INTERNATIONAL COOPERATION AND COMPETITION IN SPACE: A CURRENT PERSPECTIVE +

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From its inception, the United States civilian space program has been conducted with a high degree of international involvement. The 1958 National Aeronautics and Space Act (NASA)[1] specifically charges NASA to conduct its activities "so as to contribute materially to . . . [c]ooperation by the United States with other nations and groups of nations . . . ."[2] In fulfillment of this mandate, and in pursuit of its own objectives, NASA has entered into over 1,000 agreements with over 100 countries. These relationships have covered a full spectrum of collaborative endeavors, ranging from major space hardware exchanges to the sharing of mission data among scientists around the globe. Two particularly visible examples of international cooperation associated with the Space Shuttle are the Remote Manipulator System (RMS) built by Canada at a cost of about $100 million and the Spacelab system produced by the European Space Agency (ESA) for around $1 billion. Today, virtually every major NASA program incorporates international contributions.

Benefits of International Involvement

It is important to emphasize that NASA's commitment to international cooperation is grounded solidly in self-interest. NASA enters into joint programs only after ascertaining that the United States' space program will benefit from each undertaking and assumes that its prospective partners do likewise. The advantages accruing to the United States from its international space agreements are significant.

Foreign contributions to NASA programs reduce the costs of these programs to the United States and/or permit a more expansive effort. Financial benefits already realized by NASA through international cooperation are substantial; the value of foreign contributions to NASA programs to date exceeds $2 billion.

The United States gains access to first-class foreign science and technology relevant to its programs. In some cases, foreign assistance, such as through NASA's worldwide tracking system, has been essential to the success of United States missions.

International involvement helps to demonstrate support for proposed programs, easing their acceptance and helping to sustain subsequent domestic political and financial sustenance during their multi-year development phase.

International space collaboration also serves broader national foreign policy goals aimed at retaining positive, productive relationships with the many countries, both developed and developing, which are benefiting from the space programs.

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+ The views expressed are those of the author and not necessarily those of NASA or of any organization with which he is connected.

[1]National Aeronautics and Space Act of 1958, Pub. L. No. 85-568, 72 stat. 426 (1958).

[2]National Aeronautics and Space Act, § 102(c)(7), 72 stat. at 427.

On this last point, NASA's history of international cooperation has afforded the United States freedom of action in programs like Landsat which might otherwise have been viewed with suspicion abroad. Foreign experience in utilizing valuable worldwide Landsat data has enhanced international acceptance of global remote sensing programs, including those programs contributing to world peacekeeping. Similarly, widespread international participation in United States civil programs underscores the essential openness of these programs and underscores the United States' commitment to the peaceful, free use of outer space by all nations.

The Growth of International Competition

A discussion of international space cooperation would not be complete without countervailing reference to increasing international competition. Growing capabilities and expenditures have produced a group of mature foreign space powers, capable of competing effectively with United States firms for worldwide business.

Many foreign space budgets rose steadily throughout the 1970s, although there has been some leveling off recently as other countries experience a period of fiscal restraint similar to the United States situation. However, the budgets have been maintained at fairly high levels compared to the past. Furthermore, recent foreign budgets have shown an increased emphasis on areas of potential commercial payoff: communications, remote sensing and launch vehicle development.

Concrete examples of this trend are easy to find. ESA has successfully completed the testing of its Ariane launch vehicle, and the first operational flight is scheduled for later this year.[3] ESA recently approved funding to further upgrade the Ariane vehicle, with plans to develop and test the Ariane 4 vehicle by late 1985.[4] Several countries, most notably France and Japan, are developing land and ocean remote sensing satellites. Communications satellites have been developed and are being sold by a number of foreign firms, and both ESA and Japan are emphasizing experimental work in the commercially promising 30/20 GHz band.

