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SUBCOMMITTEE ON SPACE SCIENCE AND APPLICATIONS

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**Not for Release Before
Presentation of Testimony**

**Testimony of Philip M. Klutznick
Chairman
National Academy of Public Administration Panel
on
Encouraging Business Ventures in Space Technologies
before the
Committee on Science and Technology
U.S. House of Representatives**

May 3, 1983

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Mr. Chairman and Members of the Subcommittee:

It is a privilege to appear before you today as Chairman of the National Academy of Public Administration Panel on Encouraging Business Ventures in Space Technologies. This Panel was formed in response to a request from the Administrator of the National Aeronautics and Space Administration (NASA) to study and recommend policies and approaches designed to facilitate private sector involvement and investment in commercial activities in space. Joining with me today are fellow Panel members Vice Chairman Mitchell Rogovin, and Gerald Mossinghoff. Also at this time I would like to acknowledge the contributions of our other Panel members: Stover Babcock, Richard Bolt, Samuel Cohn, Emilio Daddario, Harold Finger, Peter Goldmark, John Johnson, and Thomas Paine. (Biographic data are attached.)

Mr. Chairman, with your permission I submit for the hearing record a complete copy of the Panel's report which was presented to the Administrator on May 2, 1983. I will make some brief observations. I suggest that an opportunity be provided for my colleagues to comment. Thereafter, we are prepared to respond to your questions.

The United States has been in the space business for approximately twenty-five years. During this period the nation has developed a comprehensive space research and technology base in government, in industry and in our universities. Our total capabilities have been demonstrated in manned Apollo missions to the moon, in unmanned science missions to the planets and in meteorological, communications and other applications satellite technologies. Except for the commercial satellite communications industry which established itself after initial NASA R&D efforts, U.S. activities in space have been characterized almost

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exclusively by government objectives and government funding. In recent months, however, there has been an upsurge of interest in the private sector in commercial space ventures. This is evidenced by various proposals submitted to NASA and by several ventures initiated independent of NASA. We cannot catalogue all the reasons for this private sector interest in space activity; it may be due in part to the advent of the space shuttle with its successful flight program offering a new and unique capability to use and explore the space environment, or it may result from an increasing awareness of profitable opportunities in and the importance of high technology enterprises. This interest has parallels abroad, particularly in Japan, France and Germany.

On the eve of this hearing, the April 19th issue of the New York Times carried a front page story in its "Business Day" section regarding the formation of the Orbital Systems Corporation by three young men 30 years of age and younger. It is stated that they borrowed their capital from banks, private investors and financial institutions, including the Space Foundation of Houston. These entrepreneurs announced that they had "negotiated a deal with NASA to develop and market a privately financed propulsion system to boost communications satellites and other payloads from the space shuttle's low orbit to higher altitudes."

Mr. Chairman, it is too early to forecast the degree of success private ventures in space technology will achieve. Communications satellites represent a major growth industry. At this time this industry is the principal example of a successful commercial application of space technology. Nevertheless, its success strongly supports the proposition that the nation should make a coordinated effort to test the commercial potential of all space technologies and the space environment. The Panel makes no predictions as to the total benefits that might

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accrue from a commercialization thrust. Such estimates would be accompanied by great uncertainty. The Panel is convinced, however, that the space arena should be carefully and thoroughly examined by the business community so that, as a nation, we do not overlook an opportunity for economic benefit. Furthermore, the involvement of the private sector is essential to maintain U.S. leadership in space - - an explicit national objective set forth in the National Aeronautics and Space Act of 1958. This objective was reaffirmed in the President's Space Policy Statement released July 4, 1982.

NASA has been and for some time will continue to be the principal generator of space technology. This role is a statutory obligation of the agency and one that has been performed extremely well. In so doing, there has been created an internal organizational philosophy and an external image that space is largely a governmental function. If the United States is to pursue the economic potential of space, NASA must play a key facilitating role - a role that is new to the agency but complementary to its continuing statutory responsibilities. These factors, lead to the Panel's recommendation that there must be a clear statement of senior management commitment and a positive program in support of commercialization as a policy compatible with the long-run future of NASA. This statement should be disseminated widely within NASA, to industry and to the general public.

