2. Should the Commission authorize multiple entrants, or a limited number thereof, relying upon diverse market-oriented service providers to determine U.S. domestic needs? (Hughes was the leading proponent of this view, but was supported by several other applicants, including RCA, Western Union and Western Tele-Communications, Inc.).
3. What should be the appropriate role for AT&T, the monopoly domestic terrestrial operator?
4. Should Comsat be permitted to provide domestic service at all, since as the "U.S. designated entity" in Intelsat, Comsat was limited to international communication services only?
5. Should entry be restricted based on critical, but subsidiary, policy issues, such as, should manufacturers or current terrestrial carriers be approved?
6. Should satellite operators be required to operate only as a common carrier or could they also provide private services as a separate entrepreneur?

The Open Skies Decision

These issues were hotly debated before the Commission and in other political forums for two years. Finally, the logjam was broken by the Commission's issuance of its seminal decision, "The Second Report and Order," known as the "Open Skies Decision," in June of 1972. The Commission gave the green light to the authorization of multiple applicants, with maximum opportunity for domestic satellite service development based on their own business judgment as to the type of service and technology. But for the adoption of the "open skies" policy, the satellite communications industry as we now know it would never have developed. More to the point, for our purposes, there probably would be no story to tell on the beginnings of SSP.

Some seven applications (or combinations) were ultimately approved in the mid 70s and commenced service. (Western Union, RCA Americom, Comsat/AT&T, SBS, American Satellite Company - owned by Fairchild and Western Union International, and later Hughes, with its Galaxy System). Also, Canada, with Anik 1, commenced service in the early '70s. By the time of the formation of SSP in 1983, there were over 20 satellites in orbit in our region, the Americas.

The industry also expanded overseas. The Inmarsat organization was established in London. After a short time, Eutelsat was formed in Paris, France, along with the development of the Ariane Launch vehicle under the auspices of the European Space Agency and Arianespace. The Indonesian Satellite System, built by Hughes and called Palapa, was launched, and regional services spread when Palapa asked to provide additional services in Southeast Asia. Additional satellite systems sprang up in Australia, France and Germany, and domestic systems in Russia and Canada continued to grow. Soon there were dozens of countries leasing capacity on INTELSAT as well. The creation of a truly global industry exploded in the 1970s. In a way it seemed almost by magic.

The Industry Converges

Towards the end of the 1970s, space lawyer Dr. Delbert Smith had a vision. He thought about publishing a new magazine called Satellite Communications that would carry stories about this new industry. He also determined an annual conference should be convened to bring people together to discuss new developments in the field. Since he was an inveterate golfer who enjoyed vacationing in Colorado, he decided to hold the conference in August in Denver, Colorado. At the first few annual meetings of SCUC (the Satellite Communications Users Conference), the various attendees (numbering only just over a hundred at the first conference) got together to eat dinner and have fun. These meetings were quite informal and occasionally more than a bit rowdy. This group became known as the "Satellite Groupies." (See related story, Once a Groupie, Always a Groupie.)

Over time during the '70s, however, the industry matured. New systems were designed and launched around the world, and revenues soared into the hundreds of millions of dollars and beyond. Irl "Bucky" Marshall, an original groupie, left Satellite Communications Magazine as publisher and struck out to create a new magazine called Via Satellite. Satellite News was born soon after when Phillips Publishing became seriously interested in the field and even bought out Via Satellite. Suddenly, "thousands" of people populated the satellite field and realized that their industry was maturing.

Amid all of this mushrooming growth, some of us who were active in the field thought we needed a more structured way to interact. After the 1982 SCUC Conference in Denver, nearly a dozen people went out to eat in a hot, not entirely fashionable, Mexican restaurant to discuss a new and seemingly "radical" idea. Since this was a new industry comprised of a variety of people with diverse engineering, marketing, software, communications and sales

National Aeronautics and Space Administration

Report of the Space Task Group, 1969

Editorial Headnote: Space Task Group, "The Post-Apollo Space Program: Directions for the Future," September 1969; available in NASA Historical Reference Collection, History Office, NASA Headquarters, Washington, D.C. Page references to original document in brackets.]

[i] Conclusions and Recommendations

The Space Task Group in its study of future directions in space, with recognition of the many achievements culminating in the successful flight of Apollo 11, views these achievements as only a beginning to the long-term exploration and use of space by man. We see a major role for this Nation in proceeding from the initial opening of this frontier to its exploitation for the benefit of mankind, and ultimately to the opening of new regions of space to access by man.

[ii] We have found increasing interest in the exploitation of our demonstrated space expertise and technology for the direct benefit of mankind in such areas as earth resources, communications, navigation, national security, science and technology, and international participation. We have concluded that the space program for the future must include increased emphasis upon space applications.

We have also found strong and wide-spread personal identification with the manned flight program, and with the outstanding men who have participated as astronauts in this program. We have concluded that a forward-looking space program for the future for this Nation should include continuation of manned space flight activity. Space will continue to provide new challenges to satisfy the innate desire of man to explore the limits of his reach.

We have surveyed the important national resource of skilled program managers, scientists, engineers, and workmen who have contributed so much to the success the space program has enjoyed. This resource together with industrial capabilities, government, and private facilities and growing expertise in space operations are the foundation upon which we can build.

We have found that this broad foundation has provided us with a wide variety of new and challenging opportunities from which to select our future directions. We have concluded that the Nation should seize these new opportunities, particularly to advance science and engineering, international relations, and enhance the prospects for peace.

We have found questions about national priorities, about the expense of manned flight operations, about new goals in space which could be interpreted as a "crash program." Principal concern in this area relates to decisions about a manned mission to Mars. We conclude that NASA has the demonstrated organizational competence and technology base, by virtue of the Apollo success and other achievements, to carry out a successful program to land man on Mars within 15 years. There are a number of precursor activities necessary before such a mission can be attempted. These activities can proceed without developments specific to a Manned Mars Mission-but for optimum benefit should be carried out with the Mars mission in mind. We conclude that a manned Mars mission should be accepted as a long-range goal for the space program. Acceptance of this goal would not give the manned Mars mission overriding priority relative to other program objectives, since options for decision on its specific date are inherent in a balanced program. Continuity of other unmanned exploration and applications efforts during periods of unusual budget constraints should be supported in all future plans.

We believe the Nation's future space program possesses potential for the following significant returns:

- new operational space applications to improve the quality of life on Earth.
- non-provocative enhancement of our national security
- scientific and technological returns from space investments of the past decade and expansion of our understanding of the universe.
- low-cost, flexible, long-lived, highly reliable, operational space systems with a high degree of commonality and reusability
- international involvement and participation on a broad basis

[iii] Therefore, we recommend -

That this Nation accept the basic goal of a balanced manned and unmanned space program conducted for the benefit of all mankind.

To achieve this goal, the United States should emphasize the following program objectives:

- increase utilization of space capabilities for services to man, through an expanded space applications program
- enhance the defense posture of the United States and thereby support the broader objective of peace and security for the world through a program which exploits space techniques for accomplishment of military missions
- increase man's knowledge of the universe by conduct of a continuing strong program of lunar and planetary exploration, astronomy, physics, the earth and life sciences
- develop new systems and technology for space operations with emphasis upon the critical factors of: (1) commonality, (2) reusability, and (3) economy, through a program directed initially toward development of a new space transportation capability and space station modules which utilize this new capability
- promote a sense of world community through a program which provides opportunity for broad international participation and cooperation

As a focus for the development of new capability, we recommend the United States accept the long-range option or goal of manned planetary exploration with a manned Mars mission before the end of this century as the first target.

[iv] In proceeding towards this goal, three phases of activities can be identified:

- initially, activity should concentrate upon the dual theme of exploitation of existing capability and development of new capability, maintaining program balance within available resources.
- second, an operational phase in which new capability and new systems would be utilized in earth-moon space with groups of men living and working in this environment for extended periods of time. Continued exploitation of science and applications would be emphasized, making greater use of man or man-attendance as a result of anticipated lowered costs for these operations.
- finally, manned exploration missions out of earth-moon space, building upon the experience of the earlier two phases.

Schedule and budgetary implications associated with these three phases are subject to Presidential choice and decision at this time with detailed program elements to be determined in a normal annual budget and program review process. Should it be decided to develop concurrently the space transportation system and the modular space station, a rise of annual expenditures to approximately $6 billion in 1976 is required. A lower level of approximately $4-5 billion could be met if the space station and the transportation system were developed in series rather than in parallel.