This competition should come as no surprise. The potential market for space hardware and services is large and technically challenging. Indeed, it would be surprising if the United States leadership in this area was not challenged. However, industry-to-government relationships in many other countries differ significantly from the United States' practice. Although the private sector abroad is active, foreign government intervention is high. In some countries, a close relationship between government and industry, particularly in high technology areas, is traditional. Many governments abroad support their space industry not only through research and development (R&D) funding, but also by price subsidization and financing assistance, development of attractive package deals, and creation of quasi-governmental marketing organizations.

For example, the Europeans have established Arianespace, a semi-private corporation, with extensive French government involvement, to market Ariane launch services. Arianespace has contracted with Grumman Corporation to be its United States Marketing agent. Arianespace's marketing strategy combines aggressive salesmanship

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[3] 10 J. Space L. 78 (1982).

[4] Joint ESA/CNES Press Release, Feb. 2, 1982, Info. No. 5.

with attractive prices, made even more attractive by government supported financing terms.

A similar situation is emerging in remote sensing. Here, France has created a largely government-owned corporation called SPOT-Image to market the data products produced by its land remote sensing satellite, SPOT, now scheduled for launch in 1984. In addition to the marketing of SPOT data, SPOT-Image will promote the sale of related French commercial equipment and services. Like Arianespace, SPOT-Image will establish a United States subsidiary to pursue business here.

Besides being inevitable, this competition can be very useful. For example, as the United States moves into the Shuttle operational era, a viable launch alternative like Ariane strongly motivates NASA to monitor closely the efficiency of its launch program. Partly in response to the newly competitive environment, NASA has initiated improvement programs to lower STS production and operating costs, and facilitate user relationships.

Cooperation—What Lies Ahead

It would be unfortunate if a fascination with competition were allowed to divert attention from those areas where international cooperation can continue offering significant benefits. Competition and cooperation are not necessarily mutually exclusive. For example, the same increasing capabilities abroad which foster economic rivalries can also make foreign nations more capable partners.

To reap the benefits of cooperation without jeopardizing the competitive position of United States industry, care must be exercised in selecting, defining and implementing joint programs. Projects leading to the early development of commercially useful technology are not usually open for international participation. In projects where there is foreign involvement, that involvement is structured so as to avoid technology transfer. Generally, foreign participants undertake to provide a discrete piece of the overall project and are then responsible for developing the resulting technology and hardware. Only the minimum amount of technical information necessary to ensure effective interface among the various elements of a project is exchanged. Although concerns are periodically expressed about technology transfer, the facts appear to show that very little significant technology escapes the United States as the result of NASA's cooperative programs.

At the moment, NASA is discussing a number of new cooperative projects with prospective partners. Of these, perhaps the most interesting is the possible development of an earth-orbiting manned space station.

At this point, it is not clear if and when NASA will receive Executive Branch and Congressional approval to move ahead with a space station or exactly what form a station would take. Similarly, whether and to what extent there will be international involvement in the development of a station are open but highly interesting questions. An exploration of how NASA is approaching these questions and the issues they raise can offer some valuable insights into both the complexity and challenge of international cooperation in today's world.

International interest in NASA's space station planning is already high. Representatives from most of the free world's space-faring nations have visited NASA to familiarize themselves with the efforts currently underway and to become acquainted

with what the future might hold. This early involvement is itself rather unique. The more traditional pattern has been for NASA to develop its plans to a rather advanced stage before inviting expressions of foreign interest. While offering some advantages, this historic approach has tended to discourage potential partners and to deprive NASA of the useful contributions others can make to the creative process.

Relatively early discussions are also particularly suited to two key space station objectives. First, the station is not viewed as a "space spectacular," but as a working orbital facility; as such, NASA wishes to gain as much information as possible now about user requirements. Gaining first hand knowledge about how a space station, in one form or another, fits into the prospective worldwide pattern of space utilization is thus an important aspect of NASA's planning activities. Secondly, the very scope and complexity of the space station project argues that foreign participation, should it occur, will need to entail sizable financial and political commitments. The growing technological competence and economic strength found abroad make such commitments feasible. At the same time, it is not unreasonable for others to want to be part of the planning process prior to deciding on whether to join the United States in such an ambitious undertaking.