The Panel believes that a commercialization role does not diminish the NASA R&D role; it strengthens it and provides additional challenges. NASA is the basic source of space technology, space systems, and knowledge of the space environment, all of which are essential to support commercial endeavors in space. While industry excels in exploiting and marketing current technology, it often does not have the resources to undertake the high risk, long term advanced

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developments necessary to maintain a leadership posture in an increasingly competitive international market. A case in point is the advanced satellite communications program in the NASA FY-1984 budget request. The Panel believes that the continuing R&D role for NASA is vital if we are to identify new opportunities such as may exist in materials processing in space (MPS). For example, the NASA/McDonnell Douglas/Johnson and Johnson joint endeavor in electrophoresis, an experiment on the STS-6 flight, is based upon initial research performed by NASA. MPS appears to hold a large potential for economic benefit. The Panel recommends that NASA give more attention to this activity.

In addition, Mr. Chairman, there are major facilities, perhaps best exemplified by the development of the space shuttle, that are multi-user, very expensive and technically complex, and that are critical to utilization of the space environment. These developments transcend the capabilities and needs of individual private sector firms. The Panel believes we should apply national facility precedents from the NASA aeronautical wind tunnel program to the development, utilization and operation of major facilities in space. We view the NASA R&D role and a concurrent commercialization thrust in the agency as mutually supportive for national goals and for economic benefit. The validity of this view is evidenced by the recognized benefits accruing from extensive NASA/industry collaboration in aeronautical research activities.

Most space endeavors are recognized as high risk, expensive and long lead time activities. These factors must be addressed if the private sector is to become involved. Technical risk can be reduced to more manageable levels through continuing NASA R&D activities that pursue new initiatives through technology demonstration. The expense of experimentation in the space environment can be reduced through the use of the joint endeavor agreement.

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Also, NASA works closely with the insurance industry to assure available coverages for risk taking. The Panel notes the NASA awareness of these inhibiting factors and that the agency has taken positive steps to address them. Such affirmative efforts have to be made continuously. Finally, stability, consistency and continuity of policy are essential to promote business enterprise. NASA's commercialization policies must recognize the importance of these factors and the agency must strive to minimize disruptions.

Perhaps the most difficult chore the Panel has identified to NASA is educating industry in space technologies and encouraging industry participation in commercial initiatives. Industry, particularly non-aerospace companies that daily produce goods and services for domestic and international markets, has to be made aware of the potential of space technology. Many of these firms will be exposed for the first time to the technological sophistication of space endeavors. NASA has developed innovative mechanisms - the industrial guest investigator program (IGI) and the technical exchange agreement (TEA) to address this need. Early familiarity with NASA R&D projects enables initial assessments of commercial potentials and enhances planning for eventual commercial applications. The Panel considers the IGI and TEA as effective approaches to this problem and their use should be expanded. In addition to these mechanisms at the technical level, it is also necessary to begin a dialogue with those industry management personnel with responsibility for strategic business planning.

Mr. Chairman, organization for the commercialization activity is vital to achieving success. NASA has a challenging problem because of its program office structure and its appropriate concentration on scientific and technical objectives. This structure has been splendidly effective in producing the many NASA accomplishments. However, the Panel found a large amount of

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fragmentation of present commercialization activities within the agency that are counterproductive. In fact, many outsiders, and some NASA personnel, do not know where to go to discuss commercial endeavors. Therefore, the Panel recommends the establishment of a well defined focus of responsibility at a high level in NASA to address the commercialization role. The report identifies functions associated with this responsibility. Implicit in our recommendation, however, is a low key approach; we are not suggesting a major reorganization of NASA. Rather we believe it is important to clearly establish the focal point and then gradually pull together appropriate organizational elements, building a cohesive unit as the agency moves ahead with its commercialization role. The Panel does stress the need for the leadership of this activity to have business decision-making and marketplace experience.

In Section X of the report the Panel has provided guidelines for use in processing proposals for commercial endeavors received by NASA. These were formulated in response to a specific request from the agency.

A word of caution as I conclude, Mr. Chairman. The Panel does not view its recommendations as requiring a significant infusion of federal funds. Our recommendations are to organize for a more efficient use of existing resources. Commercialization will require a government/industry partnership approach in which the private sector is expected to place capital at risk.

