

AMERICAN ASTRONAUTICAL SOCIETY  
13TH ANNUAL MEETING  
on  
Commercial Utilization of Space  
Dallas, Texas

PATTERNS OF INTERNATIONAL SPACE APPLICATIONS AND THEIR EXTENSION

by  
Arnold W. Frutkin - B106  
Assistant Administrator  
for International Affairs  
National Aeronautics and Space Administration

AAS 67-146

May 2, 1967

**PUBLIC AFFAIRS / HDQRS**  
**READING FILE**

## Introduction

To date we have had significant experience in the public sector of only two international space applications with commercial portent: -- communications and meteorology. The two are totally different in their early international organizational character and neither has evolved into what might be called permanent form. The communications application has been organized on a direct commercial, profit-seeking but interim basis whose real tests lie ahead. The weather application is essentially a non-profit service, contributed by the U.S. with only indirect commercial interest. It does, however, utilize an international network (the WMO) to distribute data. The motivation for other countries to shoulder more of the metsat load is not particularly clear. Other space applications of commercial significance are in the earliest experimental phase, like mapping and navigation, or lie almost entirely in the future, like earth resource surveys (for the purpose of crop monitoring, fresh water searches, fishing aids, geophysical prospecting, river and harbor control and the like).

In other words, the data for predicting future international formats for commercial space applications are very thin. There is, however, a fair amount of relevant experience to suggest what factors need to be kept in mind in anticipating, organizing or negotiating international arrangements.

\* \* \*

## Existing Interests

The first fact to be faced is that we do not approach the problem of international organization of space applications from scratch. The applications already developed and those which are on the horizon are both extensions of existing commercial interests. It is only the tools which are new -- the direct or indirect use of space technology. The interests which today are concerned with geophysical prospecting or the location of fishing grounds will be among the interests which tomorrow will be concerned with satellite data on these subjects. In

no foreseeable application can international organizations be patterned independently of existing interests -- any more than international arrangements could be made in the comsat field without regard to the existing interests of government PTT's, the ITU, and the commercial carriers. This fact alone must operate as a considerable drag upon flights of international organizational fantasy.

### International Referral

There are some who feel that new social enterprises can be organized with relative ease if only they are put into the hands of the UN, the ITU or similar bodies. There are others who know the frustrations and limitations of such agencies better but who also wish to use them -- not because these bodies have the required scope, expertise, or capability but because they hope that the task itself will generate more scope, expertise and capability in them.

In either case, it is well to remember that referral to international bodies does not in itself provide solutions. It only transfers the problems. The solution remains to be found. Indeed, in many existing international forums, the search for a solution to a limited problem may be gratuitously complicated by extraneous problems peculiar to the bodies themselves.

### Appropriate Forums

Moreover, each international agency has a specific charter, a range of traditional activities and limitations, and a personality of its own. The UN, for example, is a political organization, not an R&D agency. The WMO is engaged principally in information exchanges. The ITU recommends patterns of practice in radio frequency usage. Neither the WMO nor ITU is an operating agency. My point is simply that practical space applications differ and that different applications will require different formats. International organizational formats must be selected like tools -- the right ones for the right jobs.

To illustrate,

-- INTELSAT is an operating agency employing satellites

for direct commercial use and requiring access to ground terminals in the sovereign territory of many states. Clearly, INTELSAT had to bring together operating communications agencies under the direction of their governments for the specific task in hand. Some persons had earlier suggested the ITU for the purpose, but the ITU's charter was totally unsuited and its broad membership inappropriate for the voluntary character which was necessary for INTELSAT's membership at the time.

-- Weather satellite systems are totally different. They can be provided by one or two countries, require no access to others and have no direct commercial tie. Their internationalization is essentially a question of structuring the dissemination of information. Since the WMO is already in this business it serves admirably.

-- Still a third pattern can be imagined for earth resource survey applications. As in the case of weather satellites, the earliest versions of this application are likely to come in the form of government programs which will produce data nationally and internationally for use by anyone who wants it. The domestic utilization of these data will probably be worked out by the cognizant user agencies with their own different clienteles. The global data which the satellites will acquire, we can imagine, will be available to those who want it for their internal use as they see fit, using local or foreign assistance, private or public, as they wish.