For the Department of Defense, the space activities should be subject to continuing review relative to the Nation's needs for national security. Such review and decision processes are well established. However, the planned expansion of the DoD space technology effort and its documented interest in the Space Transportation System demands continued authoritative coordination through the Aeronautics and Astronautics Coordinating Board to assure that the national interests are met.

[v] The Space Task Group has had the opportunity to review the national space program at a particularly significant point in its evolution. We believe that the new directions we have identified can be both exciting and rewarding for this Nation. The environment in which the space program is viewed is a vibrant, changing one and the new opportunities that tomorrow will bring cannot be predicted with certainty. Our planning for the future should recognize this rapidly

changing nature of opportunities in space.

We recommend that the National Aeronautics and Space Council be utilized as a mechanism for continuing reassessment of the character and pace of the space program.

[1] THE POST-APOLLO SPACE PROGRAM: DIRECTIONS FOR THE FUTURE

I.INTRODUCTION

With the successful flight of Apollo 11, man took his first step on a heavenly body beyond his own planet. As we look into the distant future it seems clear that this is a milestone - a beginning - and not an end to the exploration and use of space.

Success of the Apollo program has been the capstone to a series of significant accomplishments for the United States in space in a broad spectrum of manned and unmanned exploration missions and in the application of space techniques for the benefit of man. In the short span of twelve years man has suddenly opened an entirely new dimension for his activity.

In addition, the national space program has made significant contributions to our national security, has been a political instrument of international value, has produced new science and technology, and has given us not only a national pride of accomplishment, but has offered a challenge and example for other national endeavors.

The Nation now has the demonstrated capability to move on to new goals and new achievements in space in all of the areas pioneered during the decade of the sixties. In each area of space exploration what seemed impossible yesterday has become today's accomplishment. Our horizons and our competence have expanded to the point that we can consider unmanned missions to any region in our solar system; manned bases in earth orbit, lunar orbit or on the surface of the Moon; manned missions to Mars; space transportation systems that carry their payloads into orbit and then return and land as a conventional jet aircraft; reusable nuclear-powered rockets for space operations; remotely controlled roving science vehicles on the Moon or on Mars; and application of space capability to a variety of services of benefit to man here on earth.

Our opportunities are great and we have a broad spectrum of choices available to us. It remains only to chart the course and to set the pace of progress in this new dimension for man.

The Space Task Group, established under the chairmanship and direction of the Vice President (Appendices A and B), has examined the spectrum of new opportunities available in space, values and benefits from space activities, casts and resource implications of future options, and international aspects of the space program. A great wealth of data has been made available to the Task Group, including reports from the National Aeronautics and Space Administration and the Department of Defense reflecting very extensive planning and review activities, a detailed report from the President's Science Advisory Committee, views from [2] members of Congress, the National Academy of Sciences Space Science Board, and the American Institute of Aeronautics and Astronautics. In addition, a series of individual reports from a special group of distinguished citizens who were asked for their personal recommendations on the future course of the space program were of considerable value to the Task Group. This broad range of material was considered and evaluated as part of the Task Group deliberations. This report presents in summary form the views of the Space Task Group on the Nation's future directions in space.

[3] II. BACKGROUND

Twelve years ago, when the first artificial Earth satellite was placed into orbit, most of the world's population was surprised and stunned by on achievement so new and foreign to human experience. Today people of all nations are familiar with satellites, orbits, the concept of zero `g', manned operations in space, and a host of other aspects characteristic of this new age - the age of space exploration.

The United States has carried out a diversified program during these early years in space, requiring innovation in many fields of science, technology, and the human and social sciences. The Nation's effort has been interdisciplinary, drawing successfully upon a synergistic combination of human knowledge, management experience, and production know-how to bring this National to a position of leadership in space.

Space activities have become a part of our national agenda.

We now have the benefit of twelve years of space activity and our leadership position as background for our examination of future directions in space.

National Priorities

By its very nature, the exploration and exploitation of space is a costly undertaking and must compete for funds with other national or individual enterprises. Now that the national goal of manned lunar landing has been achieved, discussion of future space goals has produced increasing pressures for reexamination of, and possible changes in, our national priorities.

Many believe that funds spent for the space program contribute less to our national economic growth and social well-being than funds allocated for other programs such as health, education urban affairs, or revenue sharing. Others believe that funds spent for space exploration will ultimately return great economic and social benefits not now foreseen. These divergent views will persist and must be recognized in making decisions on future space activities.

The Space Task Group has not attempted to reconcile these differences. Neither have we attempted to classify the space program in a heirarchy of national priorities. The Space Task Group has identified major technical and scientific challenges in space in the belief that returns will accrue to the society that takes up those challenges.

Values and Benefits

The magnitude of predicted great economic and social benefits from space activities cannot be precisely determined. Nevertheless, there should be a recognition that significant direct benefits have been realized as a result of space investments, particularly from applications programs, as a long-term result of space science activities, DOD space activities, and advancing technology. These direct benefits are only part of the total set of benefits from the space program, many of which are very difficult to quantify and therefore are not often given adequate consideration when costs and benefits from space activities are weighed or assessed in relation to other national programs.

[4] Benefits accrue in each of the following areas:

- economic - directly through applications of space systems to services for man, and indirectly through potential for increased productivity resulting from advancing technology; improvements in reliability, quality control techniques, application of solid state electronics, and computer technology resulting from demands of space systems; advances in understanding and use of exotic new materials and devices with broad applicability; refinement of systems engineering and management techniques for extremely complex developments.
- national security - directly through DOD space activities, and indirectly through enhancement of the national spirit and self-esteem; reinforcement of the image of the United States as a leader in advanced technology; strengthening of our international posture through demonstration that a free and democratic society can achieve a challenging, technologically sophisticated, long-term objective; maintenance of a broad base of highly skilled aerospace workers applicable to defense needs; and advancement of technology that may have relevance to defense use.
- science - directly through support for ground and space research programs, indirectly through ability to open to observation new portions of the electromagnetic spectrum; opportunity to search for life on other planets, to make measurements in situ at the planets or in other regions of space, and to utilize the unique environment of space (high vacuum, zero 'g') for experimental programs in the life sciences, physical sciences and engineering.
- exploration - the opening of new opportunities to investigate and acquire knowledge about man's environment - which now has expanded to include not only the Earth, but potentially the entire solar system.
- social - providing educational services through enhanced communications which improved treatment of social problems.
- international relations - providing opportunities for cooperation; the identification of foreign interests with U.S. space objectives and programs, and their results.

What is the value to be placed upon these benefits, and how should the space program be constituted to provide the greatest return in each of these areas for a selected level of public investment?

The answers to these questions cannot be stated in absolute terms - there is no dollar value associated with national self-esteem or with many of the other benefits listed above, and there is no fixed program of missions without which these benefits will not accrue. As with many programs, there is, however, a lower limit of activity below which the viability of the program is threatened and a reasonable upper limit which is imposed by technological capability and rate of growth of the program.

These limits are a key consideration in the options discussed later in this report.

[5]

National Resource

In the eleven years since its creation, NASA has provided the Nation with a broad capability for a wide variety of space activity, and has successfully completed a series of challenging tasks culminating in the first manned lunar landing. These accomplishments have involved rapid increases to peak annual expenditures of almost $6 billion and a peak civil service and contractor work force of 420,000 people. Expenditures for NASA have subsequently dropped over the last three years from this peak to the present level of about $4 billion and supporting manpower has dropped to about 190,000 people.

In addition to NASA space activity, the DOD has developed and operated space systems satisfying unique military requirements. Spending for military space grew rapidly in the early sixties and has increased gradually during the past few years to approximately $2 billion per year.

The Nation's space program has fostered the growth of a valuable reservoir of highly trained, competent engineers, managers, skilled workmen and scientists within government, industry and universities. The climactic achievenment of Apollo 11 is tribute to their capability.

This resource together with supporting facilities, technology and organizational entities capable of complex management tasks grew and matured during the 1960's largely in response to the stimulation of Apollo, and if it is to be maintained, needs a new focus for its future.