In addition to its homework, the Panel met on four occasions for a total of six working days to discuss these matters. During three meetings, there was extensive interaction with Mr. Beggs and senior NASA officials comprising a task force appointed for this specific purpose. Accordingly, NASA top management is quite familiar with our work and our recommendations. In one session, we met with seven entrepreneurs who are engaged in or are proposing business ventures in

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the commercialization of space technology to gain an understanding of their problems and concerns.

Mr. Chairman, I have presented a summary of the highlights of our activity. In the event I have overlooked any significant points during this brief presentation, after my colleagues have expressed their views we would be pleased to try to respond to any questions.

Thank you.

Statement of

James M. Beggs
Administrator

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

before the

Subcommittee on Space Science and Applications
Committee on Science and Technology
House of Representatives

Mr. Chairman and Members of the Subcommittee:

Mr. Chairman, it is a special pleasure for me to appear before this Subcommittee to participate in this series of Hearings on commercial activities in space. These Hearings represent a significant milestone in this Nation's space program. They are noteworthy in that the question being addressed today is no longer whether space has commercial promise but rather how best to proceed to maximize that promise for national economic well-being. In addition, they are timely because of the substantial interest expressed in commercialization by a number of industries. I have felt for some time that NASA should increase its attention to encouraging private sector investment and operations in space with the same quality of cooperation we, and our predecessor organization, the National Advisory Committee for Aeronautics, have achieved with the aeronautical interests in this country.

Shortly after the release of the President's July 4, 1982, National Space Policy Statement, which, in part, calls for the encouragement of domestic commercial exploitation of space capabilities, I asked the National Academy of Public Administration to undertake a study and make recommendations as to how best to engage the creative skills and entrepreneurial initiative of the Nation's private sector in the commercialization of space. At the same time, I asked the Academy to examine the proper role of NASA in this arena.

Before giving you my observations on the Academy report, I would like to first express my deep appreciation to the Academy and in particular to Mr. Klutznick and other members of the Academy Panel who undertook this challenging task and did it so well.

The guidelines and recommendations formulated by the Panel were requested by NASA to help us deal effec-

tively and properly with the various initiatives presented to us by industry. During the course of the study, the panel had a number of meetings with NASA management and with representatives from the industry who have expressed an interest in the commercial possibilities of space activities. I have discussed the observations and recommendations reached during the study with the panel members during the course of the study. I also expect the guidelines will be helpful to business firms contemplating a space endeavor.

Mr. Chairman, a clear message from the Academy report is that the United States, after years of building a technology base second to none, should not fail to examine fully the potential for commercial enterprise in space. A second message is the need for government/industry cooperation to make this happen. I fully agree with these views.

The Panel recognizes NASA's statutory role in research and development and the importance of NASA R&D to many commercial endeavors in space. The question we must ask ourselves is how we can most effectively continue this role and develop the right environment to support commercial potentials.

Mr. Chairman, the Panel has pointed out the many space endeavors by their very nature are high risk, expensive and long lead time activities. Stability, consistency, and continuity in policies are beneficial to business decisions. As a former member of that business community I am keenly aware of the significance of stability in policy. From my present position in the government I am equally aware of the difficulty in assuring that long-lead stability. In our relationships with industry and in formulating our policies we must seek ways to provide reasonable assurances and to be prepared to participate in a positive way in those areas impacting commercialization where other organizations are involved.

Commercialization is not new to NASA. The satellite communications industry grew out of early work by NASA. The spinning upper stages used in the Shuttle were developed under a joint agreement between NASA and McDonnell Douglas Corporation. Our experience has clearly been limited, however. Today the items we have been discussing represent quite a menu of opportunities in many different types of initiatives. We have started to develop criteria by which to evaluate these new ideas, to develop a proper government response to proposals, and to examine management and organizational approaches to assuring that the responsibilities of the government are properly carried out.

We also recognize the general unfamiliarity of the non-aerospace industry with space technology and space environment, and the importance of NASA facilities and associated hardware to the utilization of the space environment. We have taken an initial step through the Joint Endeavor Agreement approach to reduce the cost of using the Space Shuttle encouraging "path breaking" uses of space for commercial product research and experimentation purposes. We will look at our wind tunnel policies to determine what we can adapt from these policies regarding the use of other NASA facilities and hardware so as to facilitate and enhance the value of these facilities for U.S. industrial research activities.

