Contractor and Government: Teamwork and Commitment

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I. INTRODUCTION

My assigned topic, "Contractor and Government: Teamwork and Commitment," is a subject about which I am vitally interested. The successes of the U.S. space program were built on such teamwork and commitment.

It seems only a short time ago that man's role in space was an unknown quantity. In rapid succession, however, the flights of Shepard, Glenn, and Armstrong demonstrated man's capability to live and travel in space. Consequently, we no longer live with the same awe of space.

The success of these joint industry-NASA efforts in achieving our Nation's space goals testifies to the validity of our team's past commitment, management expertise, communications techniques, and teamwork over a period of 25 years. Today, however, we are at the beginning of a new era in space which poses significantly new challenges as we move into the second 25 years of the U.S. space program.

- First, we must make use of the new technologies becoming available to improve our effective utilization of our assigned resources.
- Second, we must meet the challenge of international competition in space (a challenge we welcome!).
- Third, we must establish a permanent manned presence in space.
- Fourth, we must move from an era of primarily space exploration to an era which also optimizes the commercial uses of space.

These new challenges, when considered in their totality, constitute the beginning of a new era - the Space Business Era. They require that we reexamine, revitalize, and initiate imaginative new ways of doing business in two closely interrelated areas: (1) within the Government organization itself and (2) in our joint industry-Government partnership.

Because of my familiarity with the U.S. space program, I naturally have tended to select examples which relate to it. In some instances, these illustrations may have direct applicability to a particular organization; in other instances, they may apply only indirectly. However, the important message we all must leave with is that: To be successful in this world of new challenges, we must not only extensively reexamine internally the way we do business in order to be more effective and efficient, but, equally important, we must also find more productive methods of working together. We must seek ways to eliminate adversarial relationships. We must seek ways to develop more WIN-WIN situations.

Our intent is to get started and to set our sights high. Such an undertaking is perhaps equal to or greater than the one we faced more than 25 years ago when the space program was just beginning.

II. Improving Our Methods of Doing Business

I would like now to highlight some efforts which we have underway to improve our methods of doing business. First and foremost, the NASA Administrator has given us a major new goal: That NASA, in doing its daily business, must strive to become a national leader in development and application of advanced technology and management practices. This goal is consistent with the national goal recommended by the recent White House conference that the Government: "Provide national leadership and act as catalyst in motivating organizations to focus on productivity and productivity-enhancing activities ..."

However, attempting to achieve this new goal has proven to be a significant and difficult challenge. It is forcing us to get out of the comfortable ruts we have gradually developed for ourselves during the past 25 years. It is requiring us to change our mindsets and to continually question why we do business the way we do.

One of the most difficult problems we have to deal with is how to get decisions made at the right level. As NASA has matured over the years, too many decisions have gravitated, or perhaps have been pulled, too high up the management ladder. As a result, it is taking too long to make decisions and, in many instances, I am also concerned that maybe the best decisions are not being made.

We are attempting to reverse this process and get decisions made at the lowest effective level. However, we have no magic answers on how to achieve a proper balance. Therefore, we would welcome suggestions.

In addition to looking at our decisionmaking processes, we are exploring and evaluating for application within NASA a whole host of productivity improvement applications. These range from employee participation teams to advanced office technology such as personal computer applications and the use of computer-aided design/computer-aided manufacturing (CAD/CAM). I will review a few of these applications which I believe merit attention.

American Productivity Center White Collar Productivity Improvement Project

We have joined together with nine leading industrial firms and the American Productivity Center in a 2-year action research project. It is designed to investigate means of improving the productivity and effectiveness of our professional and white-collar workers. At this time, there are approximately 40 pilot projects in operation in such functional areas as engineering, research and development (R&D), accounting, management information services, personnel, and marketing and sales.

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The private firms involved include such industry leaders as Johnson & Johnson, TRW, Atlantic Richfield, Northern Telecom, Ortho-Pharmaceutical, Rockwell International, Warner-Lambert, McDonnell-Douglas, and Armco. Although the overall project is not scheduled for completion until a year from now, preliminary indications are that it is already beginning to realize its objective of improving productivity and organizational effectiveness.

Implementing NASA/Contractor Conference Recommendations

Another major productivity improvement effort currently underway in NASA substantially involves and affects our relations with our partners in the space business - the contractor community. Industry accounts for approximately 85% of NASA's team effort; it is the key element in achieving the productivity and quality improvement vital to the Nation's space program. Therefore, if we can aid the aerospace industry in doing its job more effectively and efficiently, we will be a long way down the road to doing NASA's overall job better.

