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THE POLITICAL AND LEGAL ASPECTS OF SPACE APPLICATIONS

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My first attachment with space affairs, which happened rather suddenly, occurred back in 1954 and 1955, when I was with the National Academy of Sciences in Washington. I was the first staff member to be brought in to deal with something called the International Geophysical Year. We had no money, just a couple of borrowed desks and some rather grandiose ideas. Two of these were, first, we might borrow some Navy ships and go to Antarctica, and second, we might talk somebody into an outer-space program. A couple of years later, very much to our surprise, we were able to do a number of these things.

I still remember with considerable clarity the day Wernher von Braun walked into our office — it must have been in 1954 — and said, "Gentlemen, you have been talking about outer space and all these things. We have a rocket down there in Alabama, and I think it will do the job for you." We had a very lengthy discussion with him and were very impressed with his presentation, but unfortunately the government was not. Instead, they went ahead with a completely different program with the Navy — and you are all familiar with the Vanguard story.

I would like to discuss some of the political and legal aspects without trying to get into the jargon that some of us use in the international legal community, but trying to bring up some of the points that are rather urgent and important, many of which are not often accepted by governmental agencies as being relevant to the kinds of problems that they have in terms of engineering requirements and launching.

With this beginning of the second decade in space, it is my feeling and it is probably shared with others, that a major shift of interest is taking place. I would like to pinpoint two areas in which this is happening. First, during the sixties, as you know, the United States and the Soviet programs concentrated on manned space exploration, with some attention to science and applications. In the future, I think it

is already beginning to happen, there will be greatly increased interest on applications and a considerable decrease in public attention, at least, on the importance and the funding of manned programs.

The second major shift that we think is happening is that, during the fifties and sixties, the U.S., the Soviet Union, Europe, Japan, etc., concentrated very much on a competitive development of national capabilities. It was the political competitiveness of the effort that finally convinced President Kennedy that we should go ahead with the race to the moon and the whole beginning of the Apollo program in this country. There was some international activity in these past 10 years, particularly in the areas of meteorology and communications. But still, the greatest emphasis was on this terribly wasteful competitive nature of what we had been doing. We feel that there will be a significant change in the next couple of decades here. That change, I think, is going to bring in more international interdependence, more international cooperation and perhaps, even some multinational programs as we go along. Most of these developments are going to be centered on the applications of space programs and particularly on the benefits that they can bring to people on earth, in the economic and social spheres. It is this kind of thing, we feel, that the public is going to be willing to pay for, and not so much for expeditions to Mars and that sort of thing. This is in no way detracting from the value of space missions; I am simply trying to pull it down to what, I think, the public is likely to support.

There are a number of reasons for these shifts. The first one, as I have already mentioned, is cost. When the public was told that it cost \$25 billion to go to the moon, and then, when somebody did some computations on how much it would cost to bring each pound of rock back from the moon, without going into any of the other aspects, like technology utilization and so on, there was a very large cringing

on the part of the American public which, during the same period, was required to pay over \$100 billion for the war in Vietnam. The public sees an end to this kind of expenditure. They are much more concerned these days in using our public finances to help things out a little bit, here on earth. A second reason for this is one that may be difficult to explain, but we have had considerable writing on this and a lot of discussion, and many of us feel it is the way things are going; the way electronics and technology are going. As a matter of fact, one of the writers has coined a new word here. He calls it the Technotronic Age. The feeling here is, that as this kind of age continues there will come a greater need for international cooperation. It is something that we all have talked about before. We say, "it is a fine thing," we pay lip service, we pray before the altar of international cooperation, but governments in the past have not really been that concerned. It is national priorities and national needs that have been first. The way things are going, individual nations cannot do this anymore. There is an interdependence, a very great degree of interdependence, and it is going to force countries to adopt certain changes in their programs.

A third element responsible for this change is a rapidly growing awareness by the public of the need for global conservation of resources, and for global environmental management and global management of the exploitation of our resources. For the first time, we are beginning to realize that we are going to run out of things. We are going to run out of fossil fuels in another 100 years. And we are going to run out of clean air, perhaps, if we do not start doing something about pollution. The point which is relevant is, that the public is finally aware of all of this. They finally feel that the only way that you can lick these problems is to do it on a global or worldwide scale. This is something new.