The minimum requirements would be (1) Rapid testing and demonstration of the potential of earth resources survey by satellite -- which at this point seems within the scope of U.S. planning and capability; (2) Research by other nations into ground truth for typical areas of interest -- so that they will be able to employ operational satellite data generally in their territories; (3) Necessary training for other nations -- which could be arranged in part with the U.S., in part with any other nation which may have progressed in this area, in part with such specialized agencies as the Food and Agricultural Organization; and (4) Establishment of regional groupings in the developing world -- to permit the funding of ground research and the acquisition of instrumentation and computer resources (for high volume, sophisticated data processing).

For such a program, at this time, it is difficult to see the need, wisdom, or economy in pressing international involvement beyond the specialized agency

service and regional pooling already suggested. This simple concept is possible because we assume in this case that the space segment does not represent a commercial venture in itself, but rather a government service. I make this assumption on the ground that it is unlikely to pay private interests to provide special-purpose, limited-use space segment services in competition with multi-purpose, broad-use government services. The interpretation, application, and exploitation of data may, however, be handled through commercial contractors if this is the preferred manner of proceeding in a given country. Whether the data will be made available at copying cost only or with some pro rata sharing of operational costs for the space segment is hard to predict at this time.

The fundamental point is that each application brings with it its own requirements and opportunities and calls for its own set of international relationships. Blanket solutions do not seem appropriate.

### International Bias

Once the question of organizing a given space application is brought into an international forum, whatever it may be, a basic difference of view must be expected between the few space powers and the majority who are not space powers. A handful of countries will have relevant experience and knowledge. Depending upon the forum, as many as 120 nations will lack both. The practitioners and the nonpractitioners will not have the same understanding of the space programs under discussion, their potential, their cost, their operational requirements, their benefits or their dangers, if any.

In principle, we fear what we don't know. In the case of space, only a handful know; the great majority do not know. Thus, in a given international forum, fear and suspicion will outweigh confidence and assurance. And there will be some who are quite willing to exploit this situation.

This means that the basic orientation of international forums is likely to be formalistic rather than operational, cautious when the state of the art may warrant action and enthusiastic where caution may be required. Above all, there will be a tendency to be

regulatory and restrictive rather than facilitative. A space power prepared to proceed largely on its own and confident of producing positive benefits must, in other words, be prepared for a less positive reception than the technical prospects may seem to deserve.

### Political vs Technical Issues

This problem of opposite attitudes is further complicated by the fact that the real issues in organizing space applications are political not technical. Their resolution depends more upon satisfying diverse national and international political and economic interests than upon imaginative design or developmental approaches. The technology required for foreseeable space applications is either in hand or in good prospect. For example, the technical needs required to realize satellite ETV or direct broadcast services can be blue-printed, costed and timed with no great dispute. The more difficult issues for such services turn on programming, financing and management. In short, they turn on questions of social organization.

Alternate technical approaches may indeed reduce the magnitude of political obstacles but are very unlikely to eliminate them. A nation with preeminently political concerns and objectives can and will answer no, non, or nyet to any technical approach, good or bad.

### Effects of Disparities

All of the above considerations relating to international forums and space applications programs are minor when compared with the implications of the disparities which separate the United States and its potential partners in space enterprises. (I am not addressing the broad question of the "technological gap." I refer only to the relative abilities of the U.S. and other nations to exploit the commercial promise of space technology in the short run.)

These disparities are interacting and reinforcing: They include (1) A disparity in research and development actually applied to the scientific and technical problems of potential space uses. (2) A disparity in the scale of

unified effort -- financial and industrial -- which can be brought to bear in the short-term exploitation of new commercial applications. And (3) A disparity in national disposition and capacity to use the sophisticated products of commercial space applications.

Put another way, the U.S. is prepared and generally desires to move more rapidly toward a given application than, say, our European friends. We are better able to fund both the technical and organizational aspects. We are in a superior position to supply the necessary hardware. Our large and sophisticated market can use exotic new services and will in fact demand them while foreign markets remain cautious and unconvinced.

These differences can make themselves felt in remarkably concrete ways when the nations sit down to negotiate the organization of a commercial space application:

-- The U.S. is likely to point to experimental work it has done and to press for prompt international action to enter into the operational phase. Other advanced nations will share a strong tendency to delay so they can catch up technically or otherwise improve their bargaining position.

-- The U.S. is likely to feel that international operations will benefit from American expertise acquired in the experimental phase and that this expertise should be suitably reflected in the operating arrangements. Other nations will want the management set up on the basis of formal representation rather than experience.