Manned Space Flight

There has been universal personal identification with the astronauts and a high degree of interest in manned space activities which reached a peak both nationally and internationally with Apollo. The manned flight program permits vicarious participation by the man-in-the-street in exciting, challenging, and dangerous activity. Sustained high interest, judged in the light of current experience, however, is related to availability of new tasks and new mission activity - new challenges for man in space. The presence of man in space, in addition to its effect upon public interest in space activity, can also contribute to mission success by enabling man to exercise his unique capabilities, and thereby enhance mission reliability, flexibility, ability to react to unpredicted conditions, and potential for exploration.

While accomplishments related to man in space have prompted the greatest acclaim for our Nation's space activities, there has been increasing public reaction over the large investments required to conduct the manned flight program. Scientists have been particularly vocal about these high costs and problems encountered in performing science experiments as part of Apollo, a highly engineering oriented program in its early phases.

Much of the negative reaction to manned space flight, therefore, will diminish if costs for placing and maintaining man in space are reduced and opportunities for challenging new missions with greater emphasis upon science return are provided.

[6]

Science and Applications

Although high public interest has resided with manned space flight, the Nation has also enjoyed a successful and highly

productive science and applications program.

The list of more achievements in space science is great, ranging from our first exploratory orbital flights resulting in discoveries about the Earth and its environment to the most recent Mariner missions to the vicinity of Mars producing new data about our neighbor planet.

Both optical and radio astronomy have been stimulated by the opening of new regions of the electromagnetic spectrum and new fields of interest have been uncovered - notably in the high energy X-ray and gamma-ray regions. Astronomy is advancing rapidly at present, partly with the aid of observations from space, and a deeper understanding of the nature and structure of the universe is emerging. In planetary exploration, we have a unique opportunity to pursue a number of the major questions man has asked about his relation to the universe. What is the history of the formation and evolution of the solar system? Are there clues to the origin of life? Does life exist elsewhere in the solar system?

In the life sciences, questions about the effect of zero 'g' upon living systems, demands of long-duration space flight upon our understanding of man and his interaction or response to his environment, both physiologically and psychologically, promise new insights into the understanding of complex living systems.

These are only a few of the disciplines that have profited from the program of research in space. Space science is not divorced from science on the ground, but is rather an extension of science which builds and depends vitally upon a strong ground-based foundation.

Building upon the basic science on the ground and in space, and upon the growing capability in the design, construction and launch of satellites, the United States pioneered in the development of space applications - notably communications, meteorology and navigation. Operational systems have been placed into service in each of these areas, and the potential for the future appears bright - not only in these areas but also in new fields such as earth resource surveying and oceanography.

International Aspects

Achievement of the Apollo goal resulted in a new feeling of "oneness" among men everywhere. It inspired a common sense of victory that can provide the basis for new initiatives for international cooperation.

The U.S. and the USSR have widely been portrayed as in a "race to the Moon" or as vying over leadership in space. In a sense, this has been on accurate reflection of one of the several strong motivations for U.S. space program decisions over the previous decade.

[7] Now with the successes of Apollo, of the Mariner 6 and 7 Mars flybys, of communications and meteorology applicotions, the U.S. is at the peak of its prestige and accomplishments in space. For the short term, the race with the Soviets has been won. In reaching our present posirion, one of the grear strengths of the U.S. space program has been its open nature, and the broad front of solid achievement in science and applications that has accompanied the highly successful manned flight program.

The attitude of the American people has gradually been changing and public frustration over Soviet accomplishments in space, an important force in support of the Nation's acceptance of the lunar landing in 1961, is not now present. Today, new Soviet achievements are not likely to have the effect of those in the post. Nevertheless, the Soviets have continued development of capability for future achievements and dramatic missions of high political impact are possible. There is no sign of retrenchment or withdrawal by the Soviets from the public arena of space activity despite launch vehicle and spacecraft failures and the preemptive effect of Apollo 11.

The landing on the Moon has captured the imagination of the world. It is now abundantly clear to the man in the street, as well as to the political leaders of the world, that mankind now has at his service a new technological capability, an important characteristic of which is that its applicability transcends national boundaries. If we retain the identification of the world with our space program, we have on opportunity for significant political effects on nations and peoples and on their relationships to each other, which in the long run may be quite profound.

[9] III. GOALS AND OBJECTIVES

Goals

An important aspect in both popular acceptance of the space program and in the spirit, dedication and performance of those who ore directly involved in space activity is the conviction that such activity is worthwhile and contributes to the quality of life on Earth.

Public support for the space program con be related to understanding of the values derived from space activity and to understanding and acceptance of long-term goals and objectives which establish the framework for the program.

In the National Aeronautics and Space Act of 1958, the Congress declared "...it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind." This policy statement, which served effectively as a guide to the first decade in space, must now be translated into clearly enuncioted new long-range goals and program objectives for the post-Apollo space program.

We view the challenge of setting new goals, of providing a focus for our future space activities, of expanding the limits of man's reach and thereby demonstrating America's leadership in scientific and technological undertakings while maintaining the confidence of the people in the strength and purpose of our Nation, as the key to continued space leadership by the United States.

Facing this challenge, some would urge that our efforts should be restricted to exploitation of existing capability, pointing out, quite correctly, that exciting and challenging missions remain to be accomplished which con utilize the existing base. But such a course would risk loss of the foundation for future achievements - a foundation which depends largely on providing a new capability which challenges our technology.

One of the values of the lunar landing goal was that it carried a definite time for its accomplishment, which stressed our technology and served as basis for planning and for budget support. It was a national commitment, a demonstration of the will and determination of the American people and of our technological competence at a time when these attributes were being questioned by many.

The need for an expression of our strength and determination as a Nation has changed considerably since that time. Today the need is for guidance - for direction - to set before the people a vision of where we are going.

[10] Such a vision for the future should have a number of important qualities:

- it should have substantive values that are easily characterized and understood
- it should have a long-term goal, a beacon, an aim for our activities to act as a guide to both short-term and longer range decisions
- it should be sufficiently long-range to ensure that adequate opportunity exists for solid progress in a step-by-step fashion towards that long-term goal yet sufficiently within reach that each step draws measurably closer to that goal
- it should be challenging both for man's spirit of adventure and of exploration and for man's technological capability
- it should foster the simultaneous utilization of space capabilities for the welfare, security, and enlightenment of all people.

The Space Task Group has concluded that a balanced space program that exploits the great potential for automated and remotely-controlled spacecraft and at the some time maintains a vigorous manned flight program, can provide such a vision.

This balanced program would be based upon a framework in which the United States would:

- Accept, for the long term, the challenge of exploring the solar system, using both manned and unmanned expeditions.
- Develop on integrated and efficient space capability that will make Earth-Moon space easily and economically accessible for manned and unmanned systems.
- Maintain a steady return on space investments in applications, science, and technology.

- Use our space capability not only to extend the benefits of space to the rest of the world, but also to increase direct participation by the world community in both manned and unmanned exploration and use of space.

The balanced program for the future envisioned by the Task Group would possess several important characteristics:

- flexibility. The ability to see clearly the opportunities that lie ahead in this new field is limited at best. Some opportunities will fade as we approach them while others, not even discernible at this time, will blossom to the first magnitude. This program will permit the course and time scale to be flexible, to adjust to variations in funding, to shifting national and international conditions, while preserving a guidepost for the future.
- challenge. The space program has flourished under a set of goals that has demanded the highest standards of performance, and an incentive for excellence that has become characteristic of our space efforts. A balanced program of both challenging near-term objectives and long-range goals will enhance and preserve these attributes in the future.
- [11] opportunity. The Nation has in being significant capability for space activity. Abundant opportunities exist for further exploitation of this capability. A balanced progrom will permit adequate attention to applications and science while also creating new opportunities through development of new capability.

In its deliberations, the Space Task Group considerd a number of challenging new mission goals which were judged both technically feasible and achievable within a reasonable time, including establishment of a lunar orbit or surface base, a large 50-lOO man earth-orbiting space base, and manned exploration of the planets. The Space Task Group believes that manned exploration of the planets is the most challenging and most comprehensive of the many long-range goals available to the Nation at this time, with manned exploration of Mars as the next step toward this goal. Manned planetary exploration would be a goal, not an immediate program commitment; it would constitute on understanding that within the context of a balanced space program, we will plan and move forward as a Nation towards the objective of a manned Mars landing before the end of this century. Mars is chosen because it is most earth-like, is in fairly close proximity to the Earth, and has the highest probability of supporting extraterrestrial life of all of the other planets in the solar system.

What are the implications of accepting this long-range goal or option on the character of the space program in the immediate future?