To some extent, the aerospace industry is a maturing industry. As a result, we have built up procedures, techniques, and operations which, although successful in the past, may now be outmoded. Accordingly, we must stimulate industry to look for innovative ways of doing business and discard the outmoded. And industry, from their perspective, must point out to us where we, the Government, can improve our ways of doing business.

Therefore, in a series of workshops held last winter, we asked industry to give us their views on the major impediments to a more successful industry-NASA working relationship. And lo and behold, as a Walt Kelly comic strip character once put so well: "We have met the enemy, and they are us!" Our partners came back in short order and quickly pointed to a number of areas where we, NASA, presented stumbling blocks. The identified impediments were not necessarily new concerns. For example, they included such items as:

- We have too many different people giving directions to contractors.
- We spend too much time telling industry "how" to do things, rather than specifying "what" we want.
- We are untimely in our contractual actions.

The list is too lengthy to discuss in detail. There was, however, one possible "surprise" on the list: industry wants us to increase the frequency with which we provide them feedback on their performance. They want to be in a better position to meet our requirements in a more timely fashion.

Dismayed but undaunted by this development, we proceeded to set up five joint industry-NASA teams to develop recommendations on actions to be taken to eliminate, or at least minimize, these roadblocks. These five teams presented their recommendations late this spring in a 2-day meeting chaired by the NASA Administrator.

In almost every instance, the teams found that the action necessary to correct the problem could be largely accomplished within NASA's current authority. That is, no changes in Government laws or regulations were required. These joint industry-NASA teams were very effective in translating what could have been platitudes into specific actions.

Beginning this summer, we began taking actions within NASA to remove many of these stumbling blocks. Hopefully, our industry partners will begin to see tangible results this fall.

In August, the NASA Administrator issued a NASA-wide action plan formally establishing our commitment to implementing the majority of the joint industry-NASA recommendations. In the meantime, I had already set up an implementation committee at the Lyndon B. Johnson Space Center (JSC) chartered to develop an action plan to implement the recommendations as they relate to JSC.

Implementing action affects two major areas: existing contractual relations and new contracts. In terms of new contractual relationships, we are at a particularly fruitful juncture. We are about to embark on a major new program - Space Station. We are making every effort to ensure that, as the new industry-Government responsibilities are assigned, the joint industry-NASA recommendations are incorporated into our implementing actions. Our goal is to strive to make the partnerships that develop in these contracts a model of effective industry-Government relationships.

Implementing the changes necessary to meet this goal will be no easy task. We must find a way to make all levels of our organization aware of the issues and ideas and ready to change. However, the benefits to be realized are too great not to commit wholly to the necessary effort.

Creating WIN-WIN Situations

In addition to looking at procedural ways to improve our day-to-day working with industry, we must be more innovative in developing more WIN-WIN situations in which both the Government, representing the taxpayer, and the firm, representing the stockholders, can realize their objectives.

Incentive contracts have always been our primary tool to motivate business in the R&D environment. We are now placing increasing reliance on this contractual tool to focus on developing even more innovative and cost-effective ways of doing business. In some instances, new incentives are taking the form of increased fees based on a subjective evaluation of a firm's initiative in developing new and improved methods to streamline and otherwise reduce the ultimate cost of operations to the Government. In other instances, there is prescribed percentage dollar sharing based on costs saved. Generally, in these cases, the pool of funds from which awards are made consists of otherwise unearned award fee funds.

The contractors, in turn, are tying their own employee bonus and reward systems to the same type of criteria. The net result is that, more and more, we are getting the entire space business community to address this major productivity improvement challenge.

New Dimensions for Commitment and Teamwork in the Space Business Era

So far, I have been discussing ways in which we can improve our ongoing, day-to-day working relationships. However, as we move into the Space Business Era, there are new dimensions and new challenges for teamwork and commitment. Private sector investment and involvement is essential if the enormous commercial potential of space is to be developed. The challenge to industry is twofold.

First, industry must take on broader responsibilities in managing and operating larger segments of the space transportation system. This will enable NASA, as an R&D organization, to devote a greater portion of its limited resources to the development of new technology.

