agreements.

By way of illustration, 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 portion of the Space Station as a whole. This means that the percentage agreed, on the basis of 100% within the Alpha segment, between the founding Partners could be retained for the purpose of sharing available resources. The MOUs will provide for 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 Alpha segment.

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 utilisation resources allocated to it ...'

In addition to the above-mentioned common system operations cost responsibilities, each Partner will also be financially responsible for costs or activities attributed to operating and sustaining the functional performance of the flight and ground elements it provides and the use of its user accommodations. To give an idea of the magnitude of the costs to be borne by each Partner, it should be recalled that ESA estimated at the end of 1995, on the understanding that such an estimate would not prejudge the actual amount to be spent, that the total exploitation costs over a period of 10.5 years would be of the same order of magnitude as the total development costs of its contributions, three quarters of that sum being devoted to discharging common system operations responsibilities. This explains the efforts put by the European Partner into persuading its Partners of the need to lay down transparent financial rules for the cooperation.

On the question of crews, an understanding has been reached whereby the crew complement for the Station as a whole would be raised to seven at the beginning of the exploitation phase, which would require the development by NASA of a rescue vehicle (ACRV) able to accommodate four people, in addition to the Russian Soyuz capability for returning three people to Earth. Of the seven crew members, Russia would be able to claim three to carry out all maintenance and utilisation operations required in and on the Russian segment, while the other Partners would share the other four places.

Financial rules applicable to the cooperation and their impact on the mixed fleet of launchers

A significant interest of the European Partner in the IGA and MOU negotiation process, which extended from mid-1994 until the end of 1996, was of a financial nature and resulted from directives and guidelines given by the

Figure 3. Lift-off the second Ariane-5 test flight (502)

participants in the ESA Council Meeting at Ministerial Level held in Granada (E) in November 1992. The European Partner therefore proposed to amend Article 15 of the IGA on Funding with a view to formalising two concepts: (a) the offset concept, according to which a Partner would be able to meet its share of the Station's common system operations costs by supplying goods and services produced by itself, and (b) the concept of the 'not-to exceed figure', which would involve the establishment of procedures administered by the management bodies for containing the common system operations costs within predetermined and agreed levels, thus imposing a ceiling on these costs. This would enable a Partner to know the full extent of its commitment sufficiently in advance and to plan its expenditure accordingly.

These two concepts are linked to agreement among all the Partners on the setting-up of a fleet of spacecraft supplied by four of the five Partners to meet all of the Station's transport requirements.This change, which was unavoidable with Russia's arrival in the partnership, represents a significant departure from the situation outlined in the IGA signed in 1988, where the US Space Shuttle was the only space transportation system to be used for the cooperation. With Ariane-5 operating in conjunction with the ATV, the European Partner is in a position to discharge its share of common costs in a worthwhile manner, given that space transportation is going to account for some 80% of the Station's common operations costs. Much of the discussion between the European negotiators and their counterparts has centred on the type of assurance that the European Partner could be given at this stage by the United States and the other Partners to the effect that Ariane-5/ATV, deployed for Station-orbit reboost missions for instance, and other European services would indeed be used to offset the whole of Europe's share of common system operations responsibilities, so that cooperation could be established on the basis of no exchange of funds between the European Partner and its Partners.

Conclusion

The rules established for Space Station cooperation will undoubtedly 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 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, such as the selection of their astronauts, their training, their assignment to specific flight crew and missions, and the performance of the missions themselves, all of which is to be done in accordance with criteria, rules and standards that they themselves will set and apply to their own personnel, which should obviously meet or exceed Space Station requirements.

As with almost all aspects of Space Station cooperation, more work lies ahead for the Cooperating Agencies after the signing of the new Space Station Agreements. A reader of the IGA and the MOUs might be surprised at the number and scope of the implementing arrangements that remain to be negotiated, concluded and implemented. The Code of Conduct for the astronauts, 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 pursuant to Article 11 of the IGA. The first elements of the Space Station are scheduled to be launched mid-1998 and the Code should be in place between NASA and the RKA before a first Space Station crew is sent up at the beginning of 1999.

The development of Space Station rules will be a challenging task for the European Partner States. It calls for an effort of harmonisation between their national laws and regulations applicable to one aspect or another of Space Station cooperation. This effort will doubtless be pursued in parallel with the development of the implementing arrangements. esa