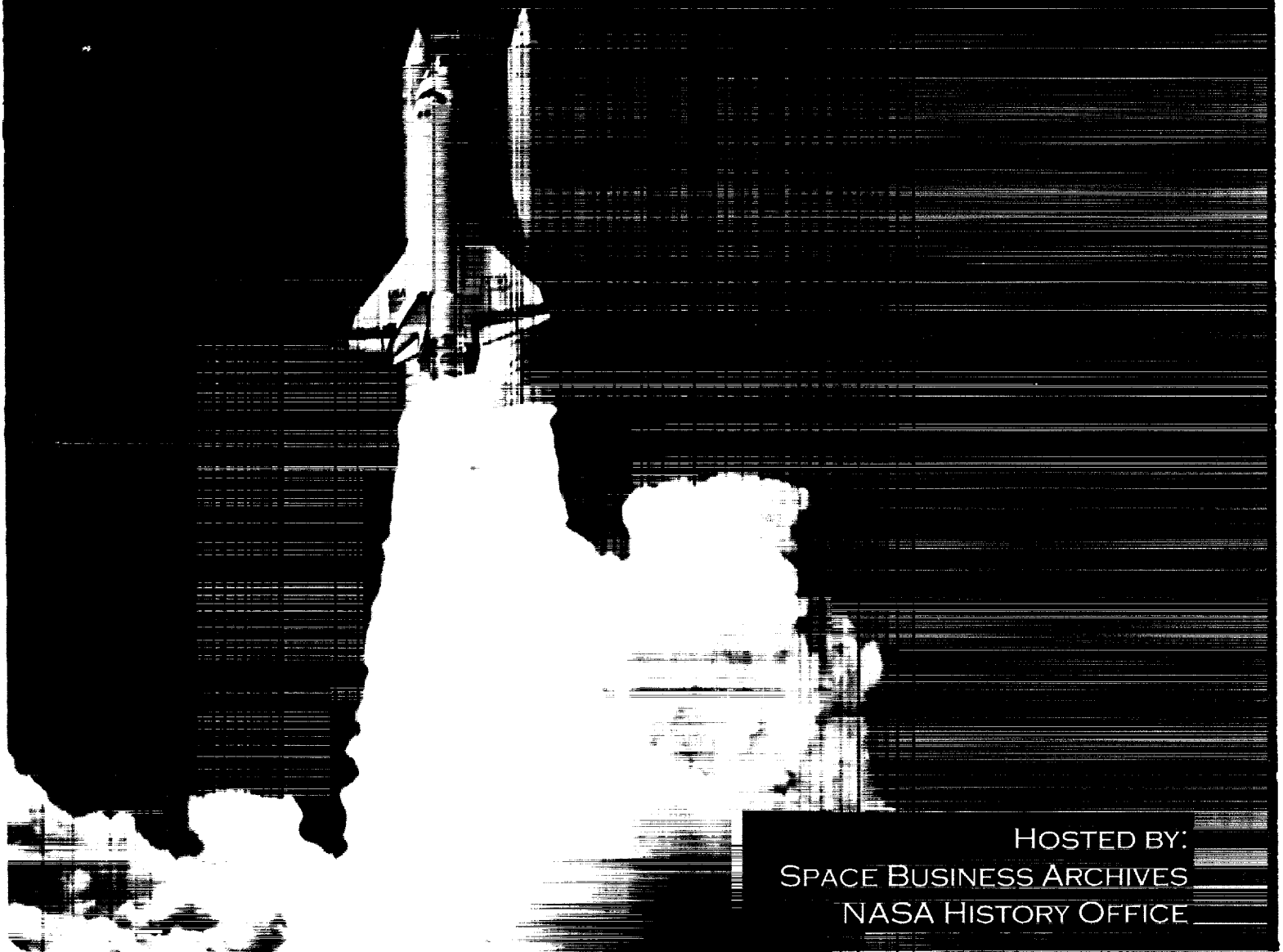
Commercial Space Policy in the 1980s:

Proceedings of a Roundtable Discussion



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On the cover:
Upper left: Space Shuttle Challenger, STS-6 (NASA Photo HqL-132)
Upper right: Space Station Freedom (from NASA Rendering NSFC-00469

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Edited by
Neil Dahlstrom

The Space Business Archives is a non-profit organization whose mission is to collect, preserve and make accessible documents that trace the development of the international commercial space industry. Primary documents from the commercial space industry are available at the Space Business Archives upon request.

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Foreward

The Space Business Archives and the NASA History Office signed a Memorandum of Understanding in March of 1999. The MOU outlines several opportunities for cooperative endeavors between the two agencies in historical programming. This oral history, and subsequently this publication, are the first products of that cooperation. In accordance with the purpose of the Space Business Archives--to provide an impartial forum for lessons learned in the development of the commercial space industry--the idea for this roundtable discussion seemed appropriate as the Archives first public program. With the combined resources of the Archives and the NASA History Office we were fortunate to assemble a panel of individuals that served in both industry and government during the 1980s, many working in both sectors during that time.

When envisioning the focus of this oral history, we decided that it was appropriate to highlight space policy in the 1980s, with an emphasis on the emerging commercial industry. Panelists were sent several documents in preparation, such as the Land Remote Sensing Commercialization Act and the Commercial Space Launch Act of 1984, President Reagan's 1982 National Space Policy, and other memoranda and letters that outline important policy issues of the decade. This discussion, we think, fills in some of the gaps that would otherwise be left unfilled when simply reading through the documents themselves. Some of these gaps include: how were these policy directives, legislation and decisions introduced and developed, by whom, and at what political and financial cost?

This transcript is meant to serve as a reference to some of the issues, organizations and individuals involved in the creation and development of space policy during the 1980s. It is also the result of the first of many future roundtable discussions aimed at providing an open exchange of ideas concerning past success and failure in order to provide a stronger base for future endeavors in governmental, civil and commercial cooperation in space.

Jeffrey Manber
Chairman
Space Business Archives

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Preface

In July of 1982, President Ronald Reagan outlined for the first time a desire for government regulated "private-sector investment and involvement in civil space and space-related activities" as a basic goal of United States space policy. In the same directive, the President called for the promotion of international cooperative activities and identified the Space Transportation System as the country's primary transportation source for space activities both at home and abroad, commercial and governmental. These goals would prove to be the driving forces of U.S. space policy for the rest of the decade. What developed was an inevitable struggle in the 1980s to implement this vision of cooperation among politically and economically opposed ideologies. The grounding of the space shuttle in 1986 amplified many of the weaknesses, paving the way for a reevaluation of domestic policy and increased efforts towards international cooperation. By the same token, commercial success abroad, such as that of the French Ariane, created real concerns in the United States about commercial sector competition, at the same time providing a catalyst for potential domestic commercial success.

According to the following discussion, the 1980s were a time of great search in terms of U.S. governmental, civil and commercial space policy. At the same time, it was also a period of leadership and innovation. Initiatives from this period--reliable space transportation, space station and the defining of the emerging commercial space industry--are some of the same issues that confront us today. What is clear, however, is that the development of space still holds immeasurable potential. Maybe more importantly, it is clear that that potential is driven from all avenues by a common desire to cultivate those opportunities by the most reliable and most efficient means available.

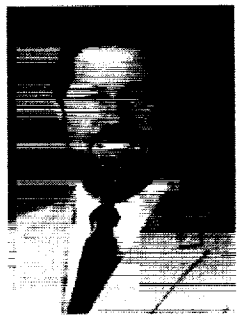
This transcript is an edited version of the proceedings of a roundtable discussion held on November 1, 1999. Within it, indiscernible words are denoted with a triple dash, '---'. Brackets have been used to insert words for the sake of clarity. Brackets are also used within the text to clarify acronyms and identify references to individuals and organizations.

Neil Dahlstrom
Chief Archivist
Space Business Archives
May 2000

Biographies

Each of the seven panelists for this oral history, some from government and some from industry, were influential in the shaping of U.S. space policy in the 1980s. Each held multiple positions during this critical time, and each remains an active champion for the development of space policy and space exploration.

Mark Albrecht

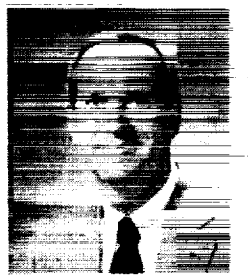


Before being appointed by President George Bush as the Executive Secretary of the White House National Space Council in 1989, Dr. Albrecht spent six years as the legislative assistant for National Security Affairs to Senator Pete Wilson. After three years with the National Space Council, Dr. Albrecht joined Science Applications International Corporation as senior Vice President, before moving to Lockheed Martin Space Systems to serve as Vice President of Business Development. He is currently President of International Launch Services (ILS) in Virginia.

James Beggs

James Beggs first government position was as Associate Administrator of Advanced Research and Technology for NASA in 1968. The following year he was appointed Under Secretary of the Department of Transportation. From 1974 to 1981, Mr. Beggs served as Executive Vice President of General Dynamics, leaving in 1981 after being appointed as NASA Administrator by President Reagan. Among his achievements as Administrator, Mr. Beggs directed the space shuttle program from its early experimental flights into operational use, and gained approval for the space station program. Mr. Beggs left NASA in 1985 to move into private industry with SPACEHAB, Incorporated and MAKAT Company, Incorporated.

Martin P. Kress



From 1979 to 1984, Mr. Kress held assignments with the Senate Budget Committee and with the Senate Commerce Committee's Subcommittee on Business, Trade and Tourism. Prior to his work with the Congress, Mr. Kress worked as a staffer for the Massachusetts League of Cities and Towns and the Massachusetts Office of Federal-State Relations. From 1984-1990, he served as a senior professional staff member with the Senate Committee on Commerce, Science and Transportation Subcommittee on Science, Technology and Space. In 1990, Mr. Kress was appointed the NASA Assistant Administrator for Legislative Affairs, and later served as NASA's Deputy Director of the Space Station Freedom Program, Deputy Director of the National Wind Tunnel Initiative, and Deputy Director of the Glenn Research Center. Mr. Kress is currently a Vice President with the Battelle Memorial Institute, a position he assumed in 1999.

James Muncy

In the early/mid 1980s, James Muncy was a policy assistant in both President Reagan's White House Office of Science and Technology Policy, and in the Office of Congressman Newt Gingrich. He served for two years as Representative Dana Rohrabacher's Legislative Assistant for Space, then served three years on the Professional Staff of the House Science Committee's Space and Aeronautics Subcommittee. Prior to joining congressional staff at the start of 1995, Mr. Muncy served for several years as a space policy and politics consultant for customers such as NASA, NOAA and private industry. In 1988 he co-founded the Space Frontier Foundation, serving as its Chairman of the Board for six years. Mr. Muncy is currently the Principal Consultant of PoliSpace, a new space policy consulting firm based in Alexandria, Virginia, that was created to help entrepreneurial and intrapreneurial clients achieve success at the intersection of space business, technology and public affairs.

James T. Rose

James Rose began his career at NASA's Langley Research Center as a research engineer supporting the Vanguard Program. In 1959 he was assigned to work with NASA's Mercury program, becoming head of the Mission Planning Office at the Manned Spacecraft Center (now Johnson Space Center) for all Gemini flights in 1962. From 1976-1987 Mr. Rose served as Director of McDonnell Douglas Corporation's EOS (Electrophoresis Operations in Space) Program. In October 1987, he was appointed NASA's Associate Administrator for Commercial Programs at NASA Headquarters, where he helped develop such initiatives as the Centers for the Commercial Development of Space (CCDS's), the commercial Middeck Augmentation Module (SPACEHAB), and the Consort and Joust commercial sounding rocket programs. Mr. Rose is currently an aerospace consultant focusing on the commercial development of space.

Gilbert D. Rye

Mr. Rye served twenty-five years in the U.S. Air Force, serving in various planning, project management and policy positions related to system procurement and space intelligence policy/planning. His last assignment before retiring from the Air Force in 1985 was as Director of Space and Intelligence Programs on the National Security Council, after which he moved to industry as President of COMSAT Government Systems Incorporated from 1985-1988. Before joining Orbital Sciences Corporation in 1990 he spent two years at BDM International, Inc. as Senior Vice President for Space Systems and Technology. Mr. Rye is currently the President of Orbital Imaging Corporation (ORBIMAGE), a subsidiary of Orbital Sciences Corporation.

Robert Walker

Congressman Walker served for twenty years in Congress (1977-1997), serving as Chairman of the House Science Committee, Vice Chairman of the Budget Committee and Chairman of the Republican Leadership. As Chairman of the Republican Leadership, Chief Deputy Minority Whip and a member of Speaker Newt Gingrich's six-person Advisory Group, Walker was a part of all the major decisions made by the House GOP for more than a decade. Among his accomplishments in office, Congressman Walker proposed the re-establishment of the National Space Council under the Vice President, and co-sponsored the Commercial Space Launch Act of 1984 and the Act's amendments in 1988. Congressman Walker is currently Chairman and CEO of the Wexler Group in Washington, D.C.

Moderator

W.D. Kay

Dr. Kay is an associate professor of political science at Northeastern University in Boston, Massachusetts. His research looks at the interactions between science, technology and government, resulting in numerous articles and books. Dr. Kay was a Fulbright Lecturer at the University of Iceland in 1992, and Scholar in Residence at NASA Headquarters History Office in 1993. He has lectured at the Smithsonian Astrophysics Observatory, the Princeton Plasma Physics Laboratory, NASA's Goddard Space Flight Center and Harvard University's Kennedy School of Government. Dr. Kay has also testified before the Space and Aeronautics Subcommittee and the full U.S. House of Representatives Science Committee.

Left to Right: Robert Walker, Mark Albrecht, Gilbert Rye, Martin Kress, W.D. Kay, James Muncy, James Rose, James Beggs

Introduction: *This half-day oral history roundtable discussion was held at American University on November 1, 1999. Panelists were asked to premise the discussion by offering some of their thoughts concerning the development of the commercial space sector during the 1980s, each from the unique vantage-point of their position within government and/or industry during that time.*

ROBERT WALKER: I think what I would do is frame it a little bit based upon an experience that I had in the early '80s, soon after the Reagan Administration came to power, soon after Jim Muncy came to the Hill with Newt Gingrich, and Newt took a particular interest in the space and science issues. Newt and I were relative backbenchers at that point, and I was serving on the Science Committee, and particularly was working with some of the space issues. Newt was a little more aggressive about using some of the powers of our office to gather together people to talk about some of these issues than I was. At one point, he put together a group of young scientists out of NASA that came in to talk to the two of us, and I'm not certain whether Jim [Beggs] was there or not, but I think he was that evening. We went over to the old Congressional Hotel, back of the House office buildings. The assignment that we brought these young NASA employees in to carry out was to tell us what it was [that] could be accomplished if they were given all the money in the world to accomplish it.

Now, we knew that there was no chance they were going to get all the money in the world. However, what we wanted to get was a baseline of what the possible was from people who were serious players, from people who understood what it was that could be accomplished. And so we started off with the idea we're going to spend a couple of hours with them that evening. We ended up going well into the morning talking to these young people because they had some absolutely brilliant concepts for where the space program could go, and where we as a nation could go as a space-faring nation.

What we realized coming off that session was that there was just an unbelievable wealth of opportunity out there to accomplish. What we also realized coming off that evening was that there was practically no hope whatsoever we were ever going to get the government funding to accomplish all of that. And so we came to the conclusion coming off that meeting that what you had to do was put together a national effort in space. Not just a federal effort in space, but a national effort that included space commercialization so that you began to attract investor dollars so that some of these things that could be done would be done in the future. And so that led to a series of actions, and I remember one of the first actions that I attempted to take was to change the NASA Organic Act to reflect the fact that NASA should be involved in encouraging commercialization of space. And, I thought this would be relatively easy. I thought nobody would find that very controversial.

So, I wandered into a markup of a space authorization bill one day with this amendment all prepared only to find that there were lots of people who were opposed to that. There were people opposed because they didn't want to change the NASA Organic Act that was written in 1958, and by God, it should stay just as it was written in 1958, nothing should change. And then I found that there was an even bigger agenda and that was that people were afraid that this would somehow change NASA's position relative to the space program if in fact what you did was encourage some kind of commercialization. So, in fact, that amendment was defeated that year and we were not able to get it through the Subcommittee or through the Committee.

I came back the next year [1982] and got the amendment passed realizing that I was going to have to do some real work on it. But that has set now the basis. NASA since that time has used this as the basis for their involvement in a lot of commercial kinds of activities. So, I put that out as sort of some perspective, that when you look at some of the administrative actions that were taking place at that point there was also a companion kind of effort taking place on Capitol Hill that was aimed at trying to set the legal basis, and if you will, the philosophical basis for some commercial activities.

MARK ALBRECHT: As you all know the 1980s were an interesting period of time in the space program. My chapter as it relates to the space program really begins in 1989 with joining the National Space Council [NSC]. Clearly a lot of the things that we were able to accomplish in the Space Council with promoting commercial space enterprise and facilitating was based on the outstanding work done by Gil [Rye] and others in the Reagan Administration beforehand. I'm sure as this story unfolds this afternoon that it will become clear that it was the clear vision and strong single mindedness of the Reagan Administration to create an environment where commercial space could be created and start to take hold that allowed us in the Bush Administration and on the National Space Council to bring some of those items into fruition.

It was a tumultuous time in the space program in the latter part of the '80s. I'm sure it's a little painful for all of us to remember the mysterious hydrogen leaks, the Hubble Space Telescope problems, etc., but there was also the beginning of a commercial space program. Many of the people on this panel had some, and probably still have some, visions about what is possible in commercial space. But there really were the beginnings of a commercial telecommunications business in space that needed to be dealt with. One of the things that the National Space Council helped was to bring what I called at the time transparency to U.S. government policy with regard to commercial space enterprises. Gil and Roger DeKok on the SIG [Senior Interagency Group] (Space) and the NSC were doing an outstanding job of sorting a lot of the difficult questions that related to the onset of commercial space. Obviously there are technology control issues. There are export issues. There's global competitiveness issues. But they were all being handled within SIG (Space) and the NSC and as you all

remember, one of the concerns people had was the transparency of the decision-making process. It wasn't clear where people who had issues and wanted predictability out of the government upon which to base solid business decisions, how they could enter the system, how they could interact. Because one of the criticisms of the SIG Space and again, they did outstanding work on behalf of the country in getting this industry going, was that it was NSC, closed meetings, not clear when decisions would come. And they would come from the President without a sense of schedule or entry point and dialogue.

The Space Council worked hard to create some transparency to governmental policy, some predictability on which people could make business decisions. We also grappled with the issue of how to deal with the balance between national security requirements. We still had the then former Soviet Union as an avowed adversary of the United States. We had issues related to export technology. We granted the first, or President Bush granted the first commercial remote sensing license. It's a business now with the launch of Ikonos. Two or three weeks ago we have our first U.S. remote sensing satellite up and producing images in the one meter range. These were all things that we did. We did them in conjunction with the government and the need to balance national security concerns. And, the point was to create a transparency in governmental policy.

GILBERT RYE: When I came to the National Security Council in 1982, it was an exciting period of time. It was a great honor for me to work for one of the great Presidents of the United States, who said to me on more than one occasion that it was the U.S. space program that inspired the American people, and that it was really the last frontier for the United States and for the people on this earth. So, he wanted to be a leader in promoting space and in putting in place policies which provided a foundation for me and those activities to take place. Some of those were the Strategic Defense Initiative, which I had some small role in writing the Star Wars speech, working with Jim Beggs on the space station program and getting that through the interagency process and getting the announcement in the State of the Union address. Some of the issues related to the shuttle and shuttle pricing all dealt with the need to bring the, not only the members of the other party along, but to provide the leadership necessary to inspire people to recognize what the full potential of space was. And one of those elements was commercial space. I think we were on the leading edge. In fact, I think it's the first time that any Administration had really acknowledged that there was a commercial space sector of the space program and the President's National Space Policy in 1982, which was the very beginning, I think, of trying to bring some coherency to the commercial space policy.

MARTIN KRESS: When I looked back at the '80s, the one thing that I really respect about the period as a whole was the energy and the dynamic period in which we all worked. I sit and wish that we lived in the same environment today in many regards. And yet I think having said that, it was a time of search. Everyone was looking for a national goal on which they could base the national space program, and I think in hindsight we failed. There was a House Committee report issued in 1981 that said the major challenge for the space program was to have such a goal. As we all remember we walked out of the decade with the Augustine Report that not only said there wasn't a consensus, but no two people agreed on what the national space program was or should be. I think there are a couple of reasons for that.

One, I think there was a seminal event, and that was the Challenger accident. I think any assessment of the '80s has to look at that and you need to do it from the context of before and after, because it really was a dramatic shift. We also had a key transition--space was no longer just the purview of NASA. The dominant space agency in terms of spending became DOD [Department of Defense] and I think that had ramifications. The key debate for the

decade, probably take exception with the premise, I thought was national space transportation policy and I still think it's national space transportation policy. The new buzzword of the '80s was commercialization and privatization and we spent a lot of time trying to find what they were, what they meant, and how we would interpret those. And the key change was the perception of NASA in the early '80s as a can-do agency to bureaucracy, which was a terrible transition and very difficult to go through, and we're still feeling the consequences.