For NASA's part, the ultimate decision about international participation will turn on the ability to resolve several critical questions. To some extent these questions are present in every cooperative project. The size and unique nature of the space station, however, give them added importance.

1. Can such a major project as a space station be undertaken on an international basis and still be effectively managed?

Management of a project as large as a space station is going to be difficult under any circumstances; adding foreign involvement will complicate the management tasks further. For example, foreign companies cannot be treated as subcontractors to a United States prime contractor. Schedule advances or slips can become delicate issues of diplomacy rather than simple items of project management. To be quite frank, added managerial complexity is one of the factors that tends to come with the territory and must be traded off against the advantages offered by international cooperation.

NASA's record of successful international dealings suggests, however, that the management burdens are not overwhelming. Several principles of operation seem particularly critical here. First, foreign contributions to a space station would need to take, insofar as possible, the form of discrete hardware packages that lend themselves to clean technical and managerial interfaces. Second, the specific responsibilities and obligations of each partner must be clearly defined and documented. Third, control of the overall station design and development should reside in a single "project manager," presumably in this case NASA. Much would depend on the final configuration of the station. A station design incorporating a number of free-flying components or clearly discernible modules will obviously lend itself more readily to diverse management modes than will a single, highly integrated structure.

2. Don't major international space projects just result in technology leakage abroad?

Past NASA international programs have not transferred technology abroad in any unacceptable degree. However, to say that NASA has done a good job in protecting against unwarranted outflows of technology is not the same as saying there is no risk. The potential for technology transfer exists in any cooperative project. Normally, careful steps must be taken on all sides to minimize the risk of undesired transfer. In this regard, it should be emphasized that foreign partners are increasingly concerned about protection of their technology as well. Protection against unwarranted technology transfer is accomplished primarily through insistence that each party to the cooperative project undertake to develop a discrete piece of hardware for which it is fully responsible and for which it has the necessary technological capability. The assessment that each cooperative partner possesses the ability to carry out its obligations without undue assistance from the other parties is an important part of the negotiations underlying any major NASA international project. In part, the growing technical sophistication of many countries abroad acts to lessen the risk that exclusive United States' technology will be lost.

3. Is international involvement consistent with possible military utilization of the space station by the United States?

While use of the space station for certain national security functions can complicate foreign participation, it does not rule it out. In the case of the Space Shuttle, for example, international cooperation and military use have co-existed quite comfortably to date. One can conceive of many designs for a space station which could accommodate a diversity of activities with a minimum of impingement and adequate accessibility of all parties to their areas of interest. Strong expressions of foreign interest in exploring the possibilities of a space station will have the effect of assuring that attention is given to those configurations which make multiple uses of the station possible and productive.

4. What are the quid pro quo for foreign contributions to a space station?

International space cooperation is not a charitable enterprise; countries cooperate because they judge it to be in their interest to do so. In return for helping to defray the cost of developing a space station, other countries will undoubtedly seek tangible benefits for themselves. First and foremost, these benefits must revolve around the opportunities afforded their industries to participate in a high technology project of the first magnitude. The spin-off effects of investments made in the space area are well documented. Beyond this, however, one can conceive of foreign contributions to a space station being directly reciprocated through such mechanisms as priority access to the station and its services and/or discounted prices on related launches or services. The balancing of interests and benefits is always the most difficult and fascinating aspect of international negotiation. The expressions of interest from foreign officials received to date suggest strongly that, in their minds, a sufficient case exists to warrant continuing a serious dialogue.

It is important to re-emphasize that no United States Government commitment to a space station has yet been made. Over the course of coming months, many important

discussions bearing on this nation's next steps in space will be held. An extremely important dimension of these debates will focus on how this country should balance its programs in response to the challenge and the promise from abroad. A space station could emerge as the centerpiece of this national dialogue and, as such, ought to serve as an interesting case study for observers of the space scene everywhere.