Second, the potential use of space for performing commercial activities is almost limitless. The commercial development of the in-space manufacture of biological materials as well as a host of industrial materials appears among the most promising of what will be the next entrepreneurship successes. The full scope of commercial uses of space can only be surmised. The real answer lies with industry, from which the ideas will come to make a commercial bonanza of space. I would like to first discuss industry's growing responsibilities in carrying out NASA's current programs and then turn to the broader role of the private sector in the commercial uses of space.

Streamlining Shuttle Operations

For the U.S. public and the world in general, our most visible program today is the Space Shuttle. Although each Shuttle mission offers much of the same drama that surrounded the early space programs, the measures of success are becoming much more demanding.

In the past, our manned space programs have been R&D efforts. With Space Shuttle, we are evolving from an R&D effort into a more routine operation - the National Space Transportation System. The National Space Transportation System is a major national resource or capability, designed to take private, Government, and international payloads into space - on a routine basis.

This phrase "on a routine basis" provides the new, more demanding basis for evaluating our performance. "On a routine basis" is translated to mean on time and successful, with a minimum of cost and effort - that is, more busiresslike.

The achievement of routine operations (which the public has already translated into a new performance standard for us) poses a significant challenge to both NASA and industry. We must not only conduct flights on a routine basis, but we must also conduct them with the same high standards of quality and reliability demonstrated in previous space programs.

Furthermore, we must be able to substantially increase the number of flights. One of our most immediate objectives is developing the capability to fly 24 Shuttle missions a year. To do so, we will have to improve on our proven method of operations by an order of magnitude. Consequently, all responsible NASA centers and contractors are heavily involved in identifying new ways to streamline our operations.

At JSC, extensive efforts are underway to reduce the time required to plan for missions, train astronauts and flight controllers, and integrate proposed new payloads into upcoming missions. At the same time, similar efforts are underway at the John F. Kennedy Space Center (KSC) to reduce the launch turnaround time as well as the time required to integrate the cargo with the Orbiter.

To achieve these reduced turnaround times, various approaches are being used. They include establishing "freeze points," or milestones in the mission preparation schedule beyond which time, hardware, software, or procedural changes cannot be introduced into the operations sequence. Standardization and automation of procedures and activities are other key elements in reducing turnaround time.

However, the streamlining of Space Shuttle operations will also involve a significant reallocation of responsibilities between Government and industry. In the long run, this reallocation of responsibilities may be of greater importance than the initial streamlining efforts briefly outlined here. We have already begun this reallocation of responsibilities. At KSC, the Shuttle Processing Contract is already in place. At JSC, industry is preparing to bid on the Space Transportation System Operations Contract and the Flight Equipment Processing Contract. These contracts involve billions of dollars.

For each contracted effort, a single contractor has been, or will be, selected to manage and provide the operations support that formerly was provided by a large number of contractors and then managed and coordinated in depth by NASA. The new contracts will allow NASA to delegate extensive management responsibilities to the contractor as NASA reduces its day-to-day involvement in operations support activities.

Contracts for as long as 15 years are planned for each activity. This duration will give the contractors the opportunity to introduce long-range improvements in management and operations to reduce costs, without sacrificing quality or timeliness of support. Later, we envision a fixed-price contract with even greater fee opportunity for the contractor. The overall objective is to inject new thinking in terms of productivity and cost consciousness and to make Shuttle mission costs competitive with those of other space transportation systems.

Incidentally, to further maximize the benefits to be derived from this reallocation of responsibilities, we are cooperating with the U.S. Air Force to determine whether similar contractual instruments can be used in support of U.S. Air Force Shuttle operations at Vandenberg Air Force Base and Colorado Springs.

By turning over more of the responsibility for management and operation of Shuttle operations support to contractors, NASA will be able to concentrate more resources on its traditional areas of research and development, especially the Space Station Program.

Space Station

Concurrent with the challenge associated with implementing an operational National Space Transportation System, we have also been assigned by the President the responsibility to develop a permanent manned presence in space - the Space Station Program.

The Space Station Program provides an exciting new challenge to the imagination and innovativeness of both Government and industry in finding new ways to improve the productivity and effectiveness of this entire team. NASA is committed to providing a fully functional manned Space Station in the early 1990's for a total cost of $8.0 billion (1984 dollars), less than the cost of building the Space Transportation System.

The Space Station is different from previous manned spacecraft in that its purpose is not transportation; instead, it will be a multipurpose, permanent facility, designed for use as a national resource. The Space Station must meet the requirements of a diverse user community consisting of private entrepreneurs, technology developers, and scientists. Many are interested in exploiting the advantages of the near weightlessness of space.