Finally, there is a growing awareness, even on the part of some of our Congressmen, that you have got to do something about the developing countries. There is much confusion here. There is also a technical term that we have developed in recent years, which is called the North-South gap. North-South does not mean much, except that the more developed countries are in the north and most of the underdeveloped countries are in the south. Essentially the term was coined to differentiate the problem from the East-West problem; the confrontation, which existed for 20 years, between the U.S. and its friends. But this North-South gap, the gap in the gross national product, or the gap in living standards between the

developed countries and the developing countries is increasing. This is the problem. The average income for the American is increasing much faster than the average income for the African or the Southeast Asian, although theirs is going up, too. However, the gap is growing. Unless something is done about this we are going to have a society in this country, in the next 50 or 60 yr, that is going to seem Buck-Rogerish compared to what is going on in the middle of Africa, or Southeastern Asia. The point here is that we can no longer look at this problem in an esoteric or philosophical way. We are too tied up with each other; we need them and they need us. Lest this sounds too idealistic, let me put it this way. The United Nations system has, I think, seized upon this point as the focus of most of its activities. There are limited opportunities in the United Nations for peacekeeping. The Security Council has its problems; we do not quite know yet what it is going to do with Peking in there; it may help, it may not help. In any event, several years ago the whole United Nations shifted a little bit. They said, "We can only do so much in peacekeeping. Let us turn our attention to the real problem of the world, which is how to help the developing countries." In the Outer Space Committee, in the General Assembly, in its subcommittees, and in every meeting that has taken place in the United Nations on outer space, the one theme that runs right through everything is, "How can this program help the developing countries?" It is always there! In fact, this past year they have appointed an individual in the United Nations Secretariat who has a title which is unique in the history of international organizations. His formal title is "Expert On Space Applications"; he has to sign his letters that way after his name. His whole job and the only reason he was appointed to this position by U Thant directly, is to set up and maintain relationships with developing countries; to try to show them how they can participate in space programs; and how, particularly, the Earth Resources Survey program, that we will get started next year, can be meaningful and useful to them. It is a big job. He has the cooperative relationships with 50 or 60 countries and he travels around. Dr. Fiorio and I are going to join him in Brazil for a meeting which the Brazilian Government is cosponsoring with the United Nations. The whole focus of the meeting is on how can a space program, like the Earth Resources Survey Satellite, be of use to a developing country. They have practically invited all of the Latin American countries there.

The United Nations conducted a meeting in Vienna 3 years ago. It was the first rather big meeting

Another point that has bothered some people is something which I often call the Mafia Satellite. Now that we can get a satellite up there for a few million dollars, we are very much concerned as to what is going to happen when the Mafia puts together a launching facility. In the 1967 treaty there was some concern about this aspect; lawyers do get very practical, and they worried about this. So they put a very formal requirement into the treaty that, regardless of how a satellite or spacecraft gets up into space, the country from which it originates, the launching place, has total responsibility. Thus, if the Mafia launches from Chicago, the U.S. Government has responsibility.

A couple of years ago in Geneva, I attended a meeting of the Working Group on Direct Broadcast Satellites of the United Nations. The committee was worrying about political and legal aspects of direct broadcasting; not so much about channels or frequencies or regulation of this and that, but about program content. Again, this is going to be a problem which engineers, technical people, or NASA is simply not going to be able to cope with. What we are worrying about is something which we call propaganda. Propaganda is a very big word, and can be a very dirty word. Essentially, there were two attitudes expressed at that Geneva meeting and unfortunately, it was the United States and the Soviet Union that were on opposite sides of the fence on this one. The U. S., as you know, is a strong believer in the idea, that he who puts up a satellite should be able to do what he wants with it. If we want to put up an Applications Technology Satellite (ATS) and use it for direct broadcasting purposes in India, then that is our and India's business, and nobody else should get involved in this. If someone else should happen to tune in on one of these programs, that is just too bad. It is not something that we really should worry about. This attitude is backed up further by a longstanding kind of human rights development in the United Nations, that everybody has the right to receive whatever information he wants. This is the anticensorship argument. If you want to get a Soviet newspaper, or a Chinese one, you should be able to get it. If you want to listen to these programs, you should have the right to do that. The Soviet Union took just the opposite side of this. They said, "This is horrible! Imagine the propaganda that is going to be sent around." They pointed out a couple of rather humorous things; for example they said that suppose Spain puts on a television broadcast of bullfighting and the Indians

pick it up in India. There would be a national revolution or something. Then one of the Russians took me aside and smiled and said, "Look, do you think that your Congressman is going to approve any kind of a deal whereby your American public will turn on Channel 11 and there is Moscow?" He said, "I don't think so, and, by the way, I think that your deodorant commercials are terrible and we do not want that stuff in the Soviet Union." The point he was trying to make and, which was eloquently established by their diplomats, was that there should be, in the Soviet terms, censorship and control by the receiving government on any kind of broadcast from a direct broadcast system outside. In other words, each country and each government has the right to examine what broadcast is coming into the country and select out those which it feels are unfit for its people. Well, here are these two completely opposing arguments. They have not been resolved and will not be resolved for a while. It is one of the major problems that we have.