NASA has made a start, as noted by the Panel, with Joint Endeavor Agreements and other cooperative arrangements to establish a two-way street with industry to identify potential opportunities, to expose our people to industry interests and requirements, and to provide appropriate support to commercial ventures. We agree with the importance of developing this relationship with industry and will seek ways to enhance the process.

We must, however, proceed with caution as we enter into this relatively new arena. Although I have indicated, I wholeheartedly believe that the time has come to encourage expansion of commercial involvement in space activities, it is imperative that we develop sound guidelines to define the Government's role in this process. We cannot ignore the fact that the American taxpayer has invested many billions of dollars in the knowledge and capability represented by today's space program. Nor can we proceed in ways which jeopardize the commitments and obligations that the government has in space programs -- commitments that derive from the long legislative history within which NASA operates. We must also deal with these issues in a balanced manner which assures adequate opportunity for all reasonable approaches by the private sector providing those approaches comply with a sound and logical set of guidelines. We are, in taking these steps, establishing precedents which could profoundly affect the civil space program in years to come. We must face the challenge in a way which will assure that the best use is made of the opportunity which it represents.

Finally, let me address a major issue now facing the Agency - the commercialization of expendable launch vehicles. Various proposals have been made to operate

the Delta, Atlas-Centaur, and Titan vehicles on a commercial basis as well as to introduce new ELVs. We have reviewed this issue within NASA and have participated in the Senior Interagency Group (Space) study. These reviews will be concluded later this month. Many issues must be considered in the decision to commercialize ELVs, including: national security considerations, and issues associated with the use of national launch facilities. While I cannot, at this point, state what the outcome of these studies will be with respect to ELV commercialization, I see no reason, from a national policy standpoint, why such an activity cannot go forward.

Mr. Chairman, these are my views regarding the Academy study and our intentions regarding the implementation of its recommendations. I will be pleased to respond to your questions.

May 3, 1983

STATEMENT OF

DANIEL J. FINK

before the

SUBCOMMITTEE ON SPACE SCIENCE AND APPLICATIONS
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

Mr. Chairman and members of the Committee: It is a great personal pleasure for me to appear before this distinguished Subcommittee to comment on the commercialization of space and the role of the private and public sectors. The subject is important, timely, and one that I have been personally interested in for a number of years. My comments today are based on my understanding of past commercialization efforts, both from my own participation and from observations of the successes (and some failures) of others. While I currently chair the NASA Advisory Council, these views do not necessarily represent the Council, which has not specifically addressed this issue and therefore takes no position. On the other hand, we do have presently underway two Task Forces, one dealing with the future missions of NASA and the other with Shuttle utilization. Both may touch on some aspects of the subject at hand. When completed, this work will certainly be available to the Subcommittee.

The National Academy of Public Administration (NAPA) report is an excellent baseline on which to initiate these hearings. It recognizes a number of factors which I believe bear repetition. First, that we in this country have perhaps a unique opportunity to maintain our leadership in space if we can truly tap the

additional contributions that can be made by the private sector. Second, that many facilitating steps must occur to make this happen. Third, that in the foreseeable future private space ventures will not be laissez faire activities; the government will interact on many levels. Finally, the report emphasizes the unique role the government must continue to play in advancing the state of the art and in carrying out the longer term and more ambitious endeavors which will be required to continue our international space leadership.

In short, like other thoughtful treatments of the subject, it discusses a blend of free enterprise and public/private cooperation that is not the norm in our way of doing business. In the time available to me I'd like to make just a few additional and perhaps amplifying points.

To me free enterprise implies both the element of choice on the part of the private sector and the expectation that they will take the initiative in trading risk for reward. I would call that private initiative, as it applies to space endeavors, "commercialization pull." When we have it, success normally follows closely in its wake. The first commercial proposition for a communications satellite appeared in 1961. No undue prodding by the government was required. Rather, the government responded admirably to that commercial suction. Contrast this with remote sensing, where commercialization "push" by some parts of the government started, as I recall, in the mid-70s. I believe such commercialization "push" can be counterproductive to the progress we all want to see made. It certainly has been frustrating to the Congress. Some elements of the government behave as though their statements on commercialization are now fact, expecting the private sector to rush in and fill the breach. This has yet to happen because the interested private parties see the government as the principal customer for the product, but this customer makes no quantitative commitment to this fact. Perhaps we should recognize that, when the government

is the principal or sole customer for a product or service, commercialization may offer some private sector efficiencies but it is really not the entrepreneurial engine that we all look to for expansion of our space endeavors. At times it may be little more than an alternate form of contracting or funding and should be recognized as such.