The task of building this multipurpose facility requires design-to-cost approaches that are, at best, only in the conceptual stages at this time. A number of preliminary ideas and concepts are under consideration to meet this challenge. One such concept is for use of "protoflight" hardware, in which the same unit used for development and certification is used as the flight article. Other concepts include extensive use of commonality, use of on-orbit maintainability, and using modular approaches to permit evolution of subsystems and space modules in space over time. These concepts involve the more innovative and extensive use of ground testbeds as technical development tools to evaluate new technology as it becomes available.

Let me expand briefly on the notion of commonality. In the Space Transportation System Program, different elements were provided by different NASA centers and different industry teams. Although an attempt was made to achieve commonality in some components, the final product, although similar, was not identical. In the Space Station Program, a 20% cost advantage for extensive use of common systems has already been factored into cost projections; thus, it is imperative that at least this level of commonality be developed.

Another concept being implemented at the outset of the Space Station Program is to make maximum use of advanced technology for management communication and data base management systems. These systems will be shared by both Government and industry to enhance the rapid and precise transfer of current information. The plan is to provide a high degree of office automation and reduce the amount of paper generated to a minimum.

In an extension of this concept to the design and manufacturing functions, the baseline configuration will be contained in a computerized data base. Use of CAD/CAM systems and software will allow easier updating of the engineering data base. This information will be readily available to all participants and should not only speed up the overall process but also ensure more accuracy than ever before.

With the advent of man living and working in space for extended durations, we are also initiating studies to improve man's productivity in space. Study and attention is being given not only to man-machine interfaces, but also to the extensive use of automation and robotics to reduce demands on the crew for routine operations and maintenance tasks. By using these techniques, the Space Station personnel will have more productive time for industrial, technology development, or scientific purposes.

With respect to the international aspect of the Space Station Program, this participation is envisioned in three distinct roles: builder, operator, and user. A number of benefits can be gained by this participation, not the least of which is to help share development and operations cost. New ideas and new methods of international cooperation will be needed to encourage and implement these joint ventures.

Commercial Uses of Space

In both the Space Transportation System Program and the Space Station Program, NASA and industry have fairly well defined tasks. I would like to turn now to that aspect of the space program where the future lies more with industry than with Government; that is, industry's role in finding ways to make beneficial use of space for commercial activities.

President Reagan, both in this year's State of the Union Address and in his recently issued (July 20, 1984) National Policy on the Commercial Use of Space, makes the expansion of private sector investment and involvement in space a major objective of the U.S. Government. The U.S. Congress has endorsed this thrust.

Concurrent with the President's initiative, NASA established a task force to develop an Agency-wide policy and program plan to enhance the Agency's ability to encourage and stimulate free enterprise in space. The task force reached three fundamental conclusions.

- First, commercial activities in space by private enterprise should begin now.
- Second, the natural and bureaucratic barriers inhibiting the commercial use of space need to be and can be relieved or removed through actions of the Government and private enterprise.
- Finally, with firm resolve and the commitment of reasonable resources over a number of years, a partnership between Government and private enterprise can turn space into an arena of immense benefit.

These conclusions led to the following five principles to govern NASA commercial space policy.

(1) The Government should reach out to and establish new links with the private sector.

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(2) The Government should not be the overall judge of a project's feasibility or impede private efforts to undertake commercial space ventures.

(3) If the private sector can operate a space venture more efficiently than the Government, then such commercial utilization should be encouraged.

(4) The Government should invest in high-leverage technologies and space facilities which encourage private investment.

(5) The Government will consider a significant contribution to a private sector initiative under two conditions:

   (a) There must be significant private capital at risk.

   (b) There must be significant potential benefits, such as a contribution to economic health or to a positive balance of trade.

Thus, beginning immediately and continuing in the long term, commercial activities in space offer great promise for private enterprise. There is also great risk. To help offset this risk, the Government, as a partner, intends and is committed to support private sector commercial initiatives.

III. Summary: Challenge and Commitment

In summary, one can only conclude that the challenges of space are many, and they are manifest. The President has charted a course that opens wide the door of space for U.S. industry. NASA, as an operating arm of the Government, is aggressively seeking ways to broaden and facilitate the role of industry as a major stockholder in the business of space.

With a firm commitment over a number of years, industry, the universities, and the Government working together can turn space into an arena of immense benefit for our Nation. The question is how will industry respond to this challenge? I believe the answer will be most positive.