I think you are all familiar with what the Earth Resources Survey Satellite will be, and with the fact that the first launch will be made in Spring 1972. Essentially, we are going to have a satellite that will circle the globe, take infrared photography, send it to earth through television systems, and come up with color photographs which will enable the data processors and data users on earth to use this information for a number of economic and social purposes. There are problems here, and I will quickly discuss a few of these. The first of these, the one which NASA denies to exist as a problem, is the question of intrusion into territorial sovereignty. What do I mean by that? Well, here you have a satellite with a camera taking pictures of a country that maybe does not want to be photographed, especially when it finds out that the photography is going to come up with data which can be translated by another country or a real "hotshot" company into means by which it can be exploited, or where, at least, they will perceive a possible exploitation. They are going to say, "Sure, we have the photograph, but we will not know what it means. Meanwhile, the XYZ Company is going to come in here and grab something from us." So the perceived exploitation is an extremely important part of this; but there also is a legal question. Do we, the United States, the Soviet Union, or any other launching power, have the right to take pictures of a country and use those pictures for economic value? The reply NASA gave to this kind of circular argument is, "Oh well, there have been spy sat-

trying to explain space applications, not to the public this time, but to diplomats, heads of government, and Foreign Ministry representatives. The idea was that if the experts could get up there in front of an audience full of diplomatic types, somehow or another, space applications could be explained and this point could be made — "Look, Representative from a little country, you should be interested in space. Get your people going there, get your geologists and meteorologists interested in this so that you can participate and receive benefits from space in the next 10 years." It was a very tough job, and it was the United Nations' staff in New York that did all the work for this. So it is beginning.

In the last 10 years, whenever you went to another country and talked space, the reaction was, "Oh well, this is something that the United States and the Soviet Union spent billions of dollars for, and they go up there, do things, come back, and that is about all." Occasionally, you can tell them that some experiments are performed and they did hear a little bit about communications, but that was about it. It is a tremendous job now to try to get these countries to be involved themselves, in programs related to outer space. We made a terrible mistake 10 years ago when we put all this attention on manned space flight, too much of it. Now we have got to go back and start getting reinvolved again. It is a very, very big operation. These diplomats did not understand. They said, "I do not see how that satellite up there is going to help my farming problem and my country." It took many hours of patient explanation to tell them about remote sensing and how this can, in fact, help his farm with infrared photography.

On the subject of politics and legality problems that I think we are going to be faced with, I will mention, very quickly and superficially, some of the primary principles which have been accepted at the international level, primarily through the leadership of the United Nations, and try to indicate why these are important. One of the first very important points was to try to figure out what the jurisdictional situation in outer space would be. We never knew, until 1967, what we were going to do, as far as legal problems in outer space were concerned. It was totally unclear, for instance, as to whether you could claim a section of the moon or whether you could not or what was to happen with it. The Daughters of the American Revolution and many other patriotic groups passed a resolution a few years ago that said, "As soon as the first American astronaut gets to the moon, the U.S. flag has to be there, and

we claim the whole thing. It is ours." Well, the feeling on the part of many people was that this would have been disastrous because then you really would have had a rush between ourselves and the Soviets. Thus, essentially, there were three different points of view; first, "let us get there, claim this, and grab it" — then the opposite point of view was that perhaps outer space, including the Moon, Mars, and all the other planets, should be completely protected from exploitation in a political and legal sense. In other words, nobody could be able to claim them, whatsoever, and outer space would be open to all mankind. The Latin term that we use for this is "Res Communis." The third idea, pushed very hard by India, Egypt, Brazil and other developing countries, took an altogether different point. "No, no! We should internationalize all of these areas. The United Nations should be in control of the moon." This horrified the United States Government and the Soviet Government, both, so we did not quite get into that one. What was finally selected, and this is the 1967 Outer Space Treaty, was the second of these three rules; nothing in space can be claimed by anybody. It is totally free and it is to stay that way. The deployment of an American flag on the moon is only meant symbolically. It has no legal meaning and we cannot claim or own 1 in. of that territory up there. Thus, the common interest of mankind is one of the major themes that has been accepted. It is one theme that the United Nations pushes very hard.

A second theme, which is brand new in international politics and international law and which has disturbed and bothered the Soviets and the United States, is that there ought to be an equal sharing of space benefits. We do not know how to go about sharing space benefits. We can publish papers and send copies around to the world but is this really sharing it? The focus now is very strong on the point that every country has the right, not just a privilege, to benefit on equal terms, and I am quoting from the United Nations document, "regardless of the actual capabilities of individual states to acquire such benefits by themselves." In other words, it is now mandatory for the United States and the Soviet Union, France, or Britain or any other space power, to share the benefits of outer space with the whole world. It is very difficult to take that mandatory requirement and translate it into actual operation. We do not spend enough time or energy; nor do we see many system models put together as to how to share this. It is an obligation, however, that we have.

ellites around for years and nobody has complained about it yet."