In a technical sense, the selection of manned exploration of the planets as a long-term option for the United States space program would act to focus a wide range of precursor activities and would be reflected in many decisions, large and small, where potential future applicability to long-lived manned planetary systems design will have relevance. In a broader sense such a selection would tend to reinforce and reaffirm the basic commitment to a long-term continued leadership position by the United States in space.

The Space Task Group sees acceptance of the long-term goal of manned planetary exploration as an important part of the future agenda for this Nation in space. The time for decisions an the development of equipment peculiar to manned mission to Mars will depend upon the level of support, in a budget sense, that is committed to the space program.

NASA has outlined plans that would include a manned Mars mission in 1981 with the development decision on a Mars Excursion Module in FY 1974, if the Nation were to accept this commitment. Such a program would result in maximum stimulation of our technology and creation of new capability. There are many precursor activities that will be required before a manned Mars mission is attempted, such as detailed study of biomedical aspects, both physiological and psychological, of flights lasting 500-600 days, unmanned reconnaissance of the planets, creation of highly reliable life support systems, power supplies, and propulsion capability adequate for the rigors of such a voyage and reliable enough to support man. Decision to proceed with a 1981 mission would require early attention to these precursor activities.

While launch of a manned Mars exploration mission appears achievable as early as 1981, it can also be accomplished at any one of the roughly biennial launch opportunities following this date, provided essential precursor activities have been carried out.

[12] Thus, the understanding that we are ultimately going to explore the planets with man provides a shaping function for the post-Apollo space program. However, in a balanced program containing other goals and objectives, this focus should not assume over-riding priority and cause sacrifice of other important activity in times of severe budget constraints. Flexibility in program content and options for decision on the specific date for a manned Mars mission are inherent in this understanding.

The Space Task Group, in response to the President's request for a "Coordinated program and budget proposal," has therefore chosen this balanced program as that plan best calculated to meet the Nation's needs for direction of its future space activity. In reaching this conclusion we have considered international and domestic influences, weighed and placed in perspective science and engineering development, exploration and application of space, manned and unmanned approaches to space missions, and have appraised interagency influences. Discussion of the principal objectives which describe this balanced program follows.

Program Objectives

Elements of the balanced program recommended by the Space Task Group can be identified within the following set of program objectives which define major emphases for future space activity:

- Application of space technology to the direct benefit of mankind
- Operation of military space systems to enhance national defense
- Exploration of the solar system and beyond
- Development of new capabilities for operating in space
- International participation and cooperation

1. Application of space technology to the direct benefit of mankind.

Focus: To increase utilization of space capabilities for services to man. Programs directed toward the application of the Nation's space capabilities to a wide range of services, such as air and ocean traffic control, world-wide navigation systems, environmental monitoring and prediction (weather, pollution), earth resource survey (crops, water resources, geological structures, oceanography) and communications have great potential for improving the quality of life on this planet Earth. Significant direct economic and social benefits from such applications have been forecast. Major contributions to management of domestic problems and greater opportunities for international cooperation could result from an expanded space applications program.

2. Operation of military space systems to enhance national defense

Focus: Enhance the defense posture of the United States and thereby support the broader objective of peace and security for the world.

[13] The Department of Defense is presently using space capabilities in the support of communications, weather forecasting, navigation, surveillance and mapping, and for other functions. Such space activity has been not an end in itself, but a means for accomplishing functions in support of existing forces and missions. Military uses of space have proven effective and space systems are now contenders for specific applications and missions. Each military space mission should continue to be decided on a case-by-case basis in competition with ground, sea, and airborne systems and should reflect priority given to national defense with consideration of arms limitation agreements, and other U. S. policy reactions. Exploitation of the unique characteristics of space systems by the Department of Defense can provide increased confidence in the ability of this Nation to defend itself from any aggressor and assurance that space will be used for peaceful purposes by all nations.

3. Exploration of the solar system and beyond.

Focus: Increase man's knowledge of the universe.

Exploration of the solar system and observations beyond the solar system should be important continuing broad objectives of the Nation's space program. Many unanswered scientific questions remain about the planets, the interplanetary medium, the sun - both as a type of star and as a source of the earth's energy - and about a variety of celestial objects, such as pulsars, quasars, X-ray and gamma ray sources. Both ground-and space-based experiments and observational programs will contribute to the quest for answers to these questions. Space platforms provide several unique advantages - such as ability to observe across the range of wave lengths of the electromagnetic spectrum (rather than only through specific atmospheric "windows," which is the case from the ground); freedom from local environmental conditions; potential for continuous observations (no day-night cycle); ability to approach, orbit and land on extraterrestrial bodies - and also disadvantages - high cost, inaccessibility for easy repair and servicing, and long lead

times for experiment modification. For these reasons a careful balance between investments in space and ground experiments should be maintained.

The major elements of such a program should be:

Planetary Exploration - Unmanned planetary exploration missions continuing throughout the decade, both for science returns and, in the case of Mars and Venus, as precursors to later manned missions. The program should include progressively more sophisticated missions to the near planets as well as multiple-planet flyby missions to the outer planets taking advantage of the favorable relative positions of the outer planets in the late 1970's. Early missions to the asteroid belt and to the vicinity of a comet should be planned.

Astronomy, Physics, the Earth and Life Sciences - In each of these disciplines, extension of existing or planned unmanned programs promises continued high science return. There are additional significant opportunities for experiments in connection with manned Earth orbital programs which should be exploited. Work in astronomy, physics and the life sciences, as well as work in the earth sciences and remote sensing, will form an essential part of the foundation for future applications benefits and will contribute to the broadening horizons of man as he acquires knowledge not only of his own planet but also about the rest of the universe.

[14] Lunar Exploration - Apollo-type manned missions to continue exploration of the Moon should proceed. The launch rate should permit maximum responsiveness to new discoveries while maintaining mission safety and efficient utilization of support personnel. Early upgrading of lunar exploration capability beyond the basic Apollo level including enhanced mobility capability, and lunar rovers, is important to safe and efficient realization of significant returns over the longer term. An orbiting lunar station, followed by a surface-base, building upon Earth orbital space station and space transportation system developments, could be deployed as early as the latter half of the decade. Extension of manned lunar activity beyond upgraded Apollo capability should include consideration of these options.

4. Development of new capabilities for operating in space.

Focus: Develop new systems for space operations with emphasis upon the critical factors of: commonality, (2) reusability, and (3) economy.

Exploration and exploitation of space is costly with our current generation of expendable launch vehicles and spacecraft systems. This is particularly true for the manned flight program. Recovery and launch costs will become on even more significant factor when multiple re-visit and resupply missions to on Earth orbiting space station are contemplated. Future developments should emphasize:

Commonality - the use of a few major systems for a wide variety of missions.

Reusability - the use of the same system over a long period for a number of missions.

Economy - far example, the reduction in the number of "throw away" elements in any mission; the reduction in the number of new developments required; the development of new program principles that capitalize on such capabilities as man-tending of space facilities; and the commitment to simplification of space hardware.

An integrated set of major new elements which satisfy these criteria are:

a. A space station module that would be the basic element of future manned activities in Earth orbit, of continued manned exploration of the Moon, and of manned expeditions to the planets. The space station will be a permanent structure, operating continuously to support 6-12 occupants who could be replaced at regular intervals. Initially, the space station would be in a low altitude, inclined orbit; later stations would be established in polar and synchronous orbits. The same space station module would also provide a permanent manned station in lunar orbit from which expeditions could be sent to the surface.

By joining together space station modules, a space base could be created. Occupied by 50-lOO men, this base would be a laboratory in space where a broad range of physical and biological experiments would be performed.

Finally, the space station module would be the prototype of a mission module for manned expeditions to the planets.

[15] Such an array of space station modules would be designed to utilize the space transportation system described below.

b. A space transportation system that will:

Provide a major improvement over the present way of doing business in terms of cost and operational capability.

Carry passengers, supplies, rocket fuel, other spacecraft, equipment, or additional rocket stages to and from orbit on a routine aircraft-like basis.

Be directed toward supporting a spectrum of both DoD and NASA missions.

Although the concept of such a space transportation capability is not new, advances in rocket engine technology, additional experience in design for reentry conditions, and improved guidance, navigation and automated check-out systems now permit initiation of on experimental effort for a Space Transportation System with technical, operational, and economic characteristics satisfying the needs of both NASA and DoD. An orderly, phased, step-by-step development program could then be implemented including as potential components:

A reusable chemically fueled shuttle operating between the surface of the Earth and low-earth orbit in an airline-type mode.