I would rather that we concentrated our attention on those areas more representative of free enterprise where there is commercialization "pull"; i.e., where the private sector is initiating activity and the government is gearing to respond. This is now happening in launch vehicles and launch services and I hope will be increasingly evident in materials processing in space as initial successes are publicized and understood. There seems to be little argument that such commercialization is a good thing and should be encouraged. But verbal encouragement and pats on the back are not enough. Positive statements and policies issued at high levels, while important, are not sufficient. As a recent corporate strategic planner, I know that the best plan is worthless if it lacks an implementation program. Healthy industries have competing demands for their investment dollars. Those opportunities with unresolved uncertainties and risks that are seemingly not controllable will simply be sacrificed for those with a more certain return. It is not that industry will not take risks, but far better the business risk that intelligent application of their own effort and capital might ameliorate than the risk of a government, no matter how well intended, changing its mind.

It is therefore vitally important that the policies now being developed to encourage commercialization be translated into actionable events by officials responsible for implementation. This is not a trivial statement because often these officials are many layers from the Agency heads and are more used to the adversary contractual process than the cooperative efforts now demanded. Perhaps if we were operating in an international

vacuum this wouldn't be so important. But this Subcommittee needs little reminder of the overseas competition that has now extended into the space arena nor of the strength of governments and industries working together.

It is not my intent to develop a complete list of uncertainties that will need resolution, but included should be questions of government restraints on access to the market; controls on pricing, if any; and a much better understanding of the implications of national security overrides and their sensitivity to policy changes. There may be need for restraints on the government which proscribe them from future competition with the private entity and limit international agreements which create overseas competition. The costs of regulation must be understood and, most important, early negotiations are required on the costs of government facilities and services needed by the private sector with some guarantee of their stability over time. Other implementation requirements are included in the NAPA report, including rights in inventions, insurance, etc. If these issues are handled in a business-like manner, I am very optimistic that there will be increasing private involvement in space activities, particularly where there is already commercialization pull, such as in the provision of launch services through expendable launch vehicles (ELVs).

We must also recognize the implications this will have for the space transportation system and the manner in which the Shuttle is used. The NAPA report recommends against commercial operation of the Shuttle at this time because, in their view, it has not yet attained technical maturity. There is another reason for not rushing into Shuttle commercialization. If the commercial ELVs are successful, then by definition there will be some unloading of the Shuttle manifest. Rather than being discouraged by this event, I would be encouraged by the impetus this should give to both military and civilian use of the Shuttle in research and development. In my view such use has been

inhibited because any R & D planner looking ahead could see the Shuttle fully utilized as a space truck with no U.S. alternative to Shuttle launching. He further faced the recognition that priority must be given to maintaining the military and commercial schedules with little room for far-reaching programs that might use the unique properties of the Shuttle: its size, the use of man, and its servicing and retrieving capabilities. This then is another reason for not prematurely commercializing Shuttle operations. It has too many other values to the nation.

In summary, Mr. Chairman, I believe the United States has a unique opportunity to extend its leadership in space technology, science, exploration and applications through proper exploitation of government responsibilities and private sector initiatives. Clearly the public policies are moving in this direction. My principle caution is that we recognize the complexity of the path on which we are embarking; that policy statements, while required, are not sufficient for success and that much attention must be paid by all parties, private and public, in implementing the policies if we are to succeed. The importance of this endeavor to our nation is admirably expressed in the closing paragraph of the NAPA report foreword:

At a time when our nation has suffered losses in areas of technological creativity where it was once the undisputed leader, the space program has provided a compensating stimulant, the tempo of which must not be lost. The prospect for business ventures in space technologies represents a major opportunity to demonstrate that within the free enterprise philosophy there is a great potential for cooperative endeavor between the public and private sector. Pursuit of this opportunity could become a model for joint public/private efforts in other areas.

Thank you, Mr. Chairman.