In terms of the Committee and its priorities, which was one way I thought I could address the issues, where did we spend our time? I think we spent most of our time dealing with the long-term goals and objectives of the civil space program and I think that was true on the House side of the Hill as well. It was an issue that we just couldn't come to grips with, and...we had more support then than ever. We had the resources of the Office of Technology Assessment. We had the Library of Congress and the Congressional Research Service. We had the Congressional Budget Office [CBO]. We had a lot of smart people working with us trying to bring this to closure.

If you go back to the decade of the '80s, what's telling are the number of reports that deal with the same subject. The Congress instructed the White House to create a Presidential Commission on Space, the Paine Commission. Dr. Paine could hardly get his report into the White House because it conflicted with the Rogers Commission Report. Sally Ride then wrote her report in '87, and the telling line in her report was that the vision of Paine conflicted with the reality of Rogers. And then we followed that up, as I said, with the Augustine Report.

The second key issue from the Committee's perspective was the space shuttle and space station. I don't know about the people here, but between...the fifth orbiter to be built privately by Mr. Rockwell and shuttle pricing policy, we all spent a lot of time and energy during the '80s trying to be economists, and I don't think any of us succeeded really well. For space station, and we're still grappling with it today, it's what are the requirements? What are the capabilities? What will be the arrangements between our international partners? And what, indeed, was the true cost of this facility? Every other week you could read a memo in the *New York Times* or the *Washington Post* that the cost had increased and it was impossible to build. It wasn't an area where we evoked much confidence in our capabilities.

Third probably in the Committee's list was space science, which, as you know, in the Augustine Report actually ranked number one as a national priority. And if I look back at something I probably would have changed, I probably would have had more forums with young people or with people who in their lives had never touched a slide rule, not to say I was drawing a demographic line, but I really think the Nintendo generation hasn't had its say yet in national space policy and that the vision of tomorrow can be very bold once we get their energy into the foray.

And the last thing on our list actually was almost of equal value and equal weight and equal time, and that was aeronautics and space commercialization. Space commercialization was something you had to deal with, but it came in different flavors. At the forefront there was a group who truly believed. But there was also another group that truly just wanted to get it off the federal budget, and that created a conflict. So, as you walked along you were going through this never ending debate of if you really wanted commercialization and privatization, what was the role and the responsibility of the government to enable that? How do you transition from something that is inherently and totally governmental into something that can truly function in the free market?

We had endless debates during the decade of the '80s on these subjects. And every time you thought you were just about there, something would happen. It was either a Challenger accident, it was a renewed negotiation with the Russians to allow them to launch or it was another negotiation with the Chinese that gave them the right to launch at least 10 satellites.

So, it was an era of great debate. It was an era of great passion, but I also think it was an era in which everyone honestly was working with one cause in mind. I think everyone was universally working for the best interest of the national space program.

JAMES MUNCY: From my perspective the 1980s was probably the first of, so far, two golden ages of space commercialization in the sense that the ideas first flowered beyond the space community and were talked about in the public policy community very broadly, and in Congress by the President and other senior Administration officials. In the 1980s space no longer became the sole province of NASA and the Department of Defense. Two other departments got involved in very substantial ways, and not just in the limited areas that they were responsible for; in the case of DOT [Department of Transportation], obviously, the commercial ELV [expendable launch vehicle] industry; and in the case of Commerce, both remote sensing and generally commercial promotion. But frankly, they had a huge impact on issues like space station and other big programs.

The other thing I like to remember about the '80s and space commercialization is that by and large it was very much motivated by a positive rationale. There was a limitation on budgets as Chairman Walker pointed out, but very much people were looking to commercialization as something with which they could add to the pie. In the recent perhaps four or five years, with a lot of talk about space commercialization...it's been motivated, at least within the bureaucracy, by an attempt either to save money because of declining budgets or to replace funds or add funds to supplement the federal budget because of declining resources.

The number one thing I remember about the 1980s throughout the different jobs I had was that everyone meant something very different by commercialization. And I'd like to play off something that Marty said, because depending on where you sat and what your agenda was and what your institutional interests were, you could have totally different opinions about what this new thing, space commercialization, meant. And I remember writing an article in 1986 for some journal which basically laid out three different possible definitions. And I find that those are definitions still, to some extent, with us today. And to some extent, we're still fighting over what we should be doing in terms of space commercialization today, based on which of those three definitions we tend to ascribe to.

The first one is what I would call commercial use. In other words, there are important things that the federal government is doing: flying a space shuttle, building the space station, developing technologies and implementing them for remote sensing, things like that which have commercial value. To some extent this fits into the old idea of spin-offs and technology utilization and applications from the 1970s that NASA really pioneered. But today that goes right to the commercial use of the space station itself. Before Challenger, of course, there were commercial payloads flying on the shuttle, things like that. And it basically was a kind of partnership between industry, not space industry, but non-space industry and NASA where industry would use NASA and work with NASA and be able to use the benefits of space, thanks to what NASA was doing as a space program.

The second definition was privatization. Private companies that wanted to get into space themselves, and to one extent or another wanted to either take over a federal asset or take over a federal function, marketing that function either back to the government or to the private sector. But it was seen as a transition of ownership control, funding, etc. from the government to the private sector. And, that often was very controversial. That same year that Mr. Walker talked about amending the Organic NASA Act, which wasn't that pristine, by the way, because I remember there were all sorts of silly amendments about automobile research put in the '70s and energy and things like that. Back when we thought that NASA was the magical R&D agency, they could do anything, so we'd just have it work. But, that same year,

I remember going to a hearing where a then member of the Subcommittee, and I won't say which party, but he, after being whispered in [his] ear by a staffer, proceeded to ask a question of a young private ELV entrepreneur, saying "Isn't all this talk about commercial ELVs just an excuse not to build a fifth orbiter?" Now, we don't tend to hear questions like that today, but that was sort of the sense of what the threat was. That somehow this commercial stuff was in a way in opposition to NASA, and that's a feeling that a lot of people still have absolutely today.

And then three. There was a broader vision, which I will call for lack of a better term, space industrialization, that one of the people I went to work for after I left the White House, Gerard O'Neill, talked about. The notion that our big picture here in space is the expansion of human activity into space in the broadest possible sense, including our economic and industrial and free enterprise and creative activities that are part of human civilization, or at least our democratic civilization in the West, moving that into space. And by moving into this frontier of space, again hearkening back to Reagan's term, that that was a very beneficial thing that would continue to infuse those opportunities into our society.

Context is critical. Which one of those three definitions you thought commercialization meant said well, it's a good idea to subsidize payloads on the shuttle. Or, it's a good idea to make it possible to deal barter deals between NASA and the private sector. But one of the companies I went to work for was Geostar, and they did some really good barter deals back in the mid '80s before the shuttle use policy changed in which they were going to provide certain things to NASA and NASA would get certain benefits returned. And you didn't have to worry about prices and who owned things because you could do innovative deals. But then after Challenger, as Marty said, everything changed totally, and suddenly we put all the payloads back into the industry. People talked about buying another orbiter. It didn't really work. And the whole game changed.

And if you look at the policy at the end of the Reagan Administration, the '88 policy was actually very critical of NASA in what it said the role of the private sector should be. A total change from the beginning of the decade to the end based on how circumstances changed and different people's view of what commercialization meant and what its role was.

JAMES ROSE: With the shuttle on the way, it was touted as being a vehicle that we could use, and it was going to be used commercially to carry commercial satellites. But also, it opened the opportunity because now we have a system that would bring things home. We could really begin to consider the prospect of taking advantage of that environment to make things.

I ended up heading a program at McDonnell Douglas to develop such a technology that would ultimately be able to produce, hopefully, some very hard to get microbiology products, genetically engineered products. In the summer of '78 the Johnson & Johnson Company joined with McDonnell in this quest, and we immediately sent an unsolicited proposal to NASA to say we need some type of a cooperative arrangement with you. We'll put all the money into it, but we need some flight support to get the technology developed and to develop the product. And once we get there, we become a paying customer and a utilizer of the shuttle itself. This triggered Administrator Frosch. In '79 he put together a team that came up with a plan that's better known as the Joint Endeavor Policy, and in 1980 McDonnell Douglas and NASA signed the first Joint Endeavor. And this was very novel because it was a no exchange of funds agreement. It wasn't a contract. We agreed we would do certain things. They agreed they would do certain things and we both benefited from it if it worked. And, it was an excellent policy that hasn't been used in a long time.

In 1982 we actually flew the first flight aboard shuttle, that was shuttle number four. About that same time Reagan issued in 1982 the National Space Policy, where for the first

time they began to mention obtaining economic and space benefits through the exportation of space. So they began to talk about that. In 1983 Jim Beggs...establishes a commercial task force to study and come up with what NASA would do to help support the commercial development of space as prescribed by the President. The Congress was also, and I will say this for Bob Walker, that it was always highly supportive of commercial space and always an ally.

By September of '83, this was the time Jim was putting the task force together, we had already completed the technology portion of this program we had established. We had already flown four times. We were convinced the technology was viable commercially and we were then focused on an actual product which became, and is a major product in the world today, it's called EPO, Erythropoietin. And, the 1984 timeframe, Congress amends the Space Act. This is what Bob Walker was alluding to. That was in early '84. Also the Department of Transportation establishes a commercial space transportation office and that gets it into the launch vehicle era, and during this timeframe, there were arguments about the shuttle being under-priced against the ELVs and this made a lot of policy. But, in the meantime, we here at McDonnell, we're still charging on.

And again, to show the openness of NASA and all the other elements of government, we wanted to fly our own astronaut in the development phase because he knew how to operate that equipment and we could not train a mission specialist adequately enough to be able to fix something if it didn't work. And so Jim Beggs and company within a few months drafted a new policy that allowed us to put an astronaut on, and he was the first private astronaut to fly. And that was in October of '84.

'84 was a big year because Reagan establishes a new commercial policy. He had five economic initiatives, three legal and regulatory initiatives, one research and development initiative, and three implementation initiatives. Jim Beggs, who is head seven months now of both a government as well as an industry team, came up with a NASA policy on commercial space which he had some nineteen major initiatives to implement it. And, by this time, we had already begun, McDonnell had already flown and we had started the flight of our own astronaut, and in the 1985 timeframe is what it was, he was primarily flying. We flew three times in fifteen months.

We had the production unit already built and under qualification testing and then two things, major things happened. The unexpected leave of Mr. Beggs from office and the Challenger. And the Challenger really changed everything. We had a head of steam. We had nowhere to go for three years, and there was no way the company was going to keep the focus of this many people in this area, so ultimately it was terminated. And, lucky for me, I got another job. The administrative -- asked me to come to Washington and...help to run their commercial activities. And what I tried to do there was to organize an operation that really did meet the intent of the NASA policy and the NASA initiatives, and to take advantage and to understand what it was that the government should do to help industry. Sometimes the government, when it says I'm going to help you, they can strangle you to death. I mean they give you that old bear hug and the next thing you know you can't breathe.

In the 1988 time we did establish an operation down at Stennis to do remote sensing. And just let me say that operation is still going on today. It's the one operation that still has not varied. It's consistent, and for that reason it's successful. I think we had all the policies in the world in the '80s. What we didn't have and what we've lost out on is implementation of those policies. The whole attitude within NASA, within the White House, everywhere, everything tends to change with Challenger. And, to that end, I couldn't see any need for more policy, but we certainly were not able to carry out the implementations. Of those nineteen initiatives that Jim Beggs set out, I think we actually implemented seven of them. The ability of NASA to use commercial products and things never happened. And so, I think a lot of things grew

out of that that are positive like SPACEHAB, Wake Shield, many other things that came out of this. The CCDS's [Centers for the Commercial Development of Space] have done a remarkable job of getting the research to a point, but, if we're going to dominate commercial space, because it is a global marketplace, there are still jobs for the government to do to encourage the building of the markets that will drive transportation, that will drive infrastructures by demand. Otherwise the government's the only user if we don't get those other markets developed.

JAMES BEGGS: I think the previous speakers have pretty much covered the ground that takes us from where we were in the late '70s [to] where we are now. I'd like to put a little historical perspective on this, if I may.

The commercialization of space goes right back to the initial NASA Enabling Act which mandated that NASA from the beginning, 1958, look for applications which could be spun off and commercialized. And there have been any number of those as we all know, and one of them, the telecommunications, has been enormously successful, as a matter of fact, still one of the fastest growing industries in the world. That one was the only one that truly had a market pull, a demand-pull, if you will. It was an existing market and everyone could see that if you do the things that you could do from space that you could develop a very profitable series of enterprises.

Everything we developed, with the possible exception of weather satellites, which also was market-pull, but weather information as we all know has been a province that has been supplied by the government. And although there are a few small companies that make a living in using specialized data from space in selling services to the public, it's still largely a NOAA [National Oceanic and Atmospheric Administration] responsibility. The rest of them, navigation, earth resources, although it was mentioned that we now have commercial resources, that one got wound up in the national security activities and never, in my opinion, developed the way it could have had it not been so constrained. The search and rescue activity which has been an enormously successful program, but not terribly successful commercially, are examples of what has been done.

When we got to the shuttle era, which Jim Rose has touched on, when Bob Frosch and his folks could see for the first time that with the shuttle we had a means of not only going up, but also of coming back, it became obvious that we had an opportunity to develop commercialization in the environment of space in a truly commercial way. That is, we could deal with research and commercial products in the same way we deal with them here on earth. And Bob Frosch and his folks created the JEA [Joint Endeavor Agreement] that was also a cooperative research agreement that was created about the same period or a little earlier in which we could side up with companies which were interested in flying space and doing commercial work. Which is to say if they were willing to invest money, we would in turn agree to fly them and fly them on a very attractive basis, namely for nothing.

When we got to the Reagan Administration, and I must say that President Reagan was probably the best supporter for space that we have had in the White House since John F. Kennedy, he wanted to put an emphasis on...the further commercialization of space. So that led to the things that Jim Rose has discussed in setting up task forces, deciding what kind of initiatives we could put in place that would attract the industry. It's not easy because all of what we were trying to do here is technology driven, not market driven. There aren't any markets for most of the things that we were trying to encourage.

What we were trying to do is to attract companies, private companies who were outside the general arena of space, into space for the purpose of developing products, services and potentially utilize the space environment as we entered into the space station era in a way that would allow them to develop new markets, not existing markets, but new markets. And that's

indeed what we've been up to in the last several years. Unfortunately, we've had a couple hiccups. Challenger has been mentioned a number of times. The fact is that our schedule for the space station has set back and before you can truly attract people into this arena, you have to have a permanent means of allowing them once they reach a point where they have a product they want to produce, they have a place where they can produce it, or at least to pursue it.

MODERATOR: *We've heard about commercialization, commercial space policy, several times. But as two of [you] suggested, there's not always great consensus on what exactly that means. How did you and your colleagues understand what it was you were trying to do?*

ROBERT WALKER: Maybe I can jump in because it really was a fundamental question, and I think remains today a fundamental question in space policy, is just what you mean when you say commercialization? Do you really mean privatization of programs that the government has run or do you mean activities where NASA is spinning off things into the private sector? I mean there are a whole variety of activities. And when Jim mentioned the fact that NASA had been engaged in commercial activities since its earliest beginning in 1958, that was in fact true. But the reason why some of us in the mid-'80s felt that there was need for change in the Organic Act was NASA didn't see that it had the authority to go beyond that, and in many cases wasn't really willing to gain the authority to go beyond that. They did not want to engage in the kind of thing where commercial enterprises would bring ideas to them that had not been developed within NASA, and therefore expand the horizons in space. And so, that was a very different kind of view of commercialization in our opinion, and there was a need to have NASA address the broader context rather than the fairly narrow way in which they had approached it up until that time.

It's interesting as we go through that there was also the mention of the weather satellites. I was going through the materials that you sent and I looked at the Remote Sensing Act, and the one section that struck me in the Remote Sensing Act was the prohibition on any kind of privatization on weather information. In fact, what that drove out was all the potential profitability that was going to be in the early days in the commercialization of Landsat and some of the remote sensing activities. Because the only thing people could really see initially was the fact that there might be a way of making some money by offering enhanced weather products. And when we prohibited that in the bill...what we did was drove out one of the initial ways that you could have had of really attaining some private capital into that market a little earlier. So, these are very, very important arguments that took place.

MARTIN KRESS: It was interesting that context, as Bob said. Landsat is really one of the unique ones. If anything I'd push that to the side because I don't think it represents the overall pattern of the era in that there are several of us that worked on this bill during that era that were asked to do a case study for the Harvard Business School...and the one thing you find in the space policy world is the gap between what you were told and what really people felt. And so as we were putting the case study together, and this is probably about in the '86 timeframe, it was interesting to find all these David Stockman memos that had one objective. The goal is to get rid of Landsat, to get it off the federal budget. And, if something else could be found, that was okay, but if it were successful wasn't important. The primary objective was to get it off the budget. And you also needed to realize in the same context, we're being told here's this great potential new market. If you remember our other battle was every year the Administration would take the X program out that was really driving the communications technology, but we weren't supposed to do that because we're only suppose to do pre-competitive generic research which I used to think K-Band, that no one's ever used in

their life, spot-beam processing, spot-beam and on-board processing no one had ever done, was pretty generic and pretty competitive.

But, there were conflicts within the era, so as you pushed on things, and Bob's right, there's an assistant secretary at DOC [Department of Commerce] that almost, I think did lose his job over the weather satellite issue. But that was still a public good. And I can tell you from the perspective of our Committee, we had about four Senators who happen to come from coastal areas ranging from South Carolina to Alaska, and the thought of taking the weather satellite out of the public domain and making it a discretionary commercial activity was something they would not consider, and I doubt they would today. So, there was a very real perceived value in terms of the importance of weather forecasting and people didn't think there should be a market force.

JAMES BEGGS: The issue of commercialization comes in three parts. One is privatization like spinning off the weather satellites, earth observation satellites, launch vehicles, etc. And that, I would argue, with some exception, we've done a pretty good job of doing. And as a matter of fact, the Congress, when Bob was up there and Newt were pushing this, they were the leaders in trying to get this endeavor going. The Administration, until the Reagan Administration got on this issue, pretty much were dragging their feet in these areas until they were pushed by the Committees to do something.

The second area is the area of the provision of private services in lieu of government services or the taking over of government services by private activities. The argument for doing that, of course, is it should improve the efficiency and potentially the economy in providing those services. And outfits like SPACEHAB, which I have been associated with, and the Wake Shield that Jim touched on and other things have, I think, demonstrated the private activity in doing and providing services that can do it in an efficient and effective way.

The third area is what I like to refer to as true commercialization, that is, working in the environment of space to produce products and services once we have occupied space permanently. The shuttle was the first thing, first machine that enabled us to do that at least partially, and the space station will be the one that puts us in space permanently. The policy that we need to implement, and those of you who have been following this I'm sure saw Section 434 of the current bill, the bill this year, which puts into law the Space Station Commercial Development Demonstration Program which suggests, and I understand this was a NASA initiative and an initiative of this Administration, that says that they should endeavor to the maximum extent possible to commercial development of the space station as the space station becomes operational. And, it, I'm not sure how this one's going to work. It provides that the receipts for the commercial use in excess of cost identified can be retained by NASA for use without fiscal year limitation, which is a very interesting provision and scares the willy out of a lot of the people who are trying to work this from the commercial side. But I don't think it necessarily should. I think if it's used properly and they do this job in a proper way and define the policy in a proper way, that it could help enhance and improve the use of the space station and the space shuttle to develop true commercialization in space.

MARK ALBRECHT: In the time that I was working with the National Space Council we took...a very strong view that the issues of what I just characterized as privatization--contracting out, doing something for the government that it's currently doing, taking it outside and selling it back to the government--I was all for it, but I did not regard that as space commercialization. Contracting out, there were circulars in OMB [Office of Management and Budget] that had to deal with how you do cost benefit analysis and trades of it.

I really wanted to focus our time and energy on markets, commercial markets in space, utilizing space and space resources for regular commercial markets, and tried to get regulations in order, trying to get some clarity and transparency of people who were trying to start up businesses with ideas of how to use space commercially. And it's related in many of the discussions. We had always got tangled into this, what I just called contracting out. Now if NASA currently does something today and there's a company that wants to start up to do it, they've only got one customer, it's NASA. They want to sell it right back to them, I was completely okay with that, but I never wanted it to be confused with commercializing. Outsourcing is a great idea if it saves the taxpayers money. You know our standing order was you do it as quickly as possible. You try to get through the wickets, etc., and outsource as much as you can. And I think that still goes on today of trying to understand what is really commercial space, what is one definition of commercial space, which is commercial customers and commercial producers in a marketplace and outsourcing to the government. So our emphasis was really trying to focus on where the real markets with commercial customers and commercial providers and what does the role of government have. And, of course, this is not the panel discussion for today, but the government has huge regulatory oversight in this business.