A chemically fueled reusable space tug or vehicle for moving men and equipment to different earth orbits. This some tug could also be used as a transfer vehicle between the lunar-orbit base and the lunar surface.

A reusable nuclear stage far transporting men, spacecraft and supplies between Earth orbit and lunar orbit and between low Earth orbit and geosynchronous orbit and for other deep space activities. The NERVA nuclear engine development program, presently underway and included in all of the options discussed later, provides the basis for this stage and represents a major advance in propulsion capability.

c. Advanced Technology Development - In addition to the major vehicle developments listed above, a continuing program of investigation and exploration of new technology that can serve as the foundation for next generation systems is on essential component of the DoD, NASA, and other agency programs. A broad and aggressive program to advance our capabilities to operate in space during the next decade and to set the stage for the decade to follow is needed.

We foresee future requirements for larger and more efficient power supplies utilizing a range of energy sources, particularly nuclear systems, for continuing propulsion system improvements - both in performance and reliability, for improved understanding of the complex interface between man and machine, for advances in technology and systems design that result in lower cost development of new spacecraft, and for achievement of new levels of reliability. In the advanced technology program, we should emphasize biomedical research, space power and propulsion technology, both nuclear and non-nuclear, remotely control led teleoperators, data management, multi-spectral sensors, communication and navigation technology, and experimental evaluation and demonstration of new concepts.

[5] 5. International participation and cooperation.

Focus: To promote a sense of world community; to optimize international scientific, technical, and economic participation; to apply space technology to mankind's needs; and to shore the benefit and cost of space research and exploration.

To these ends, our international interests will be served best by (1) projects which afford maximum opportunities for direct foreign participation, (2) projects which yield economic and social benefits for other countries as well as ourselves, and (3) activities in which further international agreement and coordination might usefully be employed.

The post decade has demonstrated that programs like Project Apollo are virtually unrivaled in their capacity to catch the

world's imagination and interest, win extensive admiration and respect for American achievements, and generate a common human experience. The decade has demonstrated also that effective ways can be found to share the practical benefits of space with people everywhere, as in space meteorology and communications. Modest but significant levels of direct participation in space flight research and exploration have also been successfully achieved through cooperative projects. Future program plans must seek to continue and substantially extend this experience.

We should also devote special effort to meliorate, between the space powers and others, the increasing gap in technological capability and the gap in awareness and understanding of new opportunities and responsibilities evolving in the space age.

If international participation and cooperation are to be expanded in an important way, there will have to be (1) a substantial raising of sights, interest and investment in space activity by the other nations able to do so in order to establish a base for major contributions by them; and (2) creation of attractive international institutional arrangements to take full advantage of new technologies and new applications for peoples in developing as well as advanced countries.

The most dramatic form of foreign participation in our program will be the inclusion of foreign astronauts. This should be approached in the context of substantive foreign contributions to the programs involved.

The form of cooperation most sought after by advanced countries will be technical assistance to enable them to develop their own capabilities. We should move toward a liberalization of our policies affecting cooperation in space activities, should stand ready to provide launch services and share technology wherever possible, and should make arrangements to involve foreign experts in the detailed definition of future United States space programs and in the conceptual and design studies required to achieve them. We should consider three further steps:

The establishment of an international arrangement through which countries may be assured of launch services without being solely and directly dependent upon the United States.

A division of labor between ourselves and other advanced countries or regional space organizations permitting assumptions of primary or joint responsibility for certain scientific or applications tasks in space.

International sponsorship and support for planetary exploration such as that which was associated with the International Geophysical Year.

[17] The developing countries will be most attracted to (l) applications of space technology which serve their economic and social needs, and (2) the development of international institutional arrangements in which they can participate along with the advanced countries. Some examples are:

- Environmental studies and earth resource surveying via satellites;
- Direct broadcast via satellites of TV instructional and educational programs;
- Expanding arrangements to acquire and use meteorological data;
- Training opportunities in space applications and space-related disciplines.

To the extent that future practical space applications are achieved, there should be no significant technical obstacles to ensuring the sharing of benefits on a global basis. There will, however, be economic and political issues which require recognition and effective anticipation.

In the case of the USSR, experience over the past ten years makes clear that the central problem in developing space cooperation is political rather than technical or economic. Numerous specific technical opportunities for cooperation with the Soviet Union have been identified and are available. Indeed, many of them have been put to the Soviet Union in various forms through the years with little success. For example, we could formulate a series of graduated steps leading toward major cooperation. They would range from full and frank exchange of detailed space project results, at the lowest level, to prearranged complementary activities at the next level (e.g., mutual support of tracking requirements, coordinated satellite missions for specific tasks in space), and ultimately to fully integrated prejects in which sub-systems could be provided by each side to carry out a total space mission of agreed character. The following possibilities merit serious consideration:

In space research -- earth orbital investigation of atmospheric dynamics and Earth's magnetic field; astronomical

observations from earth satellites or lunar stations; satellite observation of solar phenomena, and lunar and planetary exploration.

In practical applications -- coordination of a continuing network of satellites to provide data for world-wide weather prediction and early warning of natural disasters; the development of capabilities for earth resource surveying via satellites.

In manned flight -- bio-medical research, space rescue, coordination of experiments and flight parameters for Earth orbiting space stations, lunar exploration, and exchange of astronauts.

In tracking -- to supplement each other's networks.

In view of the heavy commitment of the Soviets, planetary exploration appears to offer unusual opportunities for complementary activities.

[19] IV. PROGRAM AND BUDGET OPTIONS

The Space Task Group was asked to provide "definitive recommendation on the direction the U. S. space program should take in the post-Apollo period," through preparation of a "coordinated program and budget proposal." In the Section "Goals and Objectives," the Space Task Group has outlined the elements of this coordinated program.

We have also pointed out that there are upper and lower bounds to the Funding which will support a viable, productive and well disciplined program. Between these bounds there are many options both in program content and in total funding required. In this section we will explore the range of these options and their resource implications.

Clearly, there are a number of factors outside the space program and the intrinsic merit of it; goals and objectives that must be considered in determining the allocation of resources to the program. Demands of other domestic programs, international conditions, and state of economic health of our Nation are only a few of the major influences upon the specific budget for space in a given fiscal year.

Despite the highly variable nature of these influences, which produces a corresponding increasing uncertainty in projections of resource availability, it is important far planning purposes to look into the future and forecast the general nature of funding required to support decisions on content and pace of the program. Two basic questions arise. Is the Nation to exploit its existing capabilities, to expand those capabilities or reduce its participation in space activity? Is funding for space generally to remain at present levels, to increase dramatically or to decrease significantly below present levels?

We stand at a crossroads, with many sets of missions and new developments open to us and with three main avenues for funding to pursue these opportunities.

To assist in answering these questions and to provide a basis for Task Group analyses, NASA and DOD were each requested to prepare a set of alternative proposals or options that would cover a range of future resource levels and be consistent with the goals and objectives recommended by the Task Group.

NASA Options

The range of resource levels considered by the Task Group for NASA is shown in Figure 1.

(Graphic--see hard copy)

[20] These include: (l) an upper bound, defined by a a program conducted at a maximum pace - limited, not by funds, but by technology; (2) options I, Il, and III which illustrate programs consistent with the Task Group recommendations, but conducted under varying degrees of funding restraints; and (3) a low level program constructed with an increased unmanned science and applications effort consistent with the Task Group recommendations but, because of the significantly lower budget levels, without a manned flight program after completion of Apollo and Apollo Applications.

A comparison of the timing of major mission accomplishments under the various programs is indicated in Table 1

(Graphic--see hard copy)

Although the program represented by the upper bound appears technically achievable, would provide maximum stimulation to our over-all capabilities, and is fully consistent with the Task Group recommendations, it represents on initial rate of growth of resources which cannot be realized because such budgetary requirements would substantially exceed predicted funding capabilities. This has therefore been rejected by the Space Task Group, and is presented only to demonstrate the upper bound of technological achievement.

We have therefore developed a set of options which falls within these limits to illustrate programs conducted at budget levels which appear possible during the next decade.