The second problem with Earth Resources Survey Satellites is, who is going to own these data? You say, "All right, it is an American satellite, it is an American camera, and it is going to be an American data processing system." But who owns the information that is going to be on that photograph? Why should not the country that is being photographed have some share in this? And what about the point I made earlier, whereby we have an international commitment to share this information? Our government's response is very simple. They say, "Oh yes, anybody that wants the pictures can have them." But that is not sufficient here. How do we guarantee that everybody or every country has not only an equal share in looking at the pictures, but also equal benefits from utilizing the data that can be perceived from these pictures?

We do not have any real mechanism yet for the international management of this program. It is true that NASA is prescribed by its charter to only engage in experimental programs; ERTS-A and -B are going to be an experiment. Later in this decade we are going to have an operational Earth Resources Survey program, there is no question about this. Therefore, are we going to go into another long-drawn debate about the International Telecommunications Satellite Consortium (INTELSAT)? Is this the answer, a consortium of sorts? I doubt very much whether the countries of the earth are going to agree to another consortium, in which, for the first 10 years, the U.S. owns 51 percent. This kind of development is no longer possible. They are going to want a greater share of it right from the start, even if the U.S. is paying most of the cost. This is one of the hardest things to swallow for the U.S. and its government here.

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In the same way, more than 40 nations are benefiting from improved weather forecasting, based on cloud-cover photographs relayed by a space system equipped with NASA-developed satellites. Many of these countries could not have afforded the elaborate ground stations, once needed to acquire and process satellite photos. Recently, developed prototypes of a simplified, inexpensive receiving station enable even the smallest nation to buy and use.

International Benefits

To quote a few instances of international benefits derived from space programs, the U.S. and France combined their efforts to orbit a satellite to track hundreds of balloons, making it possible to chart, for the first time, the winds that circle the globe.

Through space programs, weather forecasting is becoming increasingly accurate. Satellites and weather are inherently global systems. By using automatic readout systems, every nation in the world can benefit from the Automatic Picture Taking (APT) systems on board U.S. weather satellites. Over 50 countries are now using this to daily view weather patterns over their own territory — a wonderful example of the use of space for the benefits of men everywhere. These same countries also benefit from cloud picture mosaics routinely made available by the Weather Bureau to Europe, Asia, Australia, and North and South America. The weather mosaic is built up from individual weather photos and processed by computer; it is then retransmitted from ESSA ground station via NASA satellites. This is a very real example of the combined benefits, national and international, that space systems are creating for the average citizen.

A joint United States - India project in mass instructional television is under development. In 1972 an advanced satellite known as Applications Technology Satellite-F (ATS-F) will be maneuvered into a stationary position over India where it can "see" some 5000 villages equipped with inexpensive community receivers built by India. From a few transmitting stations, the Indian Government will beam educational television programs, focused initially on population control and improvement of agriculture, to the satellite. ATS-F will then retransmit the programs to hundreds of thousands of people in the receiver-equipped villages.

New uses are continually being found for telecommunications. Banks, stock exchanges, hotel reservations, cable television, hospitals, computer centers, and other new customers are appearing at an increasing rate. As one recently remarked, space exploration is leading us "to a global communications explosion."

An example of new applications was provided, in 1970, by the 18th International Congress, for post-graduate medical instruction. The American doctors stayed at Houston and San Antonio in Texas; their counterparts were in Switzerland, Germany, and Austria. Satellites provided closed-circuit television and two-way voice circuits between the United States and Europe, enabling a reported 30 000 European doctors to hear and see the 3-hour transatlantic conference.

World as a Unit

Space has made the world seem smaller, more delicate and precious. At the same time, it made man seem larger. Man can now look at his earth the way it truly stands — a tiny blue watery pebble that constantly roams in the silent abyss of the universe.

Since the race in space was started by Sputnik, over a billion children have been born all around the world, the first space generation. Today's children can look ahead confidently to new opportunities and to great new strides that man will make in the 21st century, when they will be in their thirties and forties. Their generation will view the earth as a whole for the first time and be able to deal with technology, science, and philosophy as a unified experience, common to all men of the blue planet, earth. This will certainly have profound educational consequences in relation to international stability and world peace.

When a generation learns to view the world as a whole, many individual and national problems would then be solved. Such problems will be approached in correlation and not in isolation. In correlation means considering similar problems that other individuals, other nations have and, in collaboration with them, try to arrive to a practical solution. What is the use of concentrating on curing a fatal disease in the arm when afterwards I let it develop in the leg? If the leg is amputated in consequence of neglect, the rest of the members of the body will suffer inconveniency as a result.