JAMES ROSE: I think you can think about commercial space as also, put them in categories. There's the user type of thing. That's the communication satellites. That's the remote-sensing people. That's the microgravity people. You've got the provider people who want to provide commercial launch vehicles and want to provide infrastructure. They want to provide satellites, boosters, everything in the world you can think of. But, if there aren't users, the user side, then the only people that these launch systems can go to is back to NASA, back to DOD and say buy my vehicle. And NASA's already got a program. It doesn't want it. That was the problem with the ISF, Industrial Space Facility, which most people have heard of, is that the electrophoresis program we negotiated, we were in the process in the 1984 timeframe with the ISF to be, to develop this device that we could use on a permanent basis. And also, we were negotiating with Fairchild on the Leasecraft, which was a conversion of one of their systems to a commercial thing. That would be an unmanned device versus the ISF would be a manned device. And we were investing money in electrophoresis. We didn't want to invest the money for those systems.

So, we were entertaining this. It's interesting, both of these companies wanted us to take, to sign up on a, where we would be responsible. If we didn't make it, then we would be responsible to pay them. Well, we said no. There's no way in the world that we will do this. We will be willing to take certain risks based on how we were faring through the FDA [Food and Drug Administration] in getting license to make this product through phase 1, phase 2, phase 3. As it turns out, up until a certain point, they are going to be fully at risk. Space Industries [Incorporated], which was the ISF, they said they would do that. So, they were willing to assume about $100 million in liability, and we were willing to pick up on termination liability part of that. But all of these get into play. It's how much risk are people willing to take? And that's going to drive a lot of these things. But, for true commercialization, you've got to establish, and that's where in the microgravity field and others, without the government help, they're not going to self-start because the risks are too high. It's a long time, we're talking ten years to go from the research until you've got something basic to tell. And so it does government help. The communications world doesn't accept the regulatory people, but they'll always be there.

But, it's these other forums which will become the markets for these infrastructures and the transportation and all the other people who want to go commercial and be called commercial. So, that's the thing we still haven't, aren't doing well right now. If we're lucky

we'll have three shuttles fly this year, if we're lucky. The third one's on December the 2nd. So, we used to have, every year really we were going to fly 25 or 26 times a year. So, I don't know where we're going to go, but until we can get back to space, we're not going to develop these technologies and we aren't going to develop these markets that will drive the transportation needs.

ROBERT WALKER: What Mark and Jim point out too is one of the problems that we've gotten into. We've always defined this in terms of space policy. All of this has come through the Science Committees and through the people who define the space policy. A lot of what we're talking about here also has to involve a variety of other policies. It has to involve regulatory policy, and it has to involve economic policy. I mean, the fact is that one of the reasons why no one's willing to take any risks is because it's very hard to see the reward. And, you've got to develop some kind of economic policy in all this that assures that there is a substantial reward for which people are willing to take substantial risks. And, we've never gotten to that phase of it. We've never got into tax policy and a number of the things that should be done. If you're truly going to commercialize, you've got to recognize there's an economic marketplace out there that has to be addressed.

GIL RYE: I think over the last 20 years there have been some successes in what I would call space commercialization and those have involved a willingness of the private sector to common purposes. Let's take a look at some definitions in the continual, in the network to collaboration effort. In that world you were talking about people sharing. And that's being demonstrated even today...in several areas: communications, remote sensing, navigation, for examples. Weather hopefully in the future will be one. But industry is prepared to take a risk, but industry is not prepared to venture into never-never land in an area of uncertainty. They must be able to quantify what the potential market is, what the revenue stream is going to be, and they are willing to take risks. But they're not willing to take unacceptable risks, especially risks when the government is at any moment going to step in and compete with them or going to announce a policy or might shut them down.

JAMES MUNCY: Gil, I agree with you and I think you hit on a key issue. We say that privatization is not sufficient or is not quite commercialization or is certainly not sufficient to have commercialization. But sometimes you can't get there without some privatization, in the sense that if we want to have a marketplace in space where goods and services can be exchanged and developed and economic policy can take hold as Chairman Walker said.

If the government is sitting in the middle of the marketplace, and it's sitting where all the market stalls would be, and there's no room for a market to develop because the government's in the middle stopping economic activity from happening, either because it creates an expectation that this is a government activity and therefore is difficult and challenging and hard and requires government resources, or introduces risk as you just said, Gil, because you know, at least don't compete with me. That's where you get into these tough issues, is how do you get to a situation? A man who's no longer alive, so I can speak of him, was...an executive in Martin Marietta in the early '80s. One of the first appointments I had when I was at OSTP [Office of Science and Technology Policy] was, he came to see me because a friend of mine on the Hill had sent him to see me. And he came to me with a very incredible story. He wanted to sign Titan III launches to Intelsat and other launches. He didn't want the shuttle to promise not to compete with him. He didn't want anything except to be able to take this asset that, of course, was developed by the government, and go make more...to sell them to Intelsat and others. And he was told by a very senior NASA official at that time, if you do that we will take away the external tank contract. 1983. Very simple.

So, the government can have a very powerful impact on the marketplace without doing anything. Without, except for saying that it wants to stay in business itself. So, sometimes privatization in the sense that government gives up some control, not so much that the government's going to be a guaranteed market, but the government gives up some control is absolutely essential for commercialization to happen.

MARTIN KRESS: I think, and Jim Rose alluded to it, one of your dilemmas is the agency required to implement is not the agency fostering the policies. And so the people responsible for the day-to-day mission success operation and all the resources were NASA. The people that were coming forward with the new ideas were not NASA and you never resolved that fundamental conflict.

The other, it's been alluded to several times. In the early '80's, I think you'll hit it on the head. President Reagan was the master, and for him the space program was a metaphor for politics. Tomorrow is going to be better than today, you know, man's reach far exceeds his grasp. It was an era where there was great excitement. We had hearings in the early '80s, I'm sure they came to Bob's side of the Hill as well. The Center for Space Policy forecasted a $100 billion, I looked it up today, market in the year 2000 as a result of commercial space activities. It was euphoric. The water level is going to rise so high, everyone could jump into this boat and we were all on our way. But then someone's pulled the plug out of the boat and we couldn't deal with the ramifications of that.

At that time things like core competency, outsourcing, really weren't on the table, but we didn't have a fundamental understanding of the business and we didn't have a clear picture of where we wanted to go. So, it was a very difficult environment. In terms of risk, you know there are some people that caught on early about the tax code and one was at CBO, the other was Craig Fuller in the White House. But they were the masters of the art and realized that you had to give incentives. But, if you remember, the dilemma that we had was the R&D tax credit was an incentive for a lot of things, and the risk associated with space are much higher than they are in the other areas. So, I could go out today, we just extended it correct, on Capitol Hill. I could go out today and I'm still confronting the fact that if I go over and make that investment I get a 35% rate of return with a degree of confidence of maybe 50/50. If I take the space investment my rate of return is lucky to be ten, if the government gets out of my way and all things stay equal. And the dilemma in the space business is nothing stays equal. It's that dynamic.

QUESTION/COMMENT (John Cassanto): My name is John Cassanto. I'm President of ITA. That stands for Instrumentation Technology Associates, and I work in commercial space.

We talked about definitions of commercial space. We've talked about profits being made with satellites. That's the only thing making money. The microgravity community rarely makes a profit right now. But, the pony is there. It will essentially happen. And I guess what's significant in going back to the '80s, we've been through the Joint Endeavor Agreement. We've been through the barter arrangements so we understand the grief, and we understand the government trying to do the right thing. I guess what's significant is we went out and got investors. We [ITA] built a hardware device, looks like a breadbox, mixes 1,000 fluids in space. We also do commercial research, cancer research, tumor research in space. What's significant is the '80s were a great time. The investors were there. NASA had a can-do attitude. You could walk in the office and they'd really work very diligently to help you. That's not as it is today. I'm saying something has changed and the specific question I have, when the National Space Council was up and running, I dealt very closely with Courtney Stadd. I dealt very closely with Jim Rose. I had people I could go to. If I had a problem with

the agency, easy, four or five telephone calls. Or, if I really had a problem, I'd go to Chairman Walker and that really could solve the problem.

The point that's significant is we had a National Space Council. We don't have that today. We don't have an ombudsman. The entrepreneur, whether it's a small business or a large business, does not have available to him any recourse. The specific question is, and again we're in the '80s here. We lost the National Space Council when the Democrats came in. How did that happen? Why did it have to go away? Why isn't that a good thing to have? Why isn't it good to have some place that a business can go to and say I'm not getting a fair deal? Please help me out?

ROBERT WALKER: Well, since Bill Nelson and I wrote the bill that created the Space Council, I guess I'm somewhat prejudiced on it. But, the reason why it came about is because we recognized that with all the things that were taking place in the '80s, the fact was that you had a lot of federal agencies that were involved in space activities, and nobody was coordinated. I mean there was an attempt to do it, and I'm not denigrating the work that was being done, but the feeling was that you had to have an upper echelon organization chaired by the Vice President that would give the overall coordination in government that was highly necessary. And so we put together that effort with the idea that coordination would allow the military and the civilian sectors and the commercial sectors all to interact with each other, discuss the policies so that you would have a coordinated view of how things work.

And, you know, I happen to believe that having put it together it worked pretty well, and I would hope in the future that somebody would see the necessity for that. But we had seen an entire decade where you had an awful lot of activity and where it was very difficult for that activity to be coordinated, and the Space Council was seen as the mechanism by which you coordinated and then formulated policies that were based upon the broad interests that were reflected in a lot of different federal agencies.

MARTIN KRESS: Actually, there's a lot of history to that, and Bob knows in '86, and the NASA authorization bill was vetoed in the only time in its history. Although unfortunately now we haven't written any, so that might be true for a long time. But it was vetoed over the fact that we put the National Space Council legislation in there, and in the quiet of an evening, because President Reagan had very strong views that you were not to tell him how to organize his White House, due to a lot of maneuvering on both sides of the aisle, both then candidates Bush and Dukakis supported the National Space Council in their platforms. And so in a quiet evening in a meeting with your successor, Roger DeKok, provided we put the effective date after President Reagan's departure, it was a great piece of legislation. And so, subsequently passed in the fall of '88, taking effect in '89.

But what drove the start of the process, I think, Bob, in '86 was the frustration of the Congress that we couldn't decide what to do after the accident and the replacement orbiter debate. That was the one period in time where I have to say I didn't think the national interest presided. To get a decision, there was so much baggage pouring on, it looked a little like an appropriate bill at times. People felt that that was not a process that we would endorse. So the Congress came down pretty hard. I do agree with you when you lose the focus and the importance was the focus with the leadership of a Vice President. That makes a big difference in terms of a perceived priority and how the government operates.

MARK ALBRECHT: I'll take a little bit of an agnostic view on the issue of the Vice President, and I was very proud to work with Vice President Quayle who was an outstanding Chairman of the National Space Council. We got a lot of things through because of his interest and support. So, this is no way a criticism of him. But I think it makes the National

Space Council when the origins go all the way back to John Kennedy giving it to Lyndon Johnson because of his interest in space, this keeping it as a Vice Presidential council, etc. The good news is it gives the Vice President his or her shoulder to the wheel on doing space policy, which is great. The bad news is it becomes highly politicized. It becomes politicized because every Vice President is a potential suitor for the Presidency. And when they say well, what does the Vice President do when he goes out and runs? National Space Council gets tagged as the Vice President's issue. So, it doesn't really get institutionalized. In some way it gets politicized, even though it's not meant to be political and it's not operating in a highly charged political environment. It gets politicized because the sitting Vice President has always looked as the next person up in the political fray. And, they're looking for things to show that they're Presidential material, so if it would ever happen again, I would say, let's try to, and one of the other reasons is people are afraid that, gee, if I have to put the National Space Council up against the National Security Council or OMB or other Executive branch, it's just not going to make it. People will just say it's not important enough. And I think it's a little bit of a coattail grab to see if we can get it hitched onto the Vice President.

I would argue if there was going to be another National Space Council, that it ought to report to the President just like the National Security Council does. This Administration designed a National Economics Council. We'll see in transition whether either of the, or whoever the new President is, embraces the National Economics Council as something that's a normal part of the White House. You know a President doesn't come in and say, "I've got to get rid of the NSC, after all, my predecessor had an NSC and I don't want any stuff that he had."

Anyway, it's something to think about. And I don't want to make this in any way, shape or form sound as though I was not happy with Vice President Quayle who was Chairman. He was an outstanding Chairman, did a great service to the space program. But, I think it's something that always is going to make the space program a toggle item in the next Administration.

GILBERT RYE: So transparency does have a down side, which is you can potentially get politicized if it becomes too visible in terms of all the puts and takes. I think there's another point which is that there is a plus and minus associated with getting organizations such as the National Security Council involved in space policy. A plus side is that the National Security Council can bring along the military intelligence and foreign apparatus to the government, sometimes which are critically important to implementing some critical policies, even those having to do with space commercialization.

Another point, whether you're talking about space commercialization or any other subject for that matter, one final mental rule, I think in the Executive branch at least, is he who has access to the decision-maker, i.e., the President of the United States, has a way of getting his agenda done and approved. And, that has proven true in, I think, every Administration. It's really proven true in the current Administration. When Clinton first came in Secretary Brown, who was Secretary of Commerce, whether you like or disliked Secretary Brown, was very effective, and influential in getting a lot of very forward looking policies approved, including the one that has to do with my industry, approved by the President of the United States. Nobody else could have done that in my view. [That] he had the access to the President, was able to convince the President this was in the national interest, in my view is correct. But, whether he had a space council or security council, whatever entity you had in being, the guy that made this happen is the guy who had the President's ear, and who the President trusted and believed in. And I think that's important no matter what bureaucracy you have in place.

QUESTION/COMMENT (John McLucas): I wanted to make a comment...[that] has to do with the Challenger accident. The first thing you think about, of course, it was a terrible human tragedy. A lot of people lost their lives and there were many repercussions that were negative. But I claim there were two good things that happened. One was a lot of the hype disappeared. People became a lot more realistic about what they thought could be done in space.

The second thing worked to the benefit of the Pentagon, you might say, to the national security, a better way to put it. Namely, the idea that we could be reduced to having only one way to get into space. That was a terrible thought that many people had. In order to promote the shuttle and make it more successful, we should design all of our military payloads to go on the shuttle, and billions of dollars were spent by the Air Force to make that happen.

First, I believe, we had a guy named Pete Aldridge who came along and said this is ridiculous. We should not put ourselves in a corner where you rely on shuttle only. So some people are saying everything should go in the shuttle.

GILBERT RYE: I want to make a statement about this because this is a real important point. This was one of the big issues of our era in the beginning with the launch of the shuttle. The nation started putting in a large amount of money into the development of the shuttle program and the shuttle program had to prove itself economically and the Air Force, which had traditionally relied on expendable launch vehicles, and very successfully relied on expendable launch vehicles for putting its payloads into orbit, was sort of dragged complaining, crying, whining all the way to fly on the shuttle. So, one of the first issues that hit me between the eyes when I came to the White House was this particular issue, and it had a lot of peripheral issues surround it, such as the shuttle pricing one.

And I was at least one of the guys that was caught in the middle: naive Air Force Colonel sort of trying to find out where the bathroom was in the Old Executive Office Building or stumbling into this awesome issue. But, what I did one day...was get Jim Beggs, and I don't know if he remembers this or not, and Pete Aldridge in my office to talk over this issue. And Jim Beggs, to his credit, struck a compromise with Pete Aldridge whereby the Air Force agreed to fly a certain number of its flights on the shuttle program in exchange for NASA agreeing to allow the beginning of a production line for what eventually became the Titan IV. That meeting happened a little over a year before Challenger occurred, and had not that decision been made, as Pete Aldridge has pointed out many times, we would have been even further behind after the Challenger accident in being grounded without a launch capable of putting our payloads into orbit.

JAMES BEGGS: Yeah, and I agree with everything you said. And Pete and I did sign off on that. And it turned out for the good of the country...but I have to point out the following, which is when Challenger occurred, every other expendable launch vehicle system in this country also was non-operational at that time, and, the Ariane was down. The flat truth of this situation is that all launch vehicles are subject to serious problems from time to time. And I have not noticed subsequently that the Titan job has been all that reliable...nor have I noticed that any of the others have been all that reliable. As a matter of fact, the most reliable vehicle into space that we now have is the shuttle, without any question. It has the greatest success rate. All I'm saying is the following. I'm not against the idea of having a robust capability to launch things into space. I think that's a great idea, and I readily agree when Gil brought Pete and I together, that they should have that backup.

What I am saying is that the idea that because you have that, that you have assurance of access to space, is an illusion. And we should not kid ourselves that just because we've got

four different systems in place or even five or six... that one or the other is always going to be available. That's just not true.

I'd like to make a comment on the shuttle line of what's just been discussed here. If we are going to be successful in commercializing space, there are about four conditions that I consider to be essential. The first is that, as you have noted, there needs to be a point of focus. There needs to be an office both in the White House and in NASA that you can go to find out what the current situation is. How you go about getting access to space. How you can work your way through the myriad of regulations and paperwork that are required. How you establish yourself in such a way that you can buy, if you have money, or get access space.

The second thing that's got to happen is this. You've got to have assured access to space. I recall a conversation I had with Jimmy Burke of Johnson & Johnson who was Jim Rose's partner in that. I used to call, Jimmy was a classmate of mine at Harvard Business School, so I knew him well. And Jimmy and I would discuss this quite a lot. And I kept asking Jimmy, "How can we get you to fly more stuff on the shuttle?" He said, "I'm having enough trouble with my research people as it is." He said, "Every time I suggest they do more, they say by God, boss, we already got enough of these cocky mammy things going on. We got research projects that will make real money for us if you let us spend money right here on Mother Earth." So, and he said, "Your first problem is you promised us a ride and then you shift the date." And he said, "My people get ready to fly and they come in and say we're ready to fly, what's the matter with NASA?" And we, well, they're having trouble.

And, so you got to have assurance of access, and it's got to be assurance on a schedule. Because if people are spending money on research and they're counting on flying, they're gonna fly. If you don't let them fly, you know there are opportunity costs or loss and there are costs or the money that they're expending to push this that are going a glimmer.

The third thing is there's got to be a pricing policy that makes sense. You cannot expect a company which is doing research to pay full freight. So, you've got to have subsidized transportation. This country has subsidized transportation for everything over its history. We've subsidized the railroads...we've subsidized the aviation industry. Now, we've got to spend some money and subsidize the space transportation business. We've got to provide assured access with a cost schedule that makes sense to attract the right kind of people.

And the final thing is that if you find a product, we finally come up with a good product that we can produce in space, you've got to have a policy which will encompass the trial period to get into the market without forcing them to spend a ton of money before they've tested it in the marketplace. And all those things are precedent to doing this. That's what we were trying to do back in the early '80s. We were trying to work through this kind of policy.

Unfortunately it comes hard for NASA. It comes hard for the good, great bureaucrats of NASA. The people at NASA are well motivated. They want to do the right things. They are, generally speaking, very happy to help anyway that they can help. But this is an area they don't understand. It's an area [that] gets a way of doing the things that they are charged to do, you know. We got to go to Mars next year! What do you mean I'm supposed to spend time commercializing space? So, there are things that are important that they've got to do, and you cannot expect them to do...it unless there's a focal point in the agency to make it possible.

JAMES MUNCY: I agree with all four of those points. They all make absolutely wonderful sense. I, too, do not believe that NASA is culturally or traditionally suited to doing those things. As recently as just two or three years ago I was writing statements for Chairman Rohrabacher saying that NASA ought to do more to commercialize the space station. Perhaps I gained some wisdom or just lost patience, but NASA isn't a commercial entity. It's not a business entity. It doesn't understand business. It's not supposed to understand business. We did subsidize the canals and we subsidized the railroads, and we subsidized aviation. But we

didn't subsidize them with central bureaucracies that were in charge of administrating and managing and carrying out those activities. In the case of the railroads, they were land grants, very simple. I mean they were politically derived, of course, but they were non-bureaucratic methods of encouraging people to make huge investments to go develop systems. And, of course, the other subsidization was from the military in the development of the locomotives.

The first item is customer service. The second item is that if you don't show up, you pay a penalty. The third item is consistent market-base pricing. And the fourth is probably some sort of quid pro quo on when you pay based on when your revenue comes and maybe getting some equity stake. All those are the sorts of things that businesses know how to do very well in partnership with other business. So, why shouldn't we expect the private sector to manage the commercialization of space rather than expect NASA to manage it?

JAMES ROSE: Let me ask as the only one who has access. Let me point out that this was, when I went to [NASA] Headquarters to run the commercial activity, it was in 1987. I said I thought we had done a lot. My definition of commercial is you've got three phases. Phase I is the technology phase. Phase II is the development phase. Phase III is the pre-production and then ultimate commercialization phase. And the government, in the areas of microgravity, remote sensing and what have you, does have a major role to play. It's one of support. And it was clearly defined this was support. As we were making good process in Phase I, it became aware to me that we could not do it. NASA was not going to do it. It was not going to be able to carry this thing into Phase II. Phase III, I put together a team and we worked for about six, seven months. I had a kitchen cabinet in which John McLucas served on. Joe Allen, if you remember these names, and Deke Slayton--people who had some background in commercial space as well as understood the agency. And they all agreed with me basically. We need to get it out of NASA into something like a quasi-government industry organization that could work more freely with industry on a more timely basis where time is important, is extremely important. And, of course, I got nowhere with the Administrator at that point in time in convincing him that this was something we should do. But we did propose this.

In 1997 there was another loop by NASA who, using the Potomac Institute for Policy Studies, both Jim Beggs and I served on in an advisory capacity there, and I think John McLucas did too, and that was a conclusion that came out from that major study in 1997. So, it hasn't gone away. And I hope we're going to see more discussion on this matter in the future. Commercial space is going to happen whether the government has anything to do with it or not, but the timing of it can be greatly influenced by what the government does and doesn't do. And, if we're in a global marketplace and we are competing with the Japanese and we are competing with the European Union, we want to be first, and therefore, there are things that the government should do and can do, and I hope we know enough today that somebody's going to pick this thing up and then begin to do something in the future. I hope this fight stimulates that.

MODERATOR: *Can I actually go back a second and ask specifically, what were you trying to do that you couldn't get the Administrator to agree to, specifically -*

JAMES ROSE: The whole attitude. Time, primarily. You couldn't get anything. The legal folks hung you up on everything you possibly could do. The whole system was not geared to being able to take over and take it into what I call Phase II where you have to deal again with the private sector one-on-one and have policies and things that would do it. It just would never work.

I went up there and on my own person realized that...I would not be able to do what I thought was necessary to be done. Maybe some of it. The first, the Phase I, the CCDS's were

doing fine and were creating the type of technology bases that we needed. What I could see was that, and the roadblocks I was running into, and John Cassanto was in the middle of that at the time. He understood what I was running into. And you get tired of getting beat up.

MARTIN KRESS: At that point in time, I mean, people forget again, NASA was trying to regroup. You have the Phillips Report on how to manage NASA. You had a National Academy of Public Administration report on the organization of space shuttle program. You had the Rogers Commission, which if you want to go back and read it again in today's timeframe, people always ask where did Reston Space Station Level II come from? Read the Rogers Commission Report. So there are a lot of reports and I think Jim Fletcher's task was to regroup the agency to get a handle on the technology needs of the shuttle program and a lot of new initiatives really weren't en vogue in the '87 timeframe.

I'll just throw out three other facts if you don't mind. When space station was approved, you know, one of the things is if you want a robust space program, you got to be willing to pay for it and that's either through direct dollars to NASA, through the tax code of the private sector, whichever mechanisms you want to use. But when space station was approved, the agreement was one-percent real growth and we get the rest of the cost out of efficiency gains in the shuttle program.

In 1984, the shuttle is declared an operational vehicle that landed...on the Air Force base. In 1986, not only did Challenger go up, but the next two launches we all forget about. We had a Centaur upper stage ready to be launched out of the Cape, and Pete Aldridge, who we did work aggressively with on the Titan IV issue, was in training at Vandenberg and was scheduled to go up in three months on a shuttle being launched out of Vandenberg Air Force Base. And then in 1989, probably the key thing, I think, was we tried and failed miserably...we couldn't regenerate the vision of Reagan in the early '80s. We still had with us the Rogers Commission Report and we could get $5 million total for the STI [Space Technology Initiative]. We couldn't recreate the vision. We couldn't get our momentum back and I think right now that that's what the Administrator is trying to do.

Here's the irony. You can recreate it within the public but you couldn't within the Congressional process. Space station was going to be delivered before anyone would look at any new initiatives and those were the requirements. We had two meetings at the White House before STI was announced with members and with staff. And the day the President announced it, it was kind of a unique event for those of you that remember it. It was at the Air and Space Museum with the Apollo crew there. The invitees sat there and didn't make a sound and the people out in the mall were applauding.

Left to Right: Mark Albrecht, Gilbert Rye, Martin Kress

MARK ALBRECHT: All the things we've said about what it's going to take to commercialize...the four steps that Jim Beggs talked about, all of those are correct. But there's a huge element that we haven't talked about, and I think the Chairman's uniquely positioned to talk about, which is the crossover with national security. This is not just like any other product or any other place.

Right now launch vehicles and satellites are on the munitions control list. They're on the munitions control list! I mean it's an issue of whether doing space commerce is a privilege or a right. If it's a privilege then it means that the government will decide whether or not you can do space commercially subject to its obligations to the general public, etc. If it's a right to do business in space, then the government simply has a check off to say unless the following things don't happen, the presumption is you're going to do it.

Commercial space has always been treated, not as a right like it is for free speech or to go start a newspaper or create a whole new product called computers or software, which the presumption in the public and the business community is it's a right to do business as long as it's legal, moral and ethical, and that the government, in its oversight and regulation of it, will only have two or three quick checks to make sure that there is some things that are adhered to, and you've got your right to pursue this business goes on.

Space is always, space commercialization, commerce and space, has always been treated as a privilege, something that the government has unto itself, that it will decide when and under what circumstances it will allow you to pursue commercial space. And as a huge element in all of this, and in fact, it's not whimsical. It does get the issues of proliferation of weapons technology. It does get to weapons of mass destruction, etc. And it is something that hasn't been mentioned here, and I think Chairman Walker's in the position because he's grappled with these issues.

ROBERT WALKER: I think that's the right observation and the problem is that government is the originator of access to space. I mean, to whether it was the military in developing the missiles or whether or not it was NASA in developing the Apollo program and so on. I mean government saw it as a uniquely government environment for a long, long time. That certainly NASA has continued to believe that things should not happen unless NASA has a hand in what's happening on the civilian side. The military has whole networks that are developed to deal with the space programs and don't particularly want people on the outside being able, for instance, to do resolution and remote sensing that approximates what the intelligence gathering capabilities are. And there are good reasons for that. But I think it starts with the idea that government was there first and has maintained its preeminence.

It seems to me, and what we wrestled with throughout the '80s and into the '90s, was how you then begin to change the culture and change the atmosphere in a way that makes sense. And to come back, for a moment, I mean one of the reasons for the Space Council and one of the reasons why it was put, you know, at the Presidential, Vice Presidential level, was so that it would force some of those discussions to take place. I mean the concern is the way this thing has evolved is that you have not only now military questions being raised that have impact on the commercial community, but now the way they have structured, you know have diplomatic questions that get raised. And so you have added even additional risk into the program because no one's sure whether or not they're going to get a license, and it may not be that there's a security problem. It may be that there's a diplomatic problem now in the whole thing. And you cannot live with those kinds of policies if you're in the commercial community trying to go to investors, telling investors that here's a product and we intend to fly it. The investor is going to look first of all at the risk elements and we have now increased the risk elements enormously.

Until you can get policies that reflect the totality of the community, including now the commercial community, you're going to have a great deal of problem getting the investment community to step up to the plate and put the kind of money in that's entirely possible. I happen to agree that someday we will get there. Whether we will get there quickly enough to lead the world is a real question right now.

JAMES BEGGS: What Jim Rose touched on earlier when he said what we really have to do is get outside the standard formal government structure and maybe set up a quasi-public institution. This Administration, Dan Goldin and the Administration, have been moving in that direction with turning over the shuttle, the U.S. Alliance, and I understand that they have been discussing at some length the idea of flying a certain number of shuttles each year for commercial purposes. If you could tie that into a certain right to space on the station over a period of time, the U.S. part, you might be able to create an entity that could promise, that could offer to commercial developers, commercial researchers and developers, the opportunity to fly on a schedule with access to the space station with assurance that they will get the services on the station that they need. That might be a solution to this problem. I don't know whether that would take legislation or not to do it. My guess is that with the passage of the section of the bill this year, they have a beginning on that.

ROBERT WALKER: That's certainly an idea and that helps resolve some of your insurance problems and a lot of other things that come in. But the one problem that you've got, of course, is the fact that over the years, because we treated the station as a diplomatic entity, we have traded away a lot of our ability to allow the commercial community to interact. And so you've got all of these deals we've made with foreign countries about space and use of power on the station and it's not clear whether you could turn over to a quasi public, quasi private company willing to manage the station that's within the framework of everything we've given away.

QUESTION/COMMENT (Roger Launius): I'd like to go back to about the 1981-82 timeframe and ask you all a couple of questions about what was taking place in the milieu in Washington at the time in terms, in the context of commercial space policies during that early period of the 1980s.

When Mr. Reagan became the President and a new group of political appointees came into Washington, was there a sense that there was great opportunity before us that we could change pretty fundamentally the structure and nature of space policy, that we could bring in greater private entrepreneurship and more commercial activities? And if there was that sense, what were the kinds of things that were being discussed about where those possibilities are and how you could accomplish them? Also, and as kind of a subtext to that I'll tack on this. Was there any discussion at that time of the Ariane and its capability and what it might do to U.S. competitiveness in space launch?

GILBERT RYE: I think in the very beginning of the '80s space commercialization wasn't a big deal. I mean it was an area that was getting some attention, but wasn't a dominant consideration I don't think in the first few years in the Reagan Administration. Later, I think it was different, certainly the momentum really picked up in the Bush Administration. And as Marty has said, the overriding, the overwhelming dominant area was transportation and the shuttle--launch vehicles. Later, of course, came the space station, but space transportation dominated most of the issues that were being addressed during this early period of time, and were really the tackled issues that bubbled up to the White House because they crossed organizational lines. How the shuttle was being used affected both NASA and the Department of Defense. Whether you do or don't have expendable launch vehicles, whether you do or don't have upper stages, commercial upper stages, all kinds of issues, pricing issues, all kinds of things were bubbling up. And there were issues that crossed organizational lines and therefore fell in the lap of those in the White House and in Congress.

Ariane was a particularly troublesome one because the French had obviously made a commitment to get into heavy lift launch vehicles with the Ariane, and in my view were very

astute at anticipating the fact that were they able to develop a reliable launch vehicle that could access geostation into orbit, that they could at least compete effectively with the shuttle. And knowing that the Russians were never going to compete with them, there weren't too many other places for sources of competition. So, the French seized an opportunity and then with the Challenger accident, I think they capitalized on their opportunity and their investment in that launch vehicle.

JAMES BEGGS: We turned it over to them.

GILBERT RYE: Yeah, I think by default, we certainly did.

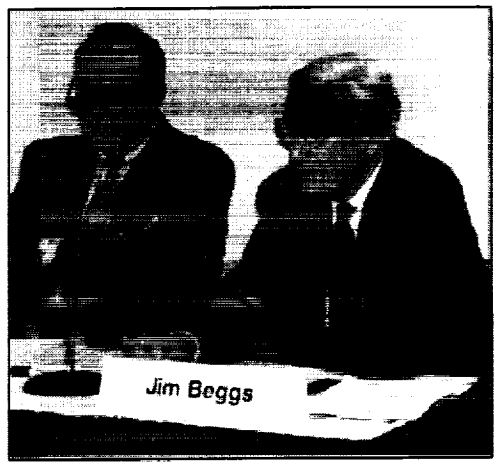
JAMES BEGGS: Not by default, by I think policy we turned it over to them. We said we're no longer going to fly commercial on the shuttle. Period. The end. And they've got to find, if you want to fly something into space, you've got to buy it on the market. And their understanding there with the established pricing policy was significantly below the level of the marketplace, price-wise. And so they returned the market over to them. We just absolutely gave it to them, and that's a fact.

MODERATOR: *I think you disagree with that decision.*

JAMES BEGGS: Wholeheartedly. I thought it was stupid. If I can just add to what Gil said. We were concerned with the Ariane from the beginning because first, we knew that the Europeans planned to buy their way into this market. We knew that they were going to get a certain percentage of the market no matter what we did and no matter what we offered. So, we were concerned from that point of view.

Secondly, we also knew that the French in their usual way and their European partners would use all of the diplomatic advantages that they are so good at using. We knew that they would use all of the advantages that they had in the marketplace to ensure that the payloads that they could control would go on the Ariane. And indeed, that's turned out to be the case.

Now, having said that, I think in many respects the competition that the Ariane provided has been a healthy thing. But it's still a situation that makes it very difficult for U.S. launch vehicle operators to compete, and we still, the way I read the numbers, they still have 50% or more of the market, do they not? And so they will hold onto that come hell or high water no matter what their U.S. counterparts do.



Left: James Rose, **Right**: James Beggs

JAMES ROSE: Well, they'll price it at whatever they want to because they're not private like we're private. In other words Arianespace, they do not pay, they don't have to recover any development cost. That's all done by the government. And if they need the business, it's sold--that's why when we say it's a global market, that this government has to do certain things or be, you know, in certain areas...if we're going to compete with the way they do business. And the Japanese are the same way. I mean, their government and industry relationships are not the same as we have in this country so I think that's important for everybody to recognize. So, the Ariane was a problem all along.

GILBERT RYE: The Administration did side with NASA on the shuttle pricing issue, just for the record. We did agree with NASA that the price of the shuttle ride should be lower than what it would have had to been had those on the other side of the issue carried the day in their argument that all of the costs of the shuttle should be allocated to the prices that are being charged customers. So that issue was resolved, in the favor of NASA. What I was referring to by default was a much earlier decision which was to put all the payloads on shuttle. The United States made this decision consciously in order to make the shuttle cost effective, which in one sense was a perfectly rational decision to make. It cost so much, it was necessary for the government to put as many payloads, both Department of Defense as well as civil, payloads on board shuttle. But in retrospect that turned out to be a bad decision. Had the United States continued the ELV production line, especially for large class geostationary capable launch vehicles, we would have, in my view, been in a position to successfully compete with the French and would not have experienced the down period that we did following the Challenger disaster.

JAMES BEGGS: I respectfully disagree. But I do agree with your comment on pricing. The pricing issue continues to rattle around in NASA even today, and it's still an issue that has not been fully resolved.

ROBERT WALKER: But just remember the context in which a lot of these decisions were being made, and the specific timeframe that you talked about, '81-'82, and that was a time when there was a great deal of optimism. The shuttle was just coming on line and, you know, there was a lot of optimism and that optimism was being reflected in some fairly wild figures that Capitol Hill was dealing with and was being dealt with in the pricing policy. I remember NASA coming not to the Science Committee, but I served on the Government Appropriations Committee at that point where we were looking at flight rates for the shuttle. And we were being told that NASA was going to fly this thing on average of once a week at that point, and the pricing policy was reflected in the number of flights per year that you were going to get out of the shuttle. And some of us who were expressing some concern about those flight rate schedules, and what they really meant and were they possible, were seen as enemies of NASA for asking the question. I was hardly an enemy of NASA but I got excoriated a little bit for suggesting that those flight rates were not probably going to be achieved.

JAMES BEGGS: And we took that to heart. We were going to fly 40 times a year. When I got back to NASA you were going to fly 40 times a year. And you and the rest of the Committee raised that with me the first time I come up here that that seemed to be, strictly speaking, in accordance with what we all understood were the possibilities, wildly exaggerated. And I took that to heart. We went back and reviewed it and we decided that the maximum we would fly was 24 times a year, which incidentally was a very good thing for the Committee to have done for us because we were at that time planning to spare and buy rocket engines and all the rest of the things for a 40 per year launch rate. So, cutting it back to 24 saved a hell of a lot of money. But to my knowledge, and I haven't followed this as closely as I used to, but to my knowledge, we've never launched more than about 15, and my feeling now...we could launch 18 if we really wanted to, but that's about the max.

MARTIN KRESS: To try to do something unique, I remember when I was on the Committee, I used to write all these great questions, we'd ask them of the witness, and then I'd sit and hear the answer, and I'd say "That's a great answer. Too bad it's not near the question." Let me try to go back to 1980-1984 and I'll speak as an individual.

When I moved over to the Commerce Committee, even when the legislation started to come to the Hill, was it a focal point? No, because you've got to remember the over-action context. One, the Senate Commerce Committee was now responsible for space and aeronautics. There was no longer a free standing separate Senate Committee, a big difference. On the House side, yes there was the House Science Committee. But in all fairness it got a B rating by its members in terms of the allocation of assignments and so that had some influence. What really was the heart of the debate in the early '80s was four things. Reduce the scope of government, balance the budget, we're going to put an end to the evil empire and deregulation. And I sat on a Committee where deregulation was the real interest and the Senate Commerce Committee, whether it was transportation or any other sectors, you all know. So, did the policy debates get a lot of attention? No. Not even to be said to say probably when we wrote the final bills. You know people would read the summaries. They would diligently come to the Committee markup, but the subtleties of these things, we were doing our best to give these initiatives a chance. It was like saying, all right, let's try. But I don't think it was perceived as a brand new third wave. You know I always had trouble with the three-legged stool because if DOD is one leg and NASA is the other leg and commercial space is the third leg, you'd have a hard time sitting on the stool.

ROBERT WALKER: But we did get rid of the evil empire.

MARTIN KRESS: Yes, we did. We balanced the budget. We deregulated... but...it didn't feel [like] it was a movement. The budgets then were very sparse. The NASA budget didn't hit double digits until the Challenger accident when it went to $10.6 because it included $2.1 for a replacement orbiter. It was really supposed to be $8.5 that year.

JAMES BEGGS: Well, we did deregulate about halfway, Marty. The thing we didn't do until very recently is reform the procurement laws sufficiently, and we still haven't reformed them enough to make what Jim Rose was talking possible. We really ought to set about putting in place a federal procurement law and structure that would allow true commercialization. And right now you can't do that under the federal acquisition regulation.

MARTIN KRESS: The Congress can do anything it so desires. I mean, if you get the right champions and the right level of support, right? I mean it is amazing what you can get through the institution. I've heard a lot of amendments mumbled through that gave people a lot of money over the years.

JAMES ROSE: To go back again, with the change in the shuttle pricing policy. Being on the other side where we were going to be users and we had already sold a business plan and what have you to our management and Johnson & Johnson and everybody else. So, you know, we need to pin something down because it makes a lot of difference whether you can show the types of returns or potential returns on investment enough to offset all these risks. And, I was saved because we had done, in fact, our technology had been to the point with the product we were going to make, on the ground we could demonstrate that we could actually get two columns of material in the same machine. And therefore could double the output. So when they doubled the price on the shuttle, I was able to offset that because I could show that we could double the output. But that is an example, if we don't pin down what things cost, and the government never did have a real pricing policy for using the shuttle for a week at a time and then coming home. They had a policy of putting the satellite in orbit, but that's not the same thing. They never got a pricing policy ever, and the station doesn't have a pricing policy today, to my knowledge, that says what it's going to cost a person. And he's going to do a

business plan before he goes out to do anything concrete, or he's got to have established, yes, this thing makes sense to go and try, at least to get involved and go do. But if he doesn't know what its going to cost him, how can he develop a business plan?

JAMES BEGGS: You've got to have assurance of access at a price, and the price has got to be fixed, defined and staged so that you can do your research for a certain price for access. You can do your development for maybe another price, and there's got to be flexibility in all this as Jim Muncy touched on earlier. You've got to be able to enter into agreements that you can defer some of these costs until the market is developed and the money starts flowing. And then pay back on a royalty basis and perhaps pay interest on that. But unless you, until and unless you have that, as Jim Rose has said, you can't develop a business plan. Without a business plan you cannot raise venture capital. Period. The end.

JAMES MUNCY: We talked about the fact that there was a pre-existing market for telecommunications and to a lesser extent a pre-existing market for remote sensing from aerial photography and stuff like that in the '60s and '70s. [Today] there is a pre-existing market for fast package delivery and for tourism. They are large multi-billion dollar industries. You don't have to create a new industry. You don't have to create new customers. You don't have to go through the huge, I mean, there's a learning curve, but there isn't a huge learning curve of someone literally doing something differently than they've ever done it before in a new environment for new customers. I mean it was hard enough for you to do what you did with Johnson & Johnson back in the early '80s. At the same time, tourism is not necessarily a respected or politically favored term in the space community right now. But it's a market and fast package delivery is a market.

JAMES ROSE: It might be the first thing that gets there. And I agree with you on that and I see nothing wrong with it. And I think if it takes that to stimulate all of this other good stuff we're talking about, so be it.

JAMES MUNCY: What should we do now? If we have an actual market, if we have an actual demand curve, if we have an actual...possibility of meeting it,...what lessons from the '80s can we draw to say...let's not necessarily go chase electrophoresis? Let's not necessarily go chase, you know, this or that particular new thing that is sort of politically correct. Let's let our very large existing demand help drive investment in things like space transportation.

MARTIN KRESS: I would have a hard time if I were still sitting on the Committee of Jurisdiction building a position that said space tourism is the -- and warrants significant federal investment. And I think that's one of the dilemmas you have. If you want to tell me I'm in space to enable bolder activities or if you want to tell me there's some high value-added areas that space will enable, I think you would find a more receptive market. Tourism's always been dangling out there. There's been groups selling seats, as you know, for a decade. And the reason I say that is, you know, look what can't survive. We can't get a high speed commercial transport through the system because the customer for that technology doesn't see a market near enough. So, to come along with space tourism, I think, Jim, would be a really tough sell.

ROBERT WALKER: Well, it depends on how broadly though you define space tourism. I mean, you can define space tourism as being people interested in going to see space facilities, and you know, is there a way in which the space community can begin to reap some reward out of the fact that there is this vast public interest in what goes on in space. The space camps

are enormously popular. There isn't, there may be an opportunity with technology that is pretty much in hand to take people to the point of weightlessness in space without actually going, you know...

MARTIN KRESS: In an airplane.

ROBERT WALKER: Yeah, precisely. Or flying people aboard the...parabolic flights. You know there are a number of things that if you define it broadly enough, there is probably a potential market without actually going to orbit. With the idea that going to orbit at some point in the future is a potential...And you know, the point being that if you don't have some kind of investment stream that people are willing to put real dollars into in order to do space related companies that then take that money and invest it in other higher line items, we're going to be a long, long time finding budgets. You're right, Marty, you take some of this stuff in the Congressional Committees, they're not going to do it. But, the Congressional Committees could open up to a lot more in the way of tourist activity some of the facilities the government has created over the years and allow far more in the way of investment in some of the infrastructures that already exist.

MARTIN KRESS: I alluded to it at the start. If there was to be convened today a Presidential commission to look at space policy, and base what we know today about the Internet and information technology and the public reaction to Mars Pathfinder, would that be the same policy that we've all been pursuing since Wernher von Braun, since Agnew, since Paine, since Augustine? And I think it would be a very interesting time to go out and test the marketplace to see if there isn't a...change in terms of the demands and the requirements. People know. I test this stuff on my kids all the time. They love Mars Pathfinder. To them a virtual world, they sit at the computer all day long, it's as common to them as anything we've ever had in our hands. And if they could explore the universe sitting at a computer terminal, that's a highly acceptable option.

Now, as we all know, we fought back a lot of amendments to do that in our day too. But I do think at some point you're going into the 21st Century. There have been phenomenal breakthroughs in the last decade. I think if you could reduce the cost of space transportation, which has been our ultimate goal for twenty years, you can enable a lot of things. But I wouldn't put tourism at the front of my enabling list. It would be secondary, tertiary, new market opportunity. But I do think there's a lot of potential there that if you let the high tech community take a look at it, they can make it possible.

GILBERT RYE: Isn't the model, you know, the model really is what's happening in the communications area today. I mean number one, you have this huge market out there that's just exploding, especially in mobile communications. You've got companies who have the bucks, are willing to invest to capitalize on that market who are, and the government's role is one of, the FCC [Federal Communications Commission]...and the WTO [World Trade Organization], for regulating frequencies that are being used, and flight safety. Other than that...I guess exporting some sensitive technologies overseas, the government is what I would consider relatively limited, and I would also argue, [a] legitimate role for the government.

MARTIN KRESS: It created conditions and provided the technology to enable it and get out of the way.

ROBERT WALKER: It is passing strange, and I think I first suggested this back in the '80s and so on. But I was one of the people who suggested that maybe one of the ways you could make money in space and get investors to put money up was by painting billboards on the side of rockets and so on, and saw by the paper the other day that Pizza Hut is going to do it, but it's going to be on a Russian rocket.

JAMES MUNCY: But it violates NASA policy.

MARTIN KRESS: Can I test the market? How many remember the Super Bowl ad with the Coke can that was flown on the shuttle next to the Pepsi can and they both turned to fizz. Things change. Conditions change. The market changes, and there's a lot more capability out there now in the high-tech community and there's a lot more entrepreneurial spirit in general that you can tap onto than you could in the '80s, I think.

You're also at a point in time where NASA is consciously looking how do you refine your core competencies? What do you focus on? So, I don't think the agency as a whole has wedded that everything that I had yesterday has to be there tomorrow. And I think that's a big step for the agency.

GILBERT RYE: There are now more commercial launches than there are government launches. So, we have come a long way in this business, and I think there are some good models for how the government, the role the government should take, and what the opportunity really is.

MODERATOR: *What are the lessons of the 1980s? I mean what can we take away from the experience as we try to think about how to define space policy in the future?*

GILBERT RYE: There's no substitute for leadership. I think the first term of President Reagan was a golden period, being able to get things done, get initiatives started. All of them weren't completed during that period of time, but I think it was a good time and I think partly because of leadership. But also because I think there was a common understanding of what the possibilities were of what could be done, and there was a will and desire to make it happen.

JAMES ROSE: I believe that, as I said, I thought we had ample policy in the '80s from everywhere, every source--the White House, the Congress as well as NASA itself. In the future we should spend more time with the implementation to make sure that those policies are implemented. You can have all the policies in the world. If you don't get them, if there's not an implemented way to do it and an effective implementing way to do it they'll die, and the regime goes away, and the new regime is not going to carry on precisely what the old regime did. I've watched this happen between the Reagan and the Bush Administration with the ISF.

JAMES BEGGS: The important thing to draw from this, from a public policy, public administration point of view, is that if you're going to attract a serious interest in a government program, you've got to establish a consistent application of the policy over a long period of time. Unless you do that, you're not going to get people to invest money. The way this country is, it has succeeded in a commercial sense is that from the very beginning, the founding fathers of the country established several rules that have consistently been followed ever since. There were binding contracts. There was a patent system set up. There was a system that allowed you to protect your intellectual property, called copyrights. There was

various policies that the federal government inaugurated right from the origins of the Republic that have remained the same ever since. And to be sure we have changed the application of how we administer such things as anti-trust and what have you over time. But the policies that were put in place at the origin of the Republic that allowed commerce to develop have been consistent over our 230 or 40 year history. And it has made us the most effective and most successful commercial country in the world, the world has ever seen.

We have not succeeded in doing the same thing for space commerce. And the policies that have been implemented, I think, have been at large, most cases have been sound but they have not been consistently applied.

ROBERT WALKER: Yeah, I would agree with that and to add one more point. It seems to me that we have to regard space as a growing area, an expanding area where you cannot have single points of entry and single points of failure. That we should have learned in [the] 1980s that if, in fact, what you do is try to run a commercial policy through one agency and not realize that it is much bigger than that and have a variety of policies that commercial entities can take advantage of on their way to commercial success, you're probably going to fail. The same thing the Challenger proved, that if you set up policies where you have a single point of failure in the entire system, it just takes the whole system down with it and it's very difficult to rebuild. And so, you know, it seems to me one of the basic lessons of the '80s is that you've got to be much bigger in your expectations than single points of interest or single points of failure allow you to be.

MARTIN KRESS: Probably, from my perspective, it takes good people to make anything work, and I think what concerns me is I look back to the '80s, [and] a lot of people paid a very high price for their involvement in the space program in the '80s. Success, we always say, is a thousand fathers and failures and orphans. I think one of the challenges you have in today's environment is how do you re-instill the value of public service in today's youth, which I think is a high priority for the agency. I think your ability to hire new people, not every decade, but every year is critical to your long-term survivability.

And the other thing I look back at the '80s, I found that the pendulum always swings too far. Whenever you correct the problem and you go so far in the other direction, and it takes you twenty years to get back where you should have been with the original decision. And the thing that I would put in that category is the revolving door. On the one hand there's been a theme here today. You need to be more business like. One of the great challenges is taking an R&D organization with a lot of history, culture and institutional structure and trying to make it more entrepreneurial. Now, we do that by closing the revolving door and prohibiting anyone from business to come in and help you without throwing away the rest of your career and all your investments. I think at some point we need to reassess that as a national issue, but I think, to me looking backward, you can't match the capability of the people. I think you have, like I said at the outset, a group of highly committed people with one goal: the best national program. May not have agreed, and there may have been a lot of differing views, but that's an important asset to have.

Appendix A: United States National Space Policy, 1982
Source: Space Business Archives, Alexandria, Virginia

THE WHITE HOUSE
WASHINGTON

July 4, 1982

NATIONAL SECURITY DECISION
DIRECTIVE NUMBER 42
(UNCLASSIFIED VERSION)

NATIONAL SPACE POLICY

I. INTRODUCTION AND PRINCIPLES

This directive establishes national policy to guide the conduct of United States space program and related activities; it supersedes Presidential Directives 37, 42, and 54, as well as National Security Decision Directive 8. This directive is consistent with and augments the guidance contained in existing directives, executive orders, and law. The decisions outlined in this directive provide the broad framework and the basis for the commitments necessary for the conduct of United States space programs.

The Space Shuttle is to be a major factor in the future evolution of United States space programs. It will continue to foster cooperation between the national security and civil efforts to ensure efficient and effective use of national resources. Specifically, routine use of the manned Space Shuttle will provide the opportunity to understand better and evaluate the role of man in space, to increase the utility of space programs, and to expand knowledge of the space environment.

The basic goals of United States space policy are to: (a) strengthen the security of the United States; (b) maintain United States space leadership; (c) obtain economic and scientific benefits through the exploitation of space; (d) expand United States private-sector investment and involvement in civil space and space-related activities; (e) promote international cooperative activities that are in the national interest; and (f) cooperate with other nations in maintaining the freedom of space for all activities that enhance the security and welfare of mankind.

The United States space program shall be conducted in accordance with the following basic principles:

A. The United States is committed to the exploration and use of space by all nations for peaceful purposes and for the benefit of mankind. "Peaceful purposes" allow activities in pursuit of national security goals.

B. The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and rejects any limitations on the fundamental right to acquire data from space.

C. The United States considers the space systems of any nation to be national property with the right of passage through and operations in space without interference. Purposeful interference with space systems shall be viewed as an infringement upon sovereign rights.

D. The United States encourages domestic commercial exploitation of space capabilities, technology, and systems for national economic benefit. These activities must be consistent with national security concerns, treaties, and international agreements.

E. The United States will conduct international cooperative space-related activities that achieve sufficient scientific, political, economic, or national security benefits for the nation.

F. The United States space program will be comprised of two separate, distinct and strongly interacting programs--national security and civil. Close coordination, cooperation and information exchange will be maintained among these programs to avoid unnecessary duplication.

G. The United States Space Transportation System (STS) is the primary space launch system for both national security and civil government missions. STS capabilities and capacities shall be developed to meet appropriate national needs and shall be available to authorized users -- domestic and foreign, commercial, and governmental.

H. The United States will pursue activities in space in support of its right of self-defense.

I. The United States will continue to study space arms control options. The United States will consider verifiable and equitable arms control measures that would ban or otherwise limit testing and deployment of specific weapons systems, should those measures be compatible with United States national security.

II. SPACE TRANSPORTATION SYSTEM

The Space Transportation System (STS) is composed of the Space Shuttle, associated upper stages, and related facilities. The following policies shall govern the development and operation of the STS:

A. The STS is a vital element of the United States space program and is the primary space launch system for both United States national security and civil government missions. The STS will be afforded the degree of survivability and security protection required for a critical national space resource.

B. The first priority of the STS program is to make the system fully operational and cost-effective in providing routine access to space.

C. The United States is fully committed to maintaining world leadership in space transportation with an STS capacity sufficient to meet appropriate national needs. The STS program requires sustained commitments by all affected departments and agencies. The United States will continue to develop the STS through the National Aeronautics and Space Administration (NASA) in cooperation with the Department of Defense (DoD).

Enhancements of STS operational capability, upper stages, and efficient methods of deploying and retrieving payloads should be pursued as national requirements are defined.

D. United States Government spacecraft should be designed to take advantage of the unique capabilities of the STS. The completion of transition to the Shuttle should occur as expeditiously as practical.

E. NASA will assure the Shuttle's utility to the civil users. In coordination with NASA, the DoD will assure the Shuttle's utility to national defense and integrate national security missions into the Shuttle system. Launch priority will be provided for national security missions.

F. Expendable launch vehicle operations shall be continued by the United States Government until the capabilities of the STS are sufficient to meet its needs and obligations. Unique national security considerations may dictate developing special-purpose launch capabilities.

G. For the near-term, the STS will continue to be managed and operated in an institutional arrangement consistent with the current NASA/DoD Memoranda of Understanding. Responsibility will remain in NASA for operational control of the STS for civil missions and in the DoD for operationpl control of the STS for national security missions. Mission management is the responsibility of the mission agency. As the STS operations mature, options will be considered for possible transition to a different institutional structure.

H. Major changes to STS program capabilities will require Presidential approval.

III. CIVIL SPACE PROGRAM

The United States shall conduct civil space programs to expand knowledge of the Earth, its environment, the solar system, and the universe; to develop and promote selected civil applications of space technology; to preserve the United States leadership in critical aspects of space science, applications, and technology; and to further United States domestic and foreign policy objectives. Consistent with the National Aeronautics and Space Act, the following policies shall govern the conduct of the civil space program.

A. Science, Applications, and Technology: United States Government civil programs shall continue a balanced strategy of research, development, operations, and exploration for science, applications, and technology. The key objectives of these programs are to:

(1) Preserve the United States preeminence in critical major space activities to enable continued exploitation and exploration of space.

(2) Conduct research and experimentation to expand understanding of: (a) astrophysical phenomena and the origin and evolution of the universe, through long-term astrophysical observation; (b) the Earth, its environment, and its dynamic relation with the Sun; (c) the origin and evolution of the solar system, through solar, planetary, and lunar sciences and exploration; and (d) the space environment and technology required to advance knowledge in the biological sciences.

(3) Continue to explore the requirements, operational concepts, and technology associated with permanent space facilities.

(4) Conduct appropriate research and experimentation in advanced technology and systems to provide a basis for future civil space applications.

B. Private Sector Participation: The United States Government will provide a climate conducive to expanded private sector investment and involvement in civil space activities with due regard to public safety and national security. Private sector space activities will be authorized and supervised or regulated by the government to the extent required by treaty and national security.

C. International Cooperation: United States cooperation in international civil space activities will:

(1) Support the public, nondiscriminatory direct readout of data from Federal civil systems to foreign ground stations and the provision of data to foreign users under specified conditions.

(2) The United States will continue cooperation with other nations in international space activities by conducting joint scientific and research programs, consistent with technology transfer policy, that yield sufficient benefits to the United States.

D. Civil Operational Remote Sensing: Management of Federal civil operational remote sensing is the responsibility of the Department of Commerce. The Department of Commerce will: (a) aggregate Federal needs for civil operational remote sensing to be met by either the private sector or the Federal government; (b) identify needed civil operational system research and development objectives; and (c) in coordination with other departments or agencies, provide for regulation of private-sector operational remote sensing systems.

IV. NATIONAL SECURITY SPACE PROGRAM

The United States will conduct those activities in space that it deems necessary to its national security. National security space programs shall support such functions as command and control, communications, navigation, environmental monitoring, warning, surveillance and space defense. The following states the policies which shall govern the conduct of the national security program:

A. Survivability. Survivability and endurance of space systems, including all system elements, will be pursued commensurate with the planned use in crisis and conflict, with the threat, and with the availability of other assets to perform the mission. Deficiencies will be identified and eliminated, and an aggressive, long-term program will be undertaken to provide more-assured survivability and endurance.

B. Anti-satellite (ASAT) Capability. The United States will proceed with development of an ASAT capability, with operational deployment as a goal. The primary purposes of a United States ASAT capability are to deter threats to space systems of the United States and its Allies and, within such limits imposed by international law, to deny any adversary the use of space-based systems that provide support to hostile military forces.

C. Space Defense. The United States will develop and maintain an integrated attack warning, notification, verification, and contingency reaction capability which can effectively detect and react to threats to United States space systems.

D. Security. Security, including dissemination of data, shall be conducted in accordance with Executive Orders and applicable directives for protection of national security information and commensurate with both the missions performed and the security measures necessary to protect related space activities.

V. INTER-PROGRAM RESPONSIBILITIES

The following guidance is applicable to and binding upon the United States national security and civil space programs:

A. The national security and civil space programs will be closely coordinated and will emphasize technology sharing within necessary security constraints. Technology transfer issues will be resolved within the framework of directives, executive orders, and laws.

B. Civil earth-imaging from space will be permitted under controls when the requirements are justified and assessed in relation to civil benefits, national security, and foreign policy. These controls will be periodically reviewed to determine if the constraints should be revised.

C. The United States Government will maintain and coordinate separate national security and civil operational space systems when differing needs of the programs dictate.

VI. IMPLEMENTATION

Normal interagency coordinating mechanisms will be employed to the maximum extent possible to implement the policies enunciated in this directive. To provide a forum to all Federal agencies for their policy views, to review and advise on proposed changes to national space policy, and to provide for orderly and rapid referral of space policy issues to the President for decisions as necessary, a Senior Interagency Group (SIG) on Space shall be established. The SIG (Space) will be chaired by the Assistant to the President for National Security Affairs and will include the Deputy or Under Secretary of State, the Deputy or Under Secretary of Defense, the Deputy or Under Secretary of Commerce, Director of Central Intelligence, Chairman of the Joint Chiefs of Staff, Director of the Arms Control and Disarmament Agency, and the Administrator of the National Aeronautics and Space Administration. Representatives of the Office of Management and Budget and the Office of Science and Technology Policy will be included as observers. Other agencies or departments will participate based on the subjects to be addressed.

Ronald Reagan [signed]

Appendix B: Land Remote-Sensing Commercialization Act of 1984, Public Law #98-365, 98 Stat., 451.
Source: NASA Historical Reference Collection, NASA History Office, NASA Headquarters, Washington, D.C.

Public Law 98-365
98th Congress

An Act

To establish a system to promote the use of land remote-sensing satellite data, and for other purposes. [citation in margin: "July 17, 1984, (H.R. 5155)"].

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Land Remote-Sensing Commercialization Act of 1984". [citation in margin: "Land remote Sensing Commercialization Act of 1984. Communications and telecommunications. 15 USC 4201 note."]

TITLE I—DECLARATION OF FINDINGS, PURPOSES, AND POLICIES

FINDINGS

SEC. 101. The Congress finds and declares that—[citation in margin: "Congress. 15 USC 4201."]

(1) the continuous civilian collection and utilization of land remote-sensing data from space are of major benefit in managing the Earth's natural resources and in planning and conducting many other activities of economic importance;

(2) the Federal Government's experimental Landsat system has established the United States as the world leader in land remote-sensing technology; [marginal note: "Landsat system."]

(3) the national interest of the United States lies in maintaining international leadership in civil remote sensing and in broadly promoting the beneficial use of remote-sensing data;

(4) land remote sensing by the Government or private parties of the United States affects international commitments and policies and national security concerns of the United States; [marginal note: "Defense and national security."]

(5) the broadest and most beneficial use of land remote-sensing data will result from maintaining a policy of nondiscriminatory access to data;

(6) competitive, market-driven private sector involvement in land remote sensing is in the national interest of the United States;

(7) use of land remote-sensing date has been inhibited by slow market development and by the lack of assurance of date continuity;

(8) the private sector, and in particular the "value-added" industry, is best suited to develop land remote-sensing data markets;

(9) there is doubt that the private sector alone can currently develop a total land remote-sensing system because of the high risk and large capital expenditure involved;

(10) cooperation between the Federal Government and private industry can help assure both data continuity and United States leadership;

(11) the time is now appropriate to initiate such cooperation with phased transition to a fully commercial system;

(12) such cooperation should be structured to involve the minimum practicable amount of support and regulation by the Federal Government and the maximum practicable amount of competition by the private sector while assuring continuous availability to the Federal Government of land remote sensing data;

(13) certain Government oversight must be maintained to assure that private sector activities are in the national interest and that the international commitments and policies of the United States are honored; and

(14) there is no compelling reason to commercialize meteorological satellites at this time.

PURPOSES

[citation in margin: "15 USC 4202."] Sec. 102. The purposes of this Act are to–

(1) guide the Federal Government in achieving proper involvement of the private sector by providing a framework for phased commercialization of land remote sensing and by assuring continuous data availability to the Federal Government;

[marginal note: "Defense and national security."] (2) maintain the United States worldwide leadership in civil remote sensing, preserve its national security, and fulfill its international obligations;

(3) minimize the duration and amount of further Federal investment necessary to assure data continuity while achieving commercialization of civil and land remote sensing;

(4) provide for a comprehensive civilian program of research, development, and demonstration to enhance both the United States capabilities for remote sensing from space and the application and utilization of such capabilities; and

(5) prohibit commercialization of meteorological satellites at this time.

POLICIES

[citation in margin: "15 USC 4203."] Sec. 103 (a) It shall be the policy of the United States to preserve its right to acquire and disseminate unenhanced remote-sensing data.

(b) It shall be the policy of the United States that civilian unenhanced remote-sensing data be made available to all potential users on a nondiscriminatory basis and in a manner consistent with applicable antitrust laws.

[marginal note: "Defense and national security."] (c) It shall be the policy of the United States both to commercialize those remote-sensing space systems that properly lend themselves to private sector operation and to avoid competition by the Government with such commercial operations, while continuing to preserve our national security, to honor our international obligations, and to retain in the Government those remote-sensing functions that are essentially of a public service nature.

DEFINITIONS

[citation in margin: "15 USC 4204."] Sec. 104 For purposes of this Act:

(1) The term "Landsat system" means Landsats 1,2,3,4, and 5, and any related ground equipment, systems, and facilities, and any successor civil land remote-sensing space systems operated by the United States government prior to the commencement of the six-year period described in title III.

(2) The term "Secretary" means the Secretary of Commerce.

(3)(A) The term "nondiscriminatory basis" means without preference bias, or any other special arrangement (except on the basis of national security concerns pursuant to section 607) regarding delivery, format, financing, or technical considerations which would favor one buyer or class of buyers over another.

(B) The sale of data is made on a nondiscriminatory basis only if (i) any offer to sell or deliver data is published in advance in such manner as will ensure that the offer is equally available to all prospective buyers (ii) the system operator has not established or changed any price, policy, procedure, or other term or condition in a manner which gives one buyer or class of buyer de factor favored access to data; (iii) the system operator does not make unenhanced data available to any purchaser on an exclusive basis; and (iv) in a case where a system operator offers volume discounts, such discounts are no greater than the demonstrable reductions in the cost of volume sales. The sale of data on a nondiscriminatory basis does not preclude the system operator from offering discounts other than volume discounts to the extent that such discounts are consistent with the provisions of this paragraph.

(C) The sale of data on a nondiscriminatory basis does not require (i) that a system operator disclose names of buyers or their purchases; (ii) that a system operator maintain all, or any particular subset of, data in a working inventory; or (iii) that a system operator expend equal effort in developing all segments of a market.

(4) The term "unenhanced data" means unprocessed or minimally processed signals or film products collected from civil remote-sensing space systems. Such minimal processing may include rectification or distortions, registration with respect to features of the Earth, and calibration of spectral response. Such minimal processing does not include conclusions, manipulations, or calculations derived from such signals or film products or combination of the signals or film products with other data or information.

(5) The term "system operator" means a contractor under title II or title III or a license holder under title IV.

TITLE II–OPERATION AND DATA MARKETING OF LANDSAT SYSTEM

OPERATION

Sec 201.(a) The Secretary shall be responsible for–[citation in margin: "15 USC 4211."]

(1) the Landsat system, including the orbit, operation, and disposition of Landsat system, including the orbit, operation, and disposition of Landsats 1,2,3,4, and 5; and

(2) provision of data to foreign ground stations under the terms of agreements between the United States Government and nations that operate such ground stations which are in force on the date of commencement of the contract awarded pursuant to the title.

(b) The provisions of this section shall not affect the Secretary's authority to contract for the operation or part or all of the Landsat system, so long as the United States Government retains–

(1) ownership of such system;

(2) ownership of the unenhanced data; and

(3) authority to make decisions concerning operation of the system.

CONTRACT FOR MARKETING OF UNENHANCED DATA

[citation in margin: "15 USC 4212."] SEC. 202. (a) In accordance with the requirements of this title, the Secretary, by means of a competitive process and to the extent provided in advance by appropriation Acts, shall contract with a United States private sector party (as defined by the Secretary) for the marketing of unenhanced data collected by the Landsat system. Any such contract—

(1) shall provide that the contractor set the prices of unenhanced data;

(2) may provide for financial arrangements between the Secretary and the contractor including fees for operating the system, payments by the contractor as an initial fee or as a percentage of sales receipts, or other such considerations;

(3) shall provide that the contractor will offer to sell and deliver unenhanced data to all potential buyers on a nondiscriminatory basis;

(4) shall provide that the contractor pay to the United States Government the full purchase price of any unenhanced data that contractor elects to utilize for purposes other than sale;

(5) shall be entered into by the Secretary only if the Secretary has determined that such contract is likely to result in net cost savings for the United States Government; and

(6) may be reawarded competitively after the practical demise of the space segment of the Landsat system, as determined by the Secretary.

(b) Any contract authorized by subsection (a) may specify that the contractor use, and, at his own expense, maintain, repair, or modify, such elements of the Landsat system as the contractor finds necessary for commercial operations.

[marginal note: "Congress."] (c) any decision or proposed decision by the Secretary to enter into any such contract shall be transmitted to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and technology of the House of Representatives for their review. No such decision or proposed decision shall be implemented unless (A) a period of thirty calendar days has passed after the receipt by each such committee of such transmittal, or (B) each such committee before the expiration of such period has agreed to transmit and has transmitted to the Secretary written notice to the effect that such committee has no objection to the decision or proposed decision. As part of the transmittal, the Secretary shall include information on the terms of the contract described in subsection (a).

(d) In defining "United Stated private sector party" for purposes of this Act, the Secretary may take into account the citizenship of key personnel, location of assets, foreign ownership, control, influence, and other such factor.

CONDITIONS OF COMPETITION FOR CONTRACT

[citation in margin: "15 USC 4213."] SEC. 203. (a) The Secretary shall, as part of the advertisement for the competition for the contract authorized by section 202, identify and publish the international obligations, national security concerns (with appropriate protection of sensitive information, domestic legal considerations, and any other standards or conditions which a private contractor shall be required to meet.

(b) In selecting a contractor under this title, the Secretary shall consider -

(1) ability to market aggressively unenhanced data;
(2) the best overall financial return to the Government, including the potential cost savings to the Government, including the potential cost savings to the Government that are likely to result from the contract;
(3) ability to meet the obligations, concerns, considerations, standards, and conditions identified under subsection (a);
(4) technical competence, including the ability to assure continuous and timely delivery of data from the Landsat system;
(5) ability to effect a smooth transition with the contractor selected under title III; and
(6) such other factors as the Secretary deems appropriate and relevant.

(c) If, as a result of the competitive process required by section 202(a) [marginal note: "Report."], the Secretary receives no proposal which is acceptable under the provisions of this title, the Secretary shall so certify and fully report such finding to the Congress. As soon as practicable but not later than thirty days after so certifying and reporting, the Secretary shall reopen the competitive process. The period for the subsequent competitive process shall not exceed one hundred and twenty days. If, after such subsequent competitive process, the Secretary receives no proposal which is acceptable under the provisions of this title, the Secretary shall so certify and fully report such finding to the Congress. In the event that no acceptable proposal is received, the Secretary shall continue to market data from the Landsat system.

(d) A contract awarded under section 202 may, in the discretion of the Secretary, be combined with the contract required by title III, pursuant to section 304(b).

SALE OF DATA

SEC. 204. (a) After the date of the commencement of the contract described in section 202(a) [citation in margin: 15 USC 4214."], the contractor shall be entitled to revenues from sales of copies of data from the Landsat system, subject to the conditions specified in sections 601 and 602.

(b) The contractor may continue to market data previously generated by the Landsat system after the demise of the space segment of the system.

FOREIGN GROUND STATIONS

SEC. 205. (a) The contract under this title shall provide that Contractor shall act as the agent of the Secretary by continuing to supply unenhanced data to foreign ground stations for the life [citation in margin: "15 USC 4215."], and according to the terms of those agreements between the United States Government and such foreign ground stations that are in force on the date of the commencement of the contract.

(b) Upon the expiration of such agreements, or in the case of foreign ground stations that have no agreement with the United States on the date of commencement of the contract, the contract shall provide —

(1) that unenhanced data from the Landsat system shall be made available to foreign ground stations only by the contractor; and
(2) that such data shall be made available on a nondiscriminatory basis.

TITLE III - PROVISION OF DATA CONTINUITY AFTER THE LANDSAT SYSTEM

PURPOSES AND DEFINITION

[citation in margin: "15 USC 4221."] SEC. 301 (a) It is the purpose of this title—

(1) to provide, in an orderly manner and with minimal risk, for a transition from Government operation to private, commercial operation of civil land remote-sensing systems; and

(2) to provide data continuity for six years after the practical demise of the space segment of the Landsat system.

(b) For purposes of this title, the term "data continuity" means the continued availability of unenhanced data -

(1) including data which are from the point of view of a data user—

(A) functionally equivalent to the multispectral data generated by the Landsat 1 and 2 satellites; and

(B) compatible with such data and with equipment used to receive and process such data; and

(2) at an annual volume at least equal to the Federal usage during fiscal year 1983.

(c) Data continuity may be provided using whatever technologies are available.

DATA CONTINUITY AND AVAILABILITY

[citation in margin: "Contracts with U.S. 15 USC 4222."] SEC. 302. The Secretary shall solicit proposals from Unites States private sector parties (as defined by the Secretary pursuant to section 202) for a contract for the development and operation of a remote-sensing space system capable of providing data continuity for a period of six years and for marketing unenhanced data in accordance with the provisions of sections 601 and 602. Such proposals, at a minimum, shall specify-

(1) the quantities and qualities of unenhanced data expected from the system;

(2) the projected date upon which operations could begin;

(3) the number of satellites to be constructed and their expected lifetimes;

(4) any need for Federal funding to develop the system;

(5) any percentage of sales receipts or other returns offered to the Federal Government;

(6) plans for expanding the market for land remote-sensing data; and

(7) the proposed procedures for meeting the national security concerns and international obligations of the United States in accordance with section 607.

AWARDING OF THE CONTRACT

[citation in margin: "15 USC 4223."] SEC. 303. (a)(1) In accordance with the requirements of this title, the Secretary shall evaluate the proposals described in section 302 and, by means of a competitive process and to the extent provided in advance by appropriation Acts, shall contract with the United States private sector party for the capability of providing data continuity for a period of six years and for marketing unenhanced data.

(2) Before commencing space operations the contractor shall obtain a license under title IV.

(b) As part of the evaluation described in subsection (a), the Secretary shall analyze the expected outcome of each proposal in terms of —

(1) the net cost to the Federal Government of developing the recommended system;

(2) the technical competence and financial condition of the contractor;

(3) the availability of such data after the expected termination of the Landsat system;

(4) the quantities and qualities of data to be generated by the recommended system;

(5) the contractor's ability to supplement the requirement for data continuity by adding, at the contractor's expense, remote-sensing capabilities which maintain United States leadership in remote sensing;

(6) the potential to expand the market for data;

(7) expected returns to the Federal Government based on any percentage of data sales or other such financial consideration offered to the Federal Government in accordance with section 305;

(8) the commercial viability of the proposal;

(9) the proposed procedures for satisfying the national security concerns and international obligations of the United States;

(10) the contractor's ability to effect a smooth transition with any contractor selected under title II; and

(11) such other factors as the Secretary deems appropriate and relevant.

(c) Any decision or proposed decision by the Secretary to enter into any such contract shall be transmitted to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives for their review [marginal note: "Congress."]. No such decision or proposed decision shall be implemented unless (1) a period of thirty calendar days has passed after the receipt by each such committee of such transmittal, or (2) each such committee before the expiration of such period has agreed to transmit and has transmitted to the Secretary written notice to the effect that such committee has no objection to the decision or proposed decision. As part of the transmittal, the Secretary shall include the information specified in subsection (a).

(d) If, as a result of the competitive process required by this section, the Secretary receives no proposal which is acceptable under the provisions of this title [marginal note: "Report."], the Secretary shall so certify and fully report such finding to the Congress. As soon as practicable but not later than thirty days after so certifying and reporting, the Secretary shall reopen the competitive process. The period for the subsequent competitive process shall not exceed one hundred and eighty days. If, after such subsequent competitive process, the Secretary receives no proposal which is acceptable under the provisions of this title, the Secretary shall so certify and fully report such finding to the Congress. Not earlier than ninety days after such certification and report, the Secretary may assure data continuity by procurement and operation by the Federal Government of the necessary systems, to the extent provided in advance by appropriation Acts.

TERMS OF CONTRACT

[citation in margin: "15 USC 4224."] SEC.304.(a) Any contract entered into pursuant to this title—

(1) shall be entered into as soon as practicable, allowing for the competitive procurement process required by this title;

(2) shall, in accordance with criteria determined and published by the Secretary, reasonably assure data continuity for a period of six years, beginning as soon as practicable in order to minimize any interruption of data availability;

(3) shall provide that the contractor will offer to sell and deliver unenhanced data to all potential buyers on a nondiscriminatory basis;

(4) shall not provide a guarantee of data purchases from the contractor by the Federal Government;

(5) may provide that the contractor utilize, on a space-available basis, a civilian United States Government satellite or vehicle as a platform for a civil land remote-sensing space system, if—

(A) the contractor agrees to reimburse the Government immediately for all related costs incurred with respect to such utilization, including a reasonable and proportionate share of fixed, platform, data transmission, and launch costs; and

(B) such utilization would not interfere with or otherwise compromise intended civilian Government missions, as determined by the agency responsible for the civilian platform; and

(6) may provide financial support by the United States Government, for a portion of the capital costs required to provide data continuity for a period of six years, in the form of loans, loan guarantees, or payments pursuant to section 305 of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 255)

(b)(1) Without regard to whether any contract entered into under this title is combined with a contract under title II, the Secretary shall promptly determine whether the contract entered into under this title reasonably effectuates the purposes and policies of title II. Such determination shall be submitted to the President and the Congress, together with a full statement of the basis for such determination.

(2) If the Secretary determines that such contract does not reasonably effectuate the requirements of title II, the Secretary shall promptly carry out the provisions of such title to the extent provided in advance in appropriations Acts.

MARKETING

[citation in margin: "15 USC 4225."] SEC.305.(a) In order to promote aggressive marketing of land remote-sensing data, any contract entered into pursuant to this title may provide that the percentage of sales paid by the contractor to the Federal Government shall decrease according to stipulated increase in sales levels.

(b) After the six-year period described in section 304(a)(2), the contractor may continue to sell data. If licensed under title IV, the contractor may continue to operate a civil remote-sensing space system.

REPORT

SEC.306. Two years after the date of the commencement of the six-year period described in section 304(a)(2) [citation in margin: "15 USC 4226."], the Secretary shall report to the President and to the Congress on the progress of the transition to fully private financing, ownership, and operation of remote-sensing space systems, together with any recommendations for actions, including actions necessary to ensure United States leadership in civilian land remote sensing from space.

TERMINATION OF AUTHORITY

SEC.307. The authority granted to the Secretary by this title shall terminate ten years after the date of enactment of this Act [citation in margin: "15 USC 4227."].

TITLE IV-LICENSING OF PRIVATE REMOTE-SENSING SPACE SYSTEMS

GENERAL AUTHORITY

SEC.401.(a)(1) In consultation with other appropriate Federal agencies [citation in margin: "15 USC 4241."], the Secretary is authorized to license private sector parties to operate private remote-sensing space systems for such period as the Secretary may specify and in accordance with the provisions of this title.

(2) In the case of a private space system that is used for remote sensing and other purposes, the authority of the Secretary under this title shall be limited only to the remote-sensing operations of such space system.

(b) No license shall be granted by the Secretary unless the Secretary determines in writing that the applicant will comply with the requirements of this Act, any regulations issued pursuant to this Act, and any applicable international obligations and national security concerns of the United States.

(c) The Secretary shall review any application and make a determination thereon within one hundred and twenty days of the receipt of such application [marginal note: "Review date."]. If final action has not occurred within such time, the Secretary shall inform the applicant of any pending issues and of actions required to resolve them.

(d) The Secretary shall not deny such license in order to protect any existing licenses from competition.

CONDITIONS FOR OPERATION

SEC.402(a) No person who is subject to the jurisdiction or control of the United States may, directly or through any subsidiary or affiliate, operate any private remote-sensing space system without a license pursuant to section 401.

(b) Any license issued pursuant to this title shall specify, at a minimum, that the license shall comply with all of the requirements of this Act and shall —

(1) operate the system in such manner as to preserve and promote the national security of the United States and to observe and implement the international obligations of the United States in accordance with section 607

(2) make unenhanced data available to all potential users on a nondiscriminatory basis;

(3) upon termination of operations under the license, make disposition of any satellites in space in a manner satisfactory to the President;

(4) promptly make available all unenhanced data which the Secretary may request pursuant to section 602;

(5) furnish the Secretary with complete orbit and data collection characteristics of the system, obtain advance approval of any intended deviation from such characteristics, and inform the Secretary of any unintended deviation;

(6) notify the Secretary of any agreement the licensee intends to enter with a foreign nation, entity, or consortium involving foreign nations or entities;

(7) permit the inspection by the Secretary of the licensee's equipment, facilities, and financial records;

(8) surrender the license and terminate operations upon notification by the Secretary pursuant o the section 403(a)(1); and

(9)(A) notify the Secretary of any "value added" activities (as defined by the Secretary by regulation) that will be conducted by the licensee or by a subsidiary or affiliate; and

(B) if such activities are to be conducted, provide the Secretary with a plan for compliance with the provisions of this Act concerning nondiscriminatory access.

ADMINISTRATIVE AUTHORITY OF THE SECRETARY

[citation in margin: "15 USC 4243."] SEC. 403.(a) In order to carry out the responsibilities specified in this title, the Secretary may—

(1) grant, terminate, modify, condition, transfer, or suspend licenses under this title, and upon notification of the licensee may terminate licensed operations on an immediate basis, if the Secretary determines that the licensee has substantially failed to comply with any provision of this Act, with any regulation issued under this Act, with any terms, conditions, or restrictions of such license, or with any international obligations or national security concerns of the United States;

(2) inspect the equipment, facilities, or financial records of any licensee under this title;

(3) provide penalties for noncompliance with the requirements for licenses or regulations issued under this title, including civil penalties not to exceed $10,000 (each day of operation in violation of such licenses or regulations constituting a separate violation);

(4) compromise, modify, or remit any such civil penalty;

(5) issue subpoenas for any materials, documents, or records, or for the attendance and testimony of witnesses for the purpose of conducting a hearing under this section;

(6) seize any object, record, or report where there is probable cause to believe that such object, record, or report was used, is being used, or is likely to be used in violation of this Act, or the requirements of a license or regulation issued thereunder; and

(7) make investigations and inquiries and administer to or take from any person an oath, affirmation, or affidavit concerning any matter relating to the enforcement of this Act.

(b) Any applicant or licensee who makes a timely request for review of an adverse action pursuant to subsection (a)(1), (a)(3), or (a)(6) shall be entitled to adjudication by the Secretary on the record after an opportunity for an agency hearing with respect to such adverse action. Any final action by the Secretary under this subsection shall be subject to judicial review under chapter 7 of title 5, United States Code [citation in margin: "5 USC 701 *et seq.*"].

REGULATORY AUTHORITY OF THE SECRETARY

SEC. 404. The Secretary may issue regulations to carry out the provisions of this title [citation in margin: "15 USC 4244."]. Such regulations shall be promulgated only after public notice and comment in accordance with the provisions of section 553 of title 5, United States Code.

AGENCY ACTIVITIES

SEC. 405. (a) A private sector party may apply for a license to operate a private remote-sensing space system which utilizes [citation in margin: "15 USC 4245."], on a space-available basis, a civilian United States Government satellite or vehicle as a platform for such system. The Secretary, pursuant to the authorities of this title, may license such system if it meets all the conditions of this title and—

(1) the system operator agrees to reimburse the Government immediately for all related costs incurred with respect to such utilization, including a reasonable and proportionate share of fixed, platform, data transmission, and launch costs; and

(2) such utilization would not interfere with or otherwise compromise intended civilian Government missions, as determined by the agency responsible for such civilian platform.

(b) The Secretary may offer assistance to private sector parties in finding appropriate opportunities for such utilization.

(c) To the extent provided in advance by appropriation Acts, any Federal agency may enter into agreements for such utilization if such agreements are consistent with such agency's mission and statutory authority, and if such remote-sensing space system is licensed by the Secretary before commencing operation.

(d) the provisions of this section do not apply to activities carried out under title V.

(e) Nothing in this title shall affect the authority of the Federal Communications Commission pursuant to the Communications Act of 1934, as amended (47 U.S.C. 151 et seq.) [citation in margin: "47 USC 609."]

TERMINATION

SEC. 406. If, five years after the expiration of the six-year period described in section 304(a)(2) [citation in margin: "15 USC 4246."], no private sector party has been licensed and continued in operation under the provisions of this title, the authority of this title shall terminate.

TITLE V—RESEARCH AND DEVELOPMENT

CONTINUED FEDERAL RESEARCH AND DEVELOPMENT

SEC. 501. (a)(1) The Administrator of the National Aeronautics and Space Administration is directed to continue and to enhance such Administration's programs of remote-sensing research and development [citation in margin: "15 USC 4261."].

(2) The Administrator is authorized and encouraged to--

(A) conduct experimental space remote-sensing programs (including applications demonstration programs and basis research at universities);

(B) develop remote-sensing technologies and techniques, including those needed for monitoring the Earth and its environment; and

(C) conduct such research and development in cooperation with other Federal agencies and with public and private research entities (including private industry, universities, State and local governments, foreign governments, and international organizations) and to enter into arrangements (including joint ventures) which will foster such cooperation.

(b)(1)The Secretary is directed to conduct a continuing program of—

(A) research in applications of remote-sensing;

(B) monitoring of the Earth and its environment; and

(C) development of technology for such monitoring.

(2) Such program may include support of basic research at universities and demonstrations of applications.

(3) The Secretary is authorized and encouraged to conduct such research, monitoring, and development in cooperation with other Federal agencies and with public and private research entities (including private industry, universities, State and local governments,

foreign governments, and international organizations) and to enter into arrangements (including joint ventures) which will foster such cooperation.

(c)(1) In order to enhance the United States ability to manage and utilize its renewable and nonrenewable resources, the Secretary of Agriculture and the Secretary of the Interior are authorized and encouraged to conduct programs of research and development in the applications of remote sensing using funds appropriated for such purposes.

(2) Such programs may include basis research at universities, demonstrations of applications, and cooperative activities involving other Government agencies, private sector parties, and foreign and international organizations.

(d) Other Federal agencies are authorized and encouraged to conduct research an development on the use of remote sensing in fulfillment of their authorized missions, using funds appropriated for such purposes.

[marginal note: "Report."] (e) The Secretary and the Administrator of the National Aeronautics and Space Administration shall, within one year after the date of enactment of this Act and biennially thereafter, jointly develop and transmit to the Congress a report which includes (1) a unified national plan for remote-sensing research and development applied to the Earth and its atmosphere; (2) a compilation of progress in the relevant ongoing research and development activities of the Federal agencies; and (3) an assessment of the state of our knowledge of the Earth and its atmosphere, the needs for additional research (including research related to operational Federal remote-sensing space programs), and opportunities available for further progress.

USE OF EXPERIMENTAL DATA

[citation in margin: "15USC 4262."] Sec. 502. Data gathered in Federal experimental remote-sensing space programs may be used in related research and development programs funded by the Federal Government (including applications programs) and cooperative research programs, but not for commercial uses or in competition with private sector activities, except pursuant to section 503.

SALE OF EXPERIMENTAL DATA

Sec. 503. Data gathered in Federal experimental remote-sensing space programs may be sold en bloc through a competitive process (consistent with national security interests and international obligations of the United States and in accordance with section 607) to any United States entity which will market the data on a nondiscriminatory basis [citation in margin: "15 USC 4263."]

TITLE VI–GENERAL PROVISIONS

NONDISCRIMINATORY DATA AVAILABILITY

Sec. 601. (a) Any unenhanced data generated by any system operator under the provisions of this Act shall be made available to all users on a nondiscriminatory basis in accordance with the requirements of this Act [citation in margin: "Public availability. 15 USC 4263."].

(b) Any system operator shall make publicly available the prices, policies, procedures, and other terms and conditions (but, in accordance with section 104(3)(C), not necessarily the names of buyers or their purchases) upon which the operator will sell such data.

ARCHIVING OR DATA

Sec. 602. (a) It is in the public interest for the United States Government [citation in margin: "15 USC 4272."]—

(1) to maintain an archive of land remote-sensing data for historical, scientific, and technical purposes, including long-term global environmental monitoring;

(2) to control the content and scope of the archive; and

(3) to assure the quality, integrity, and continuity of the archive.

(b)The Secretary shall provide for long-term storage, maintenance and upgrading of basic, global, land remote-sensing data set (hereinafter referred to as the "basic data set") and shall follow reasonable archival practices to assure proper storage and preservation of the basic data set and timely access for parties requesting data. The basic data set which the Secretary assembles in the Government archive shall remain distinct from any inventory of data which a system operator may maintain for sales and for other purposes.

(c) In determining the initial content of, or in upgrading, the basic data set, the Secretary shall–

(1) use as a baseline the data archived on the date of enactment of this Act;

(2) take into account future technical and scientific developments and needs;

(3) consult with and seek the advice of users and products;

(4) consider the need for data which may be duplicative in terms of geographical coverage but which differ in terms of season, spectral bands, resolution, or other relevant factors;

(5) include, as the Secretary considers appropriate, unenhanced data generated either by the Landsat system, pursuant to title III, or by licensees under title IV;

(6) include, as the Secretary considers appropriate, data collected by foreign ground stations or by foreign remote-sensing space systems; and

(7) ensure that the content of the archive is developed in accordance with section 607.

(d) Subject to the availability of appropriations, the Secretary shall request data needed for the basic data set and pay to the providing system operator reasonable costs for reproduction and transmission. A system operator shall promptly make requested data available in a form suitable for processing for archiving.

[marginal note: "Marketing."] (e) Any system operator shall have the exclusive right to sell all data that the operator provides to the United States remote-sensing data archive for a period to be determined by the Secretary but not to exceed ten years from the date the data are sensed. In the case of data generated from the Landsat system prior to the implementation of the contract described in section 202(a), any contractor selected pursuant to section 202 shall have the exclusive right to market such data on behalf of the United States Government for the duration of such contract. A system operator may relinquish the exclusive right and consent to distribution from the archive before the period of exclusive right has expired by terminating the offer to sell particular data.

[marginal note: "Public availability."] (f) after the expiration of such exclusive right to sell, or after relinquishment of such right, the data provided to the United States remote-sensing data archive shall be in the public domain and shall be made available to requesting parties by the Secretary of prices reflecting reasonable costs of reproduction and transmittal.

(g) In carrying out the functions of this section, the Secretary shall, to the extent practicable and as provided in advance by appropriation Act, use existing Government facilities.

NONREPRODUCTION

[citation in margin: "15 USC 4273."] Sec. 603. Unenhanced data distributed by any system operator under the provisions of this Act may be sold on the condition that such data will not be reproduced or disseminated by the purchaser.

REIMBURSEMENT FOR ASSISTANCE

[citation in margin: "15 USC 4274."] Sec. 604. The Administrator of the National Aeronautics and Space Administration, the Secretary of Defense and the heads of other Federal agencies may provide assistance to system operators under the provisions of this Act. Substantial assistance shall be reimbursed by the operator, except as otherwise provided by law.

ACQUISITION OF EQUIPMENT

[citation in margin: "15 USC 4275."] Sec. 605. The Secretary may, by means of a competitive process, allow a licensee under title IV or any other private party to buy, lease, or otherwise acquire the use or equipment from the Landsat system, when such equipment is no longer needed for the operation of such system or for the sale of data from such system. Officials of other Federal civilian agencies are authorized and encouraged to cooperative with the Secretary in carrying out the provisions of this section.

RADIO FREQUENCY ALLOCATION

Sec. 606. (a) Within thirty days after the date of enactment of this Act [citation in margin: "President of the U.S. 15 USC 4276."], the President (or the President's delegee, if any, with authority over the assignment of frequencies of radio stations of classes of radio stations operated by the United States) shall make available for nongovernmental use spectrum presently allocated to Government use, for use by United States Landsat and commercial remote-sensing space systems. The spectrum to be so made available shall conform to any applicable international radio or wire treaty or convention, or regulations annexed thereto. Within ninety days thereafter, the Federal Communications Commission shall utilize appropriate procedures to authorize the use of such spectrum for nongovernmental use. Nothing in this section shall preclude the ability of the Commission to allocate additional spectrum to commercial land remote-sensing space satellite system use.

(b) To the extent required by the Communications Act of 1934, as amended (47 U.S.C. 151 et. seq.) [citation in margin: "47 USC 609."], an application shall be filed with the Federal Communications Commission for any radio facilities involved with the commercial remote-sensing space system.

(c) It is the intent of Congress that the Federal Communications Commission complete the radio licensing process under the Communications Act of 1934, as amended (47 U.S.C. 151 et. seq), upon the application of any private sector party or consortium operator of any commercial land remote-sensing space system subject t this Act, within one hundred and twenty days of the receipt of an application for such licensing. If final action has not occurred within one hundred and twenty days of the receipt of such an application, the Federal Communications Commission shall inform the applicant of any pending issues and of actions required to resolve them.

(d) Authority shall not be required from the Federal Communications Commission for the development and construction of any United States land remote-sensing space system for

(component thereof), other than radio transmitting facilities or components, while any licensing determination is being made.

(e) Frequency allocations made pursuant to this section by the Federal Communications Commission shall be consistent with international obligations and with the public interest.

CONSULTATION

Sec. 607. (a) The Secretary shall consult with the Secretary of Defense on all matters under this Act affecting national security [citation in margin: "Defense and national security 15 USC 4277."]. The Secretary of Defense shall be responsible for determining those conditions, consistent with this Act, necessary to meet national security concerns of the United States and for notifying the Secretary promptly of such conditions.

(b)(1) The Secretary shall consult with the Secretary of State on all matters under this Act affecting international obligations. The Secretary of State shall be responsible for determining those conditions, consistent with this Act, necessary to meet international obligations and policies of the United States and for notifying the Secretary promptly of such conditions.

(2) Appropriate Federal agencies are authorized and encouraged to provide remote-sensing data, technology, and training developing nations as a component of programs of international aid.

(3) The Secretary of State shall promptly report to the Secretary any instances outside the United States of discriminatory distribution of data.

(c) If, as a result of technical modifications imposed on a system operator on the basis of national security concerns, the Secretary, in consultation with the Secretary of Defense or with other Federal agencies, determines that additional costs will be incurred by the system operator, or that past development costs (including the cost of capital) will not be recovered by the system operator, the Secretary may require the agency or agencies requesting such technical modifications to reimburse the system operator for such additional or development costs, but not for anticipated profits. Reimbursements may cover costs associated with required changes in system performance, but not costs ordinarily associated with doing business abroad.

AMENDMENT TO NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION, 1983

Sec 608. Subsection (a) of section 201 of the National Aeronautics and Space Administration Authorization Act, 1983 (Public Law 97-324; 96 Stat. 1601) is amended to read as follows [citation in margin: "15 USC 1517 note."]:

"(a) The Secretary of Commerce is authorized to plan and provide for the management and operation of civil remote-sensing space systems, which may include the Landsat 4 and 5 satellites and associated ground system equipment transferred from the National Aeronautics and Space Administration; to provide for user fees; and to plan for the transfer of the operation of civil remote-sensing space systems to the private sector when in the national interest".

AUTHORIZATION OF APPROPRIATIONS

[citation in margin: "15 USC 4278."] Sec. 609. (a) There are authorized to be appropriated to the Secretary $75,000,000 for fiscal year 1985 for the purpose of carrying out

the provisions of this Act. Such sums shall remain available until expended, but shall not become available until the time periods specified in sections 202(c) and 303(c) have expired.

(b) The authorization provided for under subsection (a) shall be in addition to moneys authorized pursuant to title II of the National Aeronautics and Space Administration Act, 1983 [citation in margin: "15 USC 1517."].

TITLE VII--PROHIBITION OF COMMERCIALIZATION OF WEATHER SATELLITES

PROHIBITION

[citation in margin: "President of U.S. 15 USC 4291."] Sec. 701. Neither the President nor any other official of the Government shall make any effort to lease, sell, or transfer to the private sector, commercialize, or in any way dismantle any portion of the weather satellite systems operated by the Department of Commerce or any successor agency.

FUTURE CONSIDERATIONS

Sec. 702. Regardless of any change in circumstances subsequent to the enactment of this Act [citation in margin: "15 USC 4292."], even if such change makes it appear to be in the national interest to commercialize weather satellites, neither the President nor any official shall take any action prohibited by section 701 unless this title has first been repealed.

Approved July 17, 1984.

LEGISLATIVE HISTORY--H.R. 5155:
HOUSE REPORT No. 96-647 (Comm. on Science and Technology).
SENATE REPORT No. 98-458 (Comm. on Commerce, Science, and Transportation.
CONGRESSIONAL RECORD Vol. 130 (1984);
Apr. 9, considered and passed House.
June 8, considered and passed Senate, amended.
June 28, House concurred in Senate amendment with an amendment.
June 29, Senate concurred in House amendment.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 20, No. 29 (1984):
July 17, Presidential statement.

Appendix C: Commercial Space Launch Act, 1984
Source: Public Law 98-575

PUBLIC LAW 98-575---OCT. 30, 1984 [98 STAT. 3055]

Public Law 98-575
98th Congress

An Act

To facilitate commercial space launches, and for other purposes.
[Oct. 30, 1984] [H.R. 3942]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,
[Commercial Space Launch Act.]

SHORT TITLE

SECTION 1. This Act may be cited as the "Commercial Space Launch Act".
[49 USC app. 2601 note.]

FINDINGS

SEC. 2. The Congress finds and declares that—
[49 USC app. 2601.]

(1) the peaceful uses of outer space continue to be of great value and to offer benefits to all mankind;

(2) private applications of space technology have achieved a significant level of commercial and economic activity, and offer the potential for growth in the future, particularly in the United States;

(3) new and innovative equipment and services are being sought, created, and offered by entrepreneurs in telecommunications, information services, and remote sensing technology;

(4) the private sector in the United States has the capability of developing and providing private satellite launching and associated services that would complement the launching and associated services now available from the United States Government;

(5) the development of commercial launch vehicles and associated services would enable the United States to retain its competitive position internationally, thereby contributing to the national interest and economic well-being of the United States;

(6) provision of launch services by the private sector is consistent with the national security interests and foreign policy interests of the United States and would be facilitated by stable, minimal, and appropriate regulatory guidelines that are fairly and expeditiously applied; and

(7) the United States should encourage private sector launches and associated services and, only to the extent necessary, regulate such launches and services in order to ensure compliance with international obligations of the United States and to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States.

PURPOSES

SEC. 3. It is therefore the purpose of this Act--
[49 USC 2602.]

(1) to promote economic growth and entrepreneurial activity through utilization of the space environment for peaceful purpose;

(2) to encourage the United States private sector to provide launch vehicles and associated launch services by simplifying and expediting the issuance and transfer of commercial launch licenses and by facilitating and encouraging the utilization of Government-developed space technology; and

(3) to designate an executive department to oversee and coordinate the conduct of commercial launch operations, to issue and transfer commercial launch licenses authorizing such activities, and to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States.

DEFINITIONS

SEC. 4. For purposes of this Act—
[49 USC app.2603]

(1) "agency" means an executive agency as defined by section 105 of title 5, United States Code;

(2) "launch" means to place, or attempt to place, a launch vehicle and payload, if any, in a suborbital trajectory, in Earth orbit in outer space, or otherwise in outer space;

(3) "launch property" means propellants, launch vehicles and components thereof, and other physical items constructed for or used in the launch preparation or launch of a launch vehicle;

(4) "launch services" means those activities involved in the preparation of a launch vehicle and its payload for launch and the conduct of a launch;

(5) "launch site" means the location on Earth from which a launch takes place, as defined in any license issued or transferred by the Secretary under this Act, and includes all facilities located on a launch site which are necessary to conduct a launch;

(6) "launch vehicle" means any vehicle constructed for the purpose of operating in, or placing a payload in, outer space and any suborbital rocket;

(7) "payload" means an object which a person undertakes to place in outer space by means of a launch vehicle, and includes subcomponents of the launch vehicle specifically designed or adapted for that object;

(8) "person" means any individual and any corporation, partnership, joint venture, association, or other entity organized or existing under the laws of any State or any nation;

(9) "Secretary" means the Secretary of Transportation;

(10) "State", and "United States" when used in a geographical sense, mean the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the United States Virgin Islands, Guam, and any other commonwealth, territory or possession of the United States; and

(11) "United States citizen" means--

(A) any individual who is a citizen of the United States;

(B) any corporation, partnership, joint venture, association, or other entity organized or existing under the laws of the United States or any State; and

(C) any corporation, partnership, joint venture, association, or other entity which is organized or exists under the laws of a foreign nation, if the controlling interest (as defined by the Secretary in regulations) in such entity is

held by an individual or entity described in subparagraph (A) or (B).

GENERAL RESPONSIBILITIES OF THE SECRETARY AND OTHER AGENCIES

SEC. 5. (a) The Secretary shall be responsible for carrying out this Act, and in doing so shall—
[49 USC app. 2604.]

(1) encourage, facilitate, and promote commercial space launches by the private sector; and

(2) consult with other agencies to provide consistent application of licensing requirements under this Act and to ensure fair and equitable treatment for all license applicants.

(b) To the extent permitted by law, Federal agencies shall assist the Secretary, as necessary, in carrying out this Act.

REQUIREMENT OF LICENSE FOR PRIVATE SPACE LAUNCH OPERATIONS

SEC. 6. (a)(1) No person shall launch a launch vehicle or operate a launch site within the United States, unless authorized by a license issued or transferred under this Act.
[49 USC app. 2605.]

(2) No United States citizen described in subparagraph (A) or (B) of section 4(11) shall launch a launch vehicle or operate a launch site outside the United States, unless authorized by a license issued or transferred under this Act.

(3)(A) No United States citizen described in subparagraph (C) of section 4(11) shall launch a launch vehicle or operate a launch site at any place which is both outside the United States and outside the territory of any foreign nation, unless authorized by a license issued or transferred under this Act. The preceding sentence shall not apply with respect to a launch or operation of a launch site if there is an agreement in force between the United States and a foreign nation which provides that such foreign nation shall exercise jurisdiction over such launch or operation.

(B)(i) Except as provided in clause (ii) of this subparagraph, this Act shall not apply to the launch of a launch vehicle or the operation of a launch site in the territory of a foreign nation by a United States citizen described in subparagraph (C) of section 4(11).

(ii) If there is an agreement in force between the United States ["International agreements" appears in the margin] and a foreign nation which provides that the United States shall exercise jurisdiction over the launch of a launch vehicle or operation of a launch site in the territory of such nation by a United States citizen described in subparagraph (C) of section 4(11), no such United States citizen shall launch a launch vehicle or operate a launch site in the territory of such nation, unless authorized by a license issued or transferred under this Act.

(b)(1) The holder of a launch license under this Act shall not launch a payload unless that payload complies with all requirements of Federal law that relate to the launch of a payload. The Secretary shall ascertain whether any license, authorization, or other permit required by Federal law for a payload which is to be launched has been obtained.

(2) If no payload license, authorization, or permit is required by any Federal law, the Secretary may take such action under this Act as the Secretary deems necessary to prevent the launch of a payload by a holder of a launch license under this Act if the Secretary determines that the launch of such payload would jeopardize the public health and safety, safety of property, or any national security interest or foreign policy interest of the United States.

(c)(1) Except as provided in this Act, no person shall be required to obtain from any agency a license, approval, waiver, or exemption for the launch of a launch vehicle or the operation of a launch site.

(2) Nothing in this Act shall affect the authority of the Federal Communications Commission under the Communications Act of 1934 (47 U.S.C. 151 et seq.) or the authority of the Secretary of Commerce under the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4201 et seq.).

AUTHORITY TO ISSUE AND TRANSFER LICENSES

[49 USC app. 2606.]

SEC. 7. The Secretary may, consistent with the public health and safety, safety of property, and national security interests and foreign policy interests of the United States, issue or transfer a license for launching one or more launch vehicles or for operating one or more launch sites, or both, to an applicant who meets the requirements for a license under section 8 of this Act. Any License issued or transferred under this section shall be in effect for such period of time as the Secretary may specify, in accordance with regulations issued under this Act.

LICENSING REQUIREMEMTS

[49 USC app. 2607]

SEC. 8. (a)(1) All requirements of Federal law which apply to the launch of a launch vehicle or the operation of a launch site shall be requirements for a license under this Act for the launch of a launch vehicle or the operation of a launch site, respectively, except to the extent provided in paragraph (2).

(2) If the Secretary determines, in consultation with appropriate agencies, that any requirement of Federal law that would otherwise apply to the launch of a launch vehicle or the operation of a launch site is not necessary to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States, the Secretary may by regulation provide that such requirement shall not be a requirement for a license under this Act.

(b) The Secretary may, with respect to launches and the operation of launch sites, prescribe such additional requirements as are necessary to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States.

(c) The Secretary may, in individual cases, waive the application of any requirement for a license under this section if the Secretary determines that such waiver is in the public interest and will not jeopardize the public health and safety, safety of property, or any national security interest or foreign policy interest of the United States.

LICENSE APPLICATION AND APPROVAL

[49 USC app. 2608]

SEC. 9. (a) Any person may apply to the Secretary for issuance or transfer of a license under this Act, in such form and manner as the Secretary may prescribe. The Secretary shall establish procedures and timetables to expedite review of applications under this section and to reduce regulatory burdens for applicants.

(b) The Secretary shall issue or transfer a license to an applicant if the Secretary determines in writing that the applicant complies and will continue to comply with the

requirements of this Act and any regulation issued under this Act. The Secretary shall include in such license such conditions as may be necessary to ensure compliance with this Act, including an effective means of on-site verification that a launch or operation of a launch site conforms to representations made in the application for a license or transfer of a license. The Secretary shall make a determination on any application not later than 180 days after receipt of such application. If the Secretary has not made a determination within 120 days after receipt of such application, the Secretary shall inform the applicant of any pending issues and of actions required to resolve such issues.

(c) The Secretary, any officer or employee of the United States, or any person with whom the Secretary has entered into a contract under section 14(b) of this Act may not disclose any data or information under this Act which qualifies for exemption under section 552(b)(4) of title 5, United States Code, or is designated as confidential by the person or agency furnishing such data or information, unless the Secretary determines that the withholding of such data or information is contrary to the public or national interest.

SUSPENSION, REVOCATION, AND MODIFICATION OF LICENSES

[49 USC app. 2609]

SEC. 10. (a) The Secretary may suspend or revoke any license issued or transferred under this Act if the Secretary finds that the licensee has substantially failed to comply with any requirement of this Act, the license, or any regulation issued under this Act, or that the suspension or revocation is necessary to protect the public health and safety, safety of property, or any national security interest or foreign policy interest of the United States.

(b) Upon application by the licensee or upon the Secretary's own initiative, the Secretary may modify a license issued or transferred under this Act, if the Secretary finds that the modification will comply with the requirements of this Act.

(c) Unless otherwise specified by the Secretary, any suspension, revocation, or modification by the Secretary under this section--

(1) shall take effect immediately; and

(2) shall continue in effect during any review of such action under section 12 of this Act.

(d) Whenever the Secretary takes any action under this section, the Secretary shall notify the licensee in writing of the Secretary's finding and the action which the Secretary has taken or proposes to take regarding such finding.

EMERGENCY ORDERS

[Prohibition. 49 USC app. 2610.]

SEC. 11. (a) The Secretary may terminate, prohibit, or suspend immediately the launch of a launch vehicle or the operation of a launch site which is licensed under this Act if the Secretary determines that such launch or operation is detrimental to the public health and safety, safety of property, or any national security interest or foreign policy interest of the United States.

(b) An order terminating, prohibiting, or suspending any launch or operation of a launch site licensed by the Secretary under this Act shall take effect immediately and shall continue in effect during any review of such order under section 12.

ADMINISTRATIVE AND JUDICIAL REVIEW

[49 USC app. 2611]

SEC. 12. (a)(l) An applicant for a license and a proposed transferee of a license under this Act shall be entitled to a determination on the record after an opportunity for a hearing in accordance with section 554 of title 5, United States Code, of any decision of the Secretary under section 9(b) to issue or transfer a license with conditions or to deny the issuance or transfer of such license. An owner or operator of a payload shall be entitled to a determination on the record after an opportunity for a hearing in accordance with section 554 of title 5, United States Code, of any decision of the Secretary under section 6(b)(2) to prevent the launch of such payload.

(2) A licensee under this Act shall be entitled to a determination on the record after an opportunity for a hearing in accordance with section 554 of title 5, United States Code, of any decision of the Secretary--

(A) under section 10 to suspend, revoke, or modify a license; or

(B) under section 11 to terminate, prohibit, or suspend any launch or operation of a launch site licensed by the Secretary.

(b) Any final action of the Secretary under this Act to issue, transfer, deny the issuance or transfer of, suspend, revoke, or modify a license or to terminate, prohibit, or suspend any launch or operation of a launch site licensed by the Secretary or to prevent the launch of a payload shall be subject to judicial review as provided in chapter 7 of title 5, United States Code.

REGULATIONS

[49 USC app. 2612]

SEC. 13. The Secretary may issue such regulations, after notice and comment in accordance with section 553 of title 5, United States Code, as may be necessary to carry out this Act.

MONITORING OF ACTIVITIES OF LICENSEES

[49 USC app. 2613]

SEC. 14. (a) Each license issued or transferred under this Act shall require the licensee--

(1) to allow the Secretary to place Federal officers or employees or other individuals as observers at any launch site used by the licensee, at any production facility or assembly site used by a contractor of the licensee in the production or assembly of a launch vehicle, or at any site where a payload is integrated with a launch vehicle, in order to monitor the activities of the licensee or contractor at such time and to such extent as the Secretary considers reasonable and necessary to determine compliance with the license or to carry out the responsibilities of the Secretary under section 6(b) of this Act; and

(2) to cooperate with such observers in the performance of monitoring functions.

(b) The Secretary may, to the extent provided in advance by appropriation Acts, enter into a contract with any person to carry out subsection (a)(1) of this section.

USE OF G0VERNMENT PROPERTY

[49 USC app. 2614.]

SEC. 15. (a) The Secretary shall take such actions as may be necessary to facilitate and encourage the acquisition (by lease, sale, transaction in lieu of sale, or otherwise) by the private sector of launch property of the United States which is excess or is otherwise not needed for public use and of launch services, including utilities, of the United States which are otherwise not needed for public use.

(b)(1) The amount to be paid to the United States by any person who acquires launch property or launch services, including utilities, shall be established by the agency providing the property or service, in consultation with the Secretary. In the case of acquisition of launch property by sale or transaction in lieu of sale, the amount of such payment shall be the fair market value. In the case of any other type of acquisition of launch property, the amount of such payment shall be an amount equal to the direct costs (including any specific wear and tear and damage to the property) incurred by the United States as a result of the acquisition of such launch property. In the case of any acquisition of launch services, including utilities, the amount of such payment shall be an amount equal to the direct costs (including salaries of United States civilian and contractor personnel) incurred by the United States as a result of the acquisition of such launch services.

(2) The Secretary may collect any payment for launch property or launch services, with the consent of the agency establishing such payment under paragraph (1).

(3) The amount of any payment received by the United States for launch property or launch services, including utilities, under this subsection shall be deposited in the general fund of the Treasury, and the amount of a payment for launch property (other than launch property which is excess) and launch services (including utilities) shall be credited to the appropriation from which the cost of providing such property or services was paid.

(c) The Secretary may establish requirements for liability insurance, hold harmless agreements, proof of financial responsibility, and such other assurances as may be needed to protect the United States and its agencies and personnel from liability, loss, or injury as a result of a launch or operation of a launch site involving Government facilities or personnel.

LIABILITY INSURANCE

[49 USC app. 2615.]

SEC. 16. Each person who launches a launch vehicle or operates a launch site under a license issued or transferred under this Act shall have in effect liability insurance at least in such amount as is considered by the Secretary to be necessary for such launch or operation, considering the international obligations of the United States. The Secretary shall prescribe such amount after consultation with the Attorney General and other appropriate agencies.

ENFORCEMENT AUTHORITY

[49 USC app. 2616.]

SEC. 17. (a) The Secretary shall enforce this Act. The Secretary may delegate the exercise of any enforcement authority under this Act to any officer or employee of the Department of Transportation or, with the approval of the head of another agency, any officer or employee of such agency.

(b) In carrying out this section, the Secretary may--

(1) make investigations and inquiries, and administer to or take from any person an oath, affirmation, or affidavit, concerning any matter relating to enforcement of this Act; and

(2) pursuant to any lawful process--

(A) enter at any reasonable time any launch site, production facility, or assembly site of a launch vehicle, or any site where a payload is integrated with a launch vehicle, for the purpose of inspecting any object which is subject to this Act and any records or reports required by the Secretary to be made or kept under this Act; and

(B) seize any such object, record, or report where there is probable cause to believe that such object, record, or report was used, is being used, or is likely to be used in violation of this Act.

PROHIBITED ACTS

[49 USC app. 2617]

SEC. 18. It is unlawful for any person to violate a requirement of this Act, a regulation issued under this Act, or any term, condition or restriction of any license issued or transferred by the Secretary under this Act.

CIVIL PENALTIES

[49 USC app. 2618]

SEC. 19. (a) Any person who is found by the Secretary, after notice and opportunity to be heard on the record in accordance with section 554 of title 5, United States Code, to have committed any act prohibited by section 18 shall be liable to the United States for a civil penalty of not more than $100,000 for each violation. Each day of a continuing violation shall constitute a separate violation. The amount of such civil penalty shall be assessed by the Secretary by written notice. The Secretary may compromise, modify, or remit, with or without conditions, any civil penalty which is subject to imposition or which has been imposed under this section.

(b) If any person fails to pay a civil penalty assessed against such person after the penalty has become final or if such person appeals an order of the Secretary and the appropriate court has entered final judgment in favor of the Secretary, the Secretary shall recover the civil penalty assessed in any appropriate district court of the United States.

(c) For purposes of conducting any hearing under this section, the Secretary may (1) issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, documents, and other records, (2) seek enforcement of such subpoenas in the appropriate district court of the United States, and (3) administer oaths and affirmations.

CONSULTATION

[Defense and national security. 49 USC app. 2619]

SEC. 20. (a) The Secretary shall consult with the Secretary of Defense on all matters, including the issuance or transfer of each license, under this Act affecting national security. The Secretary of Defense shall be responsible for identifying and notifying the Secretary of those national security interests of the United States which are relevant to activities under this Act.

(b) The Secretary shall consult with the Secretary of State on all matters, including the issuance or transfer of each license, under this Act affecting foreign policy. The Secretary of State shall be responsible for identifying and notifying the Secretary of those foreign policy interests or obligations of the United States which are relevant to activities under this Act.

(c) The Secretary shall consult with other agencies, as appropriate, in order to carry out the provisions of this Act.

RELATIONSHIP TO OTHER LAWS AND INTERNATIONAL OBLIGATIONS

[Prohibitions. 49 USC app. 2620.]

SEC. 21. (a) No State or political subdivision of a State may adopt or have in effect any law, rule, regulation, standard, or order which is inconsistent with the provisions of this Act. Nothing in this Act shall preclude a State or a political subdivision of a State from adopting or putting into effect any law, rule, regulation, standard, or order which is consistent with this Act and is in addition to or more stringent than any requirement of or regulation issued under this Act. The Secretary may, and is encouraged to, consult with the States to simplify and expedite the approval of space launch activities.

(b) A launch vehicle or payload shall not, by reason of the launching of such vehicle or payload, be considered an export for purposes of any law controlling exports.

(c) Nothing in this Act shall apply to--

(1) any--

(A) launch or operation of a launch vehicle,

(B) operation of a launch site, or

(C) other space activity, carried out by the United States on behalf of the United States; or

(2) any planning or policies relating to any such launch, operation, or activity.

(d) The Secretary shall carry out this Act consistent with any obligation assumed by the United States in any treaty, convention, or agreement that may be in force between the United States and any foreign nation. In carrying out this Act, the Secretary shall consider applicable laws and requirements of any foreign nation.

REPORT ON LEGISLATION

[Report. 49 USC app. 2621.]

SEC. 22. (a) Not later than the last day of each fiscal year ending after the date of enactment of this Act and before October 1, 1989, the Secretary shall submit to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report describing all activities undertaken under this Act, including a description of the process for the application for and approval of licenses under this Act and recommendations for legislation that may further commercial launches.

(b) Not later than July 1, 1985, the Secretary shall submit to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report which identifies Federal statutes, treaties, regulations, and policies which may have an adverse effect on commercial launches and include recommendations on appropriate changes thereto.

SEVERABILITY

[49 USC app. 2622.]

SEC. 23. If any provision of this Act, or the application of such provision to any person or circumstance, is held invalid, the remainder of this Act and the application of such provision to any other person or circumstance shall not be affected by such invalidation.

AUTHORIZED APPROPRIATIONS

[49 USC app. 2623]

SEC. 24. There are authorized to be appropriated to the Secretary $4,000,000 for fiscal year 1985.

EFFECTIVE DATE

[49 USC app. 2601 note.]

SEC. 25. (a) Except for section 15 and the authority to issue regulations, this Act shall take effect 180 days after the date of enactment of this Act.

(b) Section 15 shall take effect on the date of enactment of this Act, except that nothing in this Act shall affect any agreement, including negotiations which are substantially completed, relating to the acquisition of launch property or launch services of the United States entered into on or before the date of enactment of this Act between the United States and any private party.

[Regulations.]

(c) Regulations to implement this Act shall be promulgated not later than 180 days after the date of enactment of this Act.

Approved October 30, 1984.

Appendix D: Press Release "Space Policy and Commercial Space Initiative to Begin the Next Century," 1988
Source: Space Business Archives, Alexandria, Virginia

THE WHITE HOUSE
Office of the Press Secretary

For Immediate Release — February 11, 1988

THE PRESIDENT'S SPACE POLICY AND COMMERCIAL SPACE INITIATIVE TO BEGIN THE NEXT CENTURY

FACT SHEET

The President today announced a comprehensive "Space Policy and Commercial Space Initiative to Begin the Next Century" intended to assure United States space leadership.

The President's program has three major components:

- Establishing a long-range goal to expand human presence and activity beyond Earth orbit into the Solar System;
- Creating opportunities for U.S. commerce in space; and
- Continuing our national commitment to a permanently manned Space Station.

The new policy and programs are contained in a National Security Decision Directive (NSDD) signed by the President on January 5, 1988, the FY 1989 Budget the President will submit shortly to Congress, and a fifteen point Commercial Space Initiative.

I. EXPANDING HUMAN PRESENCE BEYOND EARTH ORBIT

In the recent NSDD, the President committed to a goal of expanding human presence and activity in the Solar System. To lay the foundation for this goal, the President will be requesting $100 million in his FY 1989 Budget for a major new technology development program "Project Pathfinder" that will enable a broad range of manned or unmanned missions beyond the Earth's orbit.

Project Pathfinder will be organized around four major focuses:

-- Exploration technology;
-- Operations technology;
-- Humans-in-space technology; and
-- Transfer vehicle technology.

This research effort will give the United States know-how in critical areas, such as humans in the space environment, closed loop life support, aero braking, orbital transfer and maneuvering, cryogenic storage and handling, and large scale space operations, and provide a base for wise decisions on long term goals and missions.

Additional highlights of the NSDD are outlined in Section IV of this fact sheet.

II. CREATING OPPORTUNITIES FOR U.S. COMMERCE IN SPACE

The President is announcing a fifteen point commercial space initiative to seize the opportunities for a vigorous U.S. commercial presence in Earth and beyond--in research and manufacturing. This initiative has three goals:

- Promoting a strong U.S. commercial presence in space;
- Assuring a highway to space; and
- Building a solid technology and talent base.

Promoting a Strong U.S. Commercial Presence in Space

1. Private Sector Space Facility: The President is announcing an intent for the Federal Government to lease space as an "anchor tenant" in an orbiting space facility suitable for research and commercial manufacturing that is financed, constructed, and operated by the private sector. The Administration will solicit proposals from the U.S. private sector for such a facility. Space in this facility will be used and/or subleased by various Federal agencies with interest in microgravity research.

The Administration's intent is to award a contract during mid-summer of this year for such space and related services to be available to the Government no later than the end of FY 1993.

2. Spacehab: The Administration is committing to make best efforts to launch within the Shuttle payload bay, in the early 1990s, the commercially developed, owned, and managed Shuttle middeck module: Spacehab. Manifesting requirements will depend on customer demand.

Spacehab is a pressurized metal cylinder that fits in the Shuttle payload bay and connects to the crew compartment through the orbiter airlock. Spacehab takes up approximately one-quarter of the payload bay and increases the pressurized living and working space of an orbiter by approximately 1,000 cubic feet or 400 percent in useable research volume. The facility is intended to be ready for commercial use in mid-1991.

3. Microgravity Research Board: The President will establish, through Executive Order, a National Microgravity Research Board to assure and coordinate a broader range of opportunities for research in microgravity conditions.

NASA will chair this board, which will include senior-level representatives from the Departments of Commerce, Transportation, Energy, and Defense, NIH, and NSF; and will consult with the university and commercial sectors. The board will have the following responsibilities:

- To stimulate research in microgravity environments and its applications to commercial uses by advising Federal agencies, including NASA, on microgravity priorities, and consulting with private industry and academia on microgravity research opportunities;

- To develop policy recommendations to the Federal Government on matters relating to microgravity research, including types of research, government/ industry/and academic cooperation, and access to space, including a potential launch voucher program;

- To coordinate the microgravity programs of Federal agencies by:
  --reviewing agency plans for microgravity research and recommending priorities for the use of Federally-owned or leased space on microgravity facilities; and

  --ensuring that agencies establish merit review processes for evaluating microgravity research proposals; and

- To promote transfer of federally funded microgravity research to the commercial sector in furtherance of Executive Order 12591.

NASA will continue to be responsible for making judgments on the safety of experiments and for making manifesting decisions for manned space flight systems.

4. External Tanks: The Administration is making available for five years the expended external tanks of the Shuttle fleet at no cost to all feasible U. S. commercial and nonprofit endeavors, for uses such as research, storage, or manufacturing in space.

NASA will provide any necessary technical or other assistance to these endeavors on a direct cost basis. If private sector demand exceeds supply, NASA may auction the external tanks.

5. Privatizing Space Station: NASA, in coordination with the Office of Management and Budget, will revise its guidelines on commercialization of the U.S. Space Station to clarify and strengthen the Federal commitment to private sector investment in this program.

6. Future Privatization: NASA will seek to rely to the greatest extent feasible on private sector design, financing, construction, and operation of future Space Station requirements, including those currently under study.

7. Remote Sensing: The Administration is encouraging the development of commercial remote sensing systems. As part of this effort, the Department of Commerce, in consultation with other agencies, is examining potential opportunities for future Federal procurement of remote sensing data from the U.S. commercial sector.

Assuring a Highway to Space

8. Reliance on Private Launch Services: Federal agencies will procure existing and future required expendable launch services directly from the private sector to the fullest extent feasible.

9. Insurance Relief for Launch Providers: The Administration will take administrative steps to address the insurance concerns of the U. S. commercial launch industry, which currently uses Federal launch ranges. These steps include:

- Limits on Third Party Liability: Consistent with the Administration's tort policy, the Administration will propose to Congress a $200,000 cap on non-economic damage awards to individual third parties resulting from commercial launch accidents;

- Limits on Property Damage Liability: The liability of commercial launch operators for damage to Government property resulting from a commercial launch accident will be administratively limited to the level of insurance required by the Department of Transportation.

If losses to the Government exceed this level, the Government will waive its right to recover for damages. If losses are less than this level, the Government will waive its right to recover for those damages caused by Government willful misconduct or reckless disregard.

10. Private Launch Ranges: The Administration will consult with the private sector on the potential construction of commercial launch range facilities separate from Federal facilities and the use of such facilities by the Federal Government.

11. Vouchers for Research Payloads: NASA and the Department of Transportation will explore providing to research payload owners manifested on the Shuttle a one time launch voucher that can be used to purchase an alternative U.S. commercial launch service.

Building a Solid Technology and Talent Base

12. Space Technology Spin-offs: The President is directing that the new Pathfinder program, the Civil Space Technology Initiative, and other technology programs be conducted in accordance with the following policies:

    - Federally funded contractors, universities, and Federal laboratories will retain the rights to any patents and technical data, including copyrights, that result from these programs. The Federal Government will have the authority to use this intellectual property royalty free;

    - Proposed technologies and patents available for licensing will be housed in a Pathfinder/CSTl library within NASA; and

    - When contracting for commercial development of Pathfinder, CSTI and other technology work products, NASA will specify its requirements in a manner that provides contractors with maximum flexibility to pursue innovative and creative approaches.

13. Federal Expertise on Loan to American Schools: The President is encouraging Federal scientists, engineers, and technicians in aerospace and space related careers to take a sabbatical year to teach in any level of education in the United States.

14. Education Opportunities: The President is requesting in his FY 1989 Budget expanding five-fold opportunities for U. S. teachers to visit NASA field centers and related aerospace and university facilities.

In addition, NASA, NSF, and DoD will contribute materials and classroom experiments through the Department of Education to U. S. schools developing "tech shop" programs. NASA will encourage corporate participation in this program.

15. Protecting U.S. Critical Technologies: The Administration is requesting that Congress extend to NASA the authority it has given the Department of Defense to protect from wholesale release under the Freedom of Information Act those critical national technologies and systems that are prohibited from export.

III. CONTINUING THE NATIONAL COMMITMENT TO THE SPACE STATION

In 1984, the President directed NASA to develop a permanently manned Space Station. The President remains committed to achieving this end and is requesting $1 billion in his FY 1989 Budget for continued development and a three-year appropriation commitment from Congress for $6.1 billion. The Space Station, planned for development in cooperation with U. S. friends and allies, is intended to be a multi-purpose facility for the Nation's science and applications programs. It will permit such things in space as: research, observation of the solar system, assembly of vehicles or facilities, storage, servicing of satellites, and basing for future space missions and commercial and entrepreneurial endeavors in space.

To help ensure a Space Station that is cost effective, the President is proposing as part of his Commercial Space Initiative actions to encourage private sector investment in the Space Station, including directing NASA to rely to the greatest extent feasible on private sector design, financing, construction, and operation of future Space Station requirements.

IV. ADDITIONAL HIGHLIGHTS OF THE JANUARY 5, 1988 NSDD

- U.S. Space Leadership- Leadership is reiterated as a fundamental national objective in areas of space activity critical to achieving U.S. national security, scientific, economic and foreign policy goals.

- Defining Federal Roles and Responsibilities: Government activities are specified in three separate and distinct sectors: civil, national security, and non-governmental. Agency roles and responsibilities are codified and specific goals are established for the civil space sector; those for other sectors are updated.

- Encouraging a Commercial Sector: A separate, nongovernmental or commercial space sector is recognized and encouraged by the policy that Federal Government actions shall not preclude or deter the continuing development of this sector. New guidelines are established to limit unnecessary Government competition with the private sector and ensure that Federal agencies are reliable customers for commercial space goods and services.

- The President's launch policy prohibiting NASA from maintaining an expendable launch vehicle adjunct to the Shuttle, as well as limiting commercial and foreign payloads on the Shuttle to those that are Shuttle-unique or serve national security or foreign policy purposes, if reaffirmed. In addition, policies endorsing the purchase of commercial launch services by Federal agencies are further strengthened.

- National Security Space Sector: An assured capability for national security missions is clearly enunciated, and the survivability and endurance of critical national security space functions is stressed.

- Assuring Access to Space: Assured access to space is recognized as a key element of national space policy. U. S. space transportation systems that provide sufficient resiliency to allow continued operation, despite failures in any single system, are emphasized. The mix of space transportation vehicles will be defined to support mission needs in the most cost-effective manner.

- Remote Sensing: Policies for Federal "remote sensing" or observation of the Earth are established to encourage the development of U. S. commercial systems competitive with or superior to foreign-operated civil or commercial systems.

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