Option I is illustrative of a decision to increase funding dramatically and results in early accomplishment of the major manned and unmanned mission opportunities, including launch of a manned mission to Mars in the mid-1980's, establishment of an orbiting lunar station, a 50 man earth-orbit space base and a lunar surface base. Funding would rise from the present $4 billion level to $8-10 billion in 1980. Decision to proceed with development of the space station, earth-to-orbit shuttle and the space tug would be required in FY 1971. Firm decisions [21] on other major systems or missions would not be needed until later years; for example, a decision to develop the Mars excursion module for an initial manned Mars expedition would not be required before FY 1974.

Options II and Ill illustrate a decision to maintain funding initially at recent levels and then gradually increasing. These options are identical with the exception that Option Il includes a later decision to launch a manned planetary mission in 1986 and in Option III this decision is deferred. Both options demonstrate the effect of simultaneous development of the Space Transportation System and earth orbital space station module, each of which is expected to require peak expenditure rates of the order of $1 billion per year, and both options include a substantial increase in unmanned science and applications from present levels but less than that in Option I. Maintaining the unmanned program at the Option I levels would require several hundred million dollars in additional funding. Decision to develop both space station and earth-to-orbit shuttle would be in about FY 1972, resulting in initial availability of these systems in 1977. Similarly, other major milestones would occur later, with decision on tne Mars Excursion Module estimated for FY 1978. Funding for both options would remain approximately level at $4 billion for the next two fiscal years and then would rise to a peak of $5.7 billion in 1976 - this increase reflecting simultaneous peak resource requirements of space station and space shuttle developments. If these developments were conducted in series, lower funding levels ($4-5 billion) could be achieved. Option II would have a later peak of nearly $8 billion in the early 1980's resulting from the manned Mars landing program. . . .

[23] The lower bound chosen by the Space Task Group illustrates a program conducted at significantly reduced funding levels. It is our judgment that, in order to achieve these significantly reduced NASA budgets, it would be necessary to reduce manned space flight operations below a viable minimum level. Therefore, this program has been constructed assuming a hiatus in manned flight following completion of Apollo applications and follow-on Apollo lunar missions. It thus sacrifices, for the period of such reduced budgets, program objectives relating to development of new capability, and the contribution of continuing manned space flight to several of the other program objectives recommended by the Task Group. It does, however, include a vigorous and expanded unmanned program of solar system exploration, astronomy, space applications for the benefit of man and potential for international cooperation. Funding for such a program would reduce gradually to a sustaining level of $2-3 billion depending upon the depth of change assumed for the supporting NASA facilities and manpower base.

The Space Task Group is convinced that a decision to phase out manned space flight operations, although painful, is the only way to achieve significant reductions in NASA budgets over the long term. At any level of mission activity, a continuing program of manned space flight, following use of launch vehicles and spacecraft purchased as part of Apollo, would require continued production of hardware, continued operation of extensive test, launch support and mission control facilities, and the maintenance of highly skilled teams of engineers, technicians, managers, and support personnel. Stretch-out of mission or production schedules, which can initially reduce total annual costs, would result in higher unit costs. More importantly, very low-level operations are highly wasteful of the skilled manpower required to carry out these operations and would risk deterioration of safety and reliability throughout the manned program. At some low level of activity, the viability at the program is in question. It is our belief that the interests of this Nation would not be served by a manned space flight program conducted at such levels.

DOD Options

A similar set of DOD Options, A through C, was constructed to illustrate three basically different levels of military space activity.

Three options are presented, not only to provide funding and program options, but also to characterize the band of choices within which a rational program of military space activities will evolve. Options A and C are considered to be the upper and lower boundaries of probable military space activity, with Option B being an example of an intermediate level.

Option A presumes a future in which the threat to national security could evolve in an increasingly hostile manner, thereby leading to increased priorities for national defense and military space activities. This option also provides for contingency efforts designed to accommodate a high degree of uncertainty in future international conditions. Cost effectiveness, technology availability, growth rate of resource application, and national policy constraints were considered in establishing this upper option for a full military space capability.

[24] Option B includes those efforts necessary to counter the known and generally accepted projections of the threat. In addition, it provides limited developmental activities toward those capabilities needed if the threat increases. Option B is a prototype program which recognizes the need to minimize cost increases over the next few years, but reflects the expectation that military space activity will increase to provide the necessary support to our military forces and posture. This option is consistent with national and DOD policies and with Force Structure planning.

Option C is directly responsive to current national economic constraints, and assumes that a lessening of world tensions will result in reduced emphasis on national defense. It, therefore, includes a lower level of system deployment than the other two options. It still includes, however, the technology and support effort necessary for contingency planning, together with those programs now considered to be reasonable and predictable requirements. Option C is the lower boundary of military space activity that will meet existing national defense needs, although implied in this option is a higher degree of risk than that inherent in Options A and B. . . .

Program Flexibility

In the options submitted by NASA and DOD, resource requirements have been projected which represent a large number of decisions to be made in sequence over a number of years. Thus, the resource projections represent the upper envelope or sum of funds required to support these decisions. Many of these decisions are relatively independent - that is, an earth orbit space station module can be developed independently, without commitment to placing such a station in orbit around the moon, or sending such a module on a mission to Mars. In both of these examples, however, development of the space station module would [25] be the normal first step in achieving the lunar orbit station or Mars mission capability. An example of the set of major program elements and hence decision points inherent in the options described, based upon NASA Option II, is included as Figure 6. A diversity of specific programs with varying emphasis can be constructed by delaying or shifting initiation of funding for these major elements relative to other new developments.

There is, therefore, a great amount of flexibility inherent in each of these options and adjustments to funding constraints may be made on a yearly basis as part of the normal budget process. Of course, once initiated, a specific major system development profits from continuity in funding - stretchout or major fluctuations in funding for a particular project generally increase the total costs associated with it.

The levels of activity for the NASA and the DOD programs are essentially independent, that is, selection of Options I or II for NASA could be consistent with an Option A, B, or C level of activity for DOD, since the DOD space activity will continue to be responsive to national defense needs and will be determined on a case-by-case basis under the budget and program established annually for the Defense Department. It is important, however, that continued coordination of the NASA and DOD programs and the effect of each agency's activity on a common industrial and facility base receive authoritative attention.

For Further Information Contact Roger D. Launius, NASA Chief Historian, roger.launius@hq.nasa.gov

(4)

COMMUNICATIONS SATELLITE CORPORATION

Via Rote

ROBERT E. SUTTON
The Special Assistant to the Chairman

July 29, 1969

EXECUTIVE
VT 1
FG 102
FG 103
FG 164

Dear John:

The attached correspondence refers to the NASA/COMSAT team project.

Phase I - the inventory of usable system hardware - should be completed by this Friday, August 1st.

Phase II - discussions with possible users - will commence as soon as possible.

The whole project has an aspect of some urgency and goes ahead regardless of the new White House task force.

I think CPB would be at the head of the list for Phase II.

Sincerely,

Attachments.

Mr. John W. Macy, Jr.
President
Corporation for Public Broadcasting
Suite 630
1250 Connecticut Avenue, N.W.
Washington, D.C. 20036

BROUGHT FORWARD

EXECUTIVE
FG164 8-22-69
Previously filed Date

NAME Memo fr. M. Flanigan to M. Tom Wicker Read
ORGANIZATION

EXECUTIVE
F-G164 9-4-69
New File Symbol Date

FINAL ACTION memo fr. Checker Finn
to Jim Schlesinger

EXECUTIVE
FE 14-1
FG164

August 6, 1969

TO: ED MORGAN

FROM: PETER FLANIGAN

You will note from the attached that we are about to have an action under the Freedom of Information Law. This is a matter that you and the Counsel's office should be aware of. I presume you will take any action that is appropriate. When you have determined what action to take, please be sure to let Klein's office know.

c.c. to:
Tom Whitehead

SPACE TASK GROUP (STG)

Purpose:

To provide the President, by September 1, 1969, a coordinated program and budget proposal for the scope and direction of the space program during the Post-Apollo period.

Membership:

The Space Task Group consists of the following:

Vice President, Chairman

Secretary of Defense

Administrator, National Aeronautics and Space Administration

Science Adviser to the President

As appropriate, participation will be invited from the Secretary of State, the Director, BoB, the Director, CIA, and other interested parties.

Staff Support:

Appropriate staff support will be provided by member agencies. No single unified staff is anticipated. A staff director's committee, chaired by OST, will meet on a regular basis to consult, to coordinate staff studies, and to monitor progress toward Task Group objectives. NASA and DoD would each appoint a senior staff director who will serve as a point of contact and represent NASA and DoD on the staff director's committee. The staff directors should be informed of all STG related efforts within their organizations, and have direct access to their principals on STG matters.