-- The U.S. will want hardware procurement on a competitive basis because this is likely to satisfy specifications in the fastest and most economical way and, at the same time, to reward pioneering American investment in R&D. The other nations will want to distribute the contracts on an equal-shares basis regardless of merit.

-- The U.S. may feel that its ordinarily outside financial expenditures, in the pre-organizational and organizational phases alike, should be reflected in the control mechanism. Other nations will prefer a one-vote, one-country system of control.

Such issues will be the ones to find and face, regardless of forum or format. Organizational solutions which avoid or muffle them are not likely to produce a viable balance of interests.

### Conclusions

So far I have suggested that the future international organization of commercial space applications must take account of existing interests, that submission of organizational problems to international forums merely transfers rather than solves them, that the forums and arrangements must be tailored to different applications, that international forums will in any event take a more restrictive than facilitative attitude toward space questions in direct proportion to their lack of expertise, that this fact is compounded by the predominantly political as opposed to technical nature of international space questions, and that the different status of space capability in the U.S. and other countries tends to put them on opposite sides of the issues when it comes to organization of a space application on an international basis.

*2 sentence summary*

What conclusions can be drawn?

It is clear that the European countries, for example, have not yet taken the fundamental actions which alone can bring them to international bargaining tables as equal partners. They have not invested the time, money, and interest to put themselves in a basic position for takeoff in advanced applications of the kind we are discussing. (Europe is investing under \$300 million a year in space technology relative to our \$5 billion.) A pooling of resources on a regional basis seems to be required. Clearly, also, a greater willingness to invest in the future is required. If Europe addresses itself narrowly to specific applications, it will continue to lack the broad base of competence which can be mobilized to bear on any target of opportunity in the field of advanced applications. This is another way of saying that the communications satellite does not necessarily place practitioners in a position to exploit readily the next application which comes along. The communications satellite is itself only a major spinoff from the basic investment made by this nation more broadly in space technology. It is

that basic investment which puts us in a superior position to move quickly toward other specific applications.

In theory, it is relatively simple to fall back on the old compromise principle of give and take. The U.S. might be asked to slow down its development of new applications and to moderate its requirements for control of any joint effort. Europe would, in this spirit, be asked to accept a somewhat more rapid pace than would permit a total catch-up, and to accept with realism the prospect that the major contribution should carry with it some concomitant weight in control. This is the standard stuff of international negotiations. But it is not the whole story.

In fact, there is real urgency in bringing to bear new technology to advance the pace by which the developing nations in particular can be brought forward into the modern world. The future practical applications of space, already described elsewhere in this Conference but in particular turning about the survey of natural resources, seem to have extraordinary potential. In light of the needs of the developing countries, their advent should be expedited rather than delayed.

When specific applications have been demonstrated feasible so that their character can begin to be appreciated, it should then be possible to organize them in an appropriate way, emphasizing early service and the acquisition of experience and minimizing the political trappings. This is in good part what has been done in the case of the communications satellite: experimentation was possible without significant restrictions, it was conducted successfully, the feasibility of commercial applications was conclusively demonstrated, and it was then possible to organize a functional group among the practicing agencies of the world, incorporating virtually half the membership of the United Nations, to get on with the job of making the benefits available to people.

Such difficulties as may have arisen in the resulting organization are open to renegotiation, specifically provided for in advance. This is not a bad pattern for future applications. The task is to experiment, to demonstrate feasibility, to understand the parameters, to bring together those with competence to use and develop, and to organize on an interim basis

so that values can be extracted as soon as possible, leaving permanent organization to be developed at leisure on the basis of accumulating experience.

There is another important factor which leads to the same conclusion: The concerns which are occasionally voiced regarding space activity, and which are exploited without hesitation in some quarters, are so far entirely groundless. This is important for the work and bias of international forums. If the record showed that the development of space technology had been fraught with negative implications for mankind, it might make some sense to stress the need for international controls or regulation. In fact, the reverse is true. Some Cassandras, few but perennial, have viewed various space experiments in advance with alarm, but events have shown them in error in each case, hasty if not irresponsible.

In ten years of space development, no nation has been harmed in any way. We must point to this record constantly in order to improve the atmosphere and wisdom of international consideration. We must emphasize the expansion of benefits rather than restrictions upon progress. The record makes clear that we can address the more complicated questions of international organization on an evolutionary basis with the advantage of growing experience. The needs of the developing world and the magnificent record of space applications so far combine to show that the issues of international organization are secondary to the task of accelerating benefits for the world.