Special Studies:

To provide the basis for selection of alternative programs by the STG, studies will be conducted by the member agencies in those areas determined by the STG to be important to an informed judgment. In those areas which are program oriented, the study objectives will be to define hardware characteristics,

estimated development schedule, estimated development and operational costs, the character of the operations or experiments to be conducted and all other information relevant to determining the technological, scientific, economic, or political value of the program and its requirements for funds, facilities, manpower and other resources for the next ten years. The studies will be conducted by the responsible agencies or, where deemed appropriate by the STG, by an interagency working group.

Outside Support:

The President has suggested that the STG "seek advice from scientific, engineering and industrial communities, from the Congress and the public." There are several mechanisms by which this may be accomplished. The STG may consider one or more of the following:

President's Science Advisory Committee -- The President's Science Advisory Committee, particularly the members of its Panel on Space Science and Technology, will be available to comment on the special studies and issues papers developed in the course of the study and to conduct such special inquiries as may be necessary and appropriate.

Other Advisory Committees -- The National Academy of Science through its Space Science Board may be asked to perform specific studies; within the principal agencies individual advisory groups may be utilized, such as the Defense Science Board, STAC, the Lunar and Planetary Missions Board, Astronomy Missions Board and the Research Advisory Committee for NASA.

Individual Associations -- The Aerospace Industries Association can be encouraged to address specific topics which would be of value to the Task Force.

Public Participation -- Professional societies, such as the AIAA and the AAS, could be requested to organize and convene special symposia in which the broad topic of the space program for the next decare or specific areas within this topic could be discussed with broad public participation.

The Congress -- The STG principals could arrange a series of luncheon meetings with key Congressional leaders in which the subject of the STG efforts would be discussed and views exchanged on the principal issues. It may also be desirable to arrange staff contact between the STG staff director's committee and appropriate members of the Congressional committee staffs.

Areas for Special Analysis

A. Lunar Exploration
   1. Maximum scientific exploration with current Apollo hardware plus unmanned probes
   2. Exploration using Lunar Logistic Module and longer (7-10 day) stay times
   3. Establishment of a lunar base

B. Earth Orbital Activities
   1. Space Station - National Research Center
   2. Space Station - Assembly and Launch Facility for planetary missions
   3. Space Station - Service Facility for unmanned earth orbiting satellites
   4. Combinations of the above
   5. MOL follow-on program
   6. Reuseable Reentry Vehicle
      a. Logistic Resupply for MOL follow-on programs
      b. Logistic Resupply for NASA Space Stations
      c. As a spacecraft for a recoverable payload
   7. Experiments required to establish man's capability for planetary missions
   8. Orbital Astronomy
   9. Earth Resources
      a. ERTS Experimental Program
      b. Potential follow-on operations
      c. International Policy
   10. Navigation Systems
      a. Military
      b. Civilian
   11. MOL-AAP interaction

C. Mars Exploration
   1. Manned landing?
   2. Manned orbiting
   3. Unmanned

D. Other planetary exploration (unmanned)

E. Launch Vehicles
   1. NASA - DOD use of existing boosters
   2. Large booster development/production
      a. Saturn V production
      b. New large booster development

F. USSR Capabilities

MEMORANDUM OF INFORMATION FOR THE FILE

EXECUTIVE

DATE 6/25/69

LETTER, MEMO, ETC.

TO: Mr. Flanigan

FROM: Clay T. Whitehead

SUBJECT: NASA space program

CORRESPONDENCE FILED CENTRAL FILES – CONFIDENTIAL FILE

Lewis M. Branscomb
March 4, 1969.

Comments on the Memorandum to the President from the Acting Administrator of NASA, dated February 22, 1969.

The key issue posed in this memorandum is: Are there policy issues regarding manned space flight that must be settled prior to the completion of the work of the high level group in August 1969? A subsidiary issue is: Are funds required in the FY 1970 budget that can only be obtained through a supplemental appropriation in this session in order to preserve meaningful options to the high level group? We believe the answer to the first question is, "No" and the answer to the second is "Probably no".

The proposal assumes that the continuation of manned space flight activity is not up for debate, and notes that the implied level of total NASA funding is 4.5 - 5.5B per annum. The Panel agrees that at that funding level manned space flight activity should be a component of NASA program, but the higher priority we would accord to other program elements forces us to the conclusion that the pace and nature of manned space flight must be a function of the total resources available. Thus from our point of view the most important policy implication of this request for a commitment to two major manned space flight goals is a commitment to a NASA budget in the 5 billion dollar range.

Assuming that the DOD expenditures on space operations remain at about 2.2 B, this implies a total commitment in the range of 7 billions and tends to remove from the arena of discussion in advance perhaps the most difficult policy issue facing the President: What shall be the program for earth-orbital manned space flight activity

at the end of the presently authorized AAP (NASA) and MOL (USAF) programs, which will be conducted almost concurrently in 1971-73? What will be the responsibilities of the two agencies, and is a joint responsibility possible or desirable? If the President is not prepared to make this basic decision now, the program commitment requested by NASA should be postponed until completion of the high level study.

The memorandum identifies as the focus for manned space flight activity in the next decade two principal programs: (a) exploration of the moon and (b) operating a permanent space station in earth orbit. These are the two areas for manned space flight identified as of greatest interest in the 1967 PSAC report, the President-elect's Space Task Force report of January 1969 and the PSAC Panel Report of January 1969. Thus other alternatives (manned planetary missions, permanent lunar base) will apparently not be raised by NASA as program issues at this time.

The proposal assumes that the Apollo landing is completed in the middle to late 1969 and the 5-launch Apollo Applications Program (AAP) is conducted as scheduled in 1971-72. It requests a policy commitment buttressed by an FY supplemental appropriation for the continuation of major manned space flight activity focussed on the above two objectives and the continuation of Saturn V production beyond 515.

Two aspects of the manned space flight program contribute to the time urgency of this request as seen by NASA: (a) the long lead time for new developments (and thus the need for early funding) and (b) the morale and integrity of the organization assembled

for the conduct of Apollo. The latter is perhaps a matter of urgency, but does not necessarily require a supplemental appropriation. The need for decision on new space goals is urgent, and careful thought must be given to the timing and manner of their announcement. This is particularly important if the manned program is to receive relatively less priority in the future, for the manned exploration of the moon is a challenging task of great difficulty and serious risk. Retention of a first-rate team of scientists, engineers and managers is essential. Of course, many people whose talents are critical to success in an endeavour as complex as space exploration are concerned about the future, including scientists working in other program areas. The high level group must consider the wisdom of Presidential policy commitments prior to the completion of the whole study in this light.

The three elements of the requested program commitment and budget supplement should be considered separately.

Space Station

The Panel continues to be skeptical of the rationale for a space station and is not reassured by the characterization of the space station's justification as a technological end in itself, accompanied by reluctance to discuss the station in terms of its potential contribution to science, applications and defense. A space station may eventually prove to be a useful and justifiable means for providing engineering support to major scientific installations in earth orbit; at the present time the unmanned space science program is so modest, in comparison with the manned program, that one cannot predict the time scale when orbital observatories

would justify the provision of orbital engineering support. The most clearcut application of the space station concept is probably preparation for eventual manned exploration of the planets, which will require an extensive program of biomedical research and may require orbital assembly and checkout. Since the implications of this motivation are very substantial, it would appear wise to defer this decision until the completion of the full policy study in August. In any case, since the space station is not envisioned until 1975, a one year slip in its availability does not seem critical.

A component of the requested supplemental expenditures under the category "space station" are engineering studies of alternative approaches to low cost systems for transportation to orbit. We believe such developments are essential to the future of manned space flight and are important for space applications generally. When NASA has designed a convincing program for progress in this area, we urge its support. We have not yet reviewed the elements in the current supplemental request in order to judge whether it is the right approach. Such a review should be an important part of the high level group's work and should involve both NASA and DOD interests. In any case, a low cost transportation system development can be initiated without commitment to a space station as such.

The supplemental request also includes funds for follow-on lunar exploration and for an initial commitment (54 Millions in FY 70) towards continued SV production beyond 515. These two issues are interlocked. Production of the SV was put in suspension

last year. The last of the Apollo buy will be delivered this year; many subcontractors have already been discontinued and have turned to other business. Clearly it becomes progressively more difficult to resume production as time proceeds. On the other hand, there are problems associated with the continued production of SV:

(a) Under present circumstances and at low production rates SV is exceedingly expensive to buy and launch, although NASA believes the costs delivered to the Cape can be reduced to about $150 Million as continued experience identifies the reliable components and permits a relaxation of test requirements.

(b) The SV is viewed by many as of awkward size, in that it is too large for efficient use on any missions except to the moon (it hasn't the velocity to be optimized for heavy payloads to deep space), yet it is not capable of direct ascent to the moon with useful manned payloads.

(c) Finally, and most important, early success in Apollo will leave up to 9 SV-Apollo systems unexpended. Clearly if the rate at which we wish to use them permits the development of a cheaper or more useful large launch vehicle of more modern technology before the supply is exhausted, the wisdom of continued production is questionable.

Thus the decision on the continuation of SV production is critically dependent on (a) when the Apollo is successful, (b) what our future requirements for large launch vehicles will be and the timescale for their development and (c) the rate at which the current

inventory will be used after the success of Apollo and the ability to ensure the reliability of hardware held in storage a number of years. Because of (c) we must give serious consideration to the plan for both near and long term lunar exploration.

Follow-on Lunar Exploration

The Panel has long felt that preparations for post-Apollo lunar exploration were badly overdue, even in 1966 when the PSAC post-Apollo Goals report was being prepared. It would be singularly unfortunate to abandon the moon after the first landing and fail to use our new capability to explore its secrets. Thus we are deeply concerned by the fact that experimental packages are available for as many as four manned landings, but virtually no preparations beyond that have been made that would justify continued manned missions beyond the first three or four. Needed are mission objectives and plans, scientific instruments, improved mobility and mobile life support for the astronauts, pin-point and moderate to high latitude landing capability for the LM, and unmanned spacecraft support - both logistical and scientific. The urgency of additional funds for these developments is a function of lead times for their development, the date of the first Apollo success and the rate and number of Apollo landings that should be made without waiting for substantially augmented capability.

We are pleased to note that the Administrator has specified a particular number of such launchings (three after the initial success), particularly since OMSF appears to favor the continued repetition of the Apollo landings at very short intervals and long after the scien-

The question of the interval between lunar landings requires serious debate. In order to permit each mission to profit from the scientific results of its predecessor, scientific investigators need at least six months, perhaps one year between missions. NASA now feels that the minimum operational requirements for efficient and safe launch are at least two launches per year, preferably four or six. This conflict in requirements becomes even more serious if one seeks to increase scientific return at reduced cost by interspersing unmanned studies of the lunar surface between even more infrequent manned landings. The results of this debate determine the rate of use of the existing inventory of SV-Apollo systems, and thus the date when this inventory is consumed, as noted above. The launch rate also determines the that augmented lunar exploration capability and additional scientific preparations are required.

The Apollo launch rate now embodied in the President's FY 70 budget is an interval of only 2.5 months/launch, butthis interval applies to launches prior to success. Last year NASA presented a number of program alternatives to BoB, including program 3A which seemed (and still seems) reasonable to the Panel: a total of four manned landings at the rate of two per year, making the last one in early calendar 1971, if first success is obtained in July 1969. Then the launches would be terminated until the follow-on capability was in hand, beginning in about mid-calendar 1972 and continuing at roughly a 6 months launch interval. At this rate SV 515 would be launched in late '74, early '75. (This is the

five-launch AAP program would be conducted, thus providing some continuity in manned mission activity.

NASA now states, in material furnished BOB accompanying the supplemental request that (a) the post-Apollo launch rate must be at least three per year (four launches are completed by early 1970), and that a gap in SV launches is unacceptable, so that the remaining 6 SV systems must be launched as an uninterrupted follow-on, resulting in a termination of the Apollo inventory by late 1972. This program, if accepted, would clearly require crash effort to provide some scientific payload for the six missions from mid-1970 to late 1972 and would require immediate resumption of SV production if vehicles are required for the space station or any other SV program starting in early '73. Since these items comprise the supplemental request it is clear that the case for this plan to launch all ten SV's (506-515) at four month intervals following success in July 1969 must be examined very carefully.

The Panel agrees that the launch interval must be stretched out as much as possible, and believes six month intervals to be possible, even if more costly per launch than a higher rate. We are less certain that the SV launch program can be gapped for a year in '71-72 and then resumed without loss of capability and standards of safety. However, we note that NASA thought this possible a year ago and, further, it is NASA's present intention to do precisely that with the SIB program, whose launch facility was secured in the summer of '68, and which will resume operations with the AAP in late calendar

In any case, the Panel does not urge a hiatus in lunar landings as an end in itself; we only urge that adequate preparations for the second phase of lunar exploration be in hand before the continuation of manned lunar landings beyond the first four. We are uncertain whether substantial FY '70 funding is required to avoid a gap, even at the two per year launch rate recommended, but we suspect that it is. However, funds in the FY '70 budget might be found for this purpose without recourse to the supplemental request by (a) stretchout in the Apollo launch rate (shown in FY '70 budget as 2-1/2 month intervals on the conservative assumption that success is not achieved by 506) and (b), if needed, by reprogramming from AAP (for examply, by not preparing the two back-up missions).

Summary

We recognize that Dr. Paine's memorandum has identified a number of the key issues for the high level policy study, but we do not believe that these issues have to be settled in advance of the study itself. Regarding supplemental funding for FY '70, we believe the strongest case can be made for funds to prepare for follow-on lunar exploration but we hope that the essential elements can be found by reprogramming within the FY '70 budget in the event of the success of Apollo 11 next July. We certainly feel that the requested policy commitments - to manned lunar and earth-orbital programs - should not be made unless the President is satisfied with a continuing total space program of about 7 Billions. Also of concern is the dual responsibility for earth orbital manned spaceflight between

programs in '71-73 but contains the possibility that both agencies will want follow-on earth orbital programs for the indefinite future.

EXECUTIVE
FG 164

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

OFFICE OF THE ADMINISTRATOR

March 18, 1969

Mr. John D. Ehrlichman
Counsel to the President
The White House

Dear Mr. Ehrlichman:

This is in reply to your request of March 15, 1969, for a description of present and reasonably probable future activities of the National Aeronautics and Space Administration in certain areas:

1. Programs Involving Legislative Enactment - We have not proposed since January 20, 1969, nor do we now contemplate programs requiring new substantive legislation. NASA's requirements for legislation at this time are limited to the annual authorization required each year for our appropriations, and, of course, the appropriation legislation itself. Our needs here are discussed under the next item.

2. Programs to be Undertaken Pursuant to Existing Legislative Authority - I have recommended to the President that the authorizing legislation and FY 1970 Budget request now before Congress be amended to meet problems and take advantage of opportunities the Administration has at this time in the field of manned space flight. Enclosed are copies of my memorandum to the President of February 26, 1969, and his reply dated March 7, 1969. In accordance with my memorandum and the President's letter, my recommendations on manned space flight are now being considered by the Task Group established by the President on February 17, 1969. This group consists of the Vice President as Chairman, Secretary Seamans, Dr. DuBridge, and myself. Chairman Seaborg of AEC, Undersecretary Alexis Johnson of State, and the Director of the Budget are participating as observers. The Task Group is now scheduled to meet Saturday, March 22, 1969, to consider its recommendations to the President. Concurrently, the Bureau of the Budget is considering our proposed amendment to the FY 1970 Budget.

It is my hope that a Nixon Administration amendment to the FY 1970 Budget will be approved in time for the House Committee on Science and Astronautics to hold hearings before they report out the NASA FY 1970 authorization. Hearings on this bill are being completed this week and we understand the present intention of the Committee is to report the bill and attempt to secure floor action prior to the Easter recess.

3. Reorganization Within the Agency - I am now considering the need for organizational changes to provide within NASA a strong focal point to plan and eventually direct our work on the manned space station project discussed in my memorandum to the President of February 26, 1969. The nature and timing of this organizational change, and the degree of its significance from the standpoint of the President, will depend in part on the decisions of the President on the matters raised in that memorandum. We will keep your office informed.

With respect to long-range programs, we are developing proposed goals, objectives, and plans for consideration by the President next fall, or earlier if he wishes. As the President requested in his memorandum of February 13, 1969, our long-range plans and proposals will be considered by the Task Group referred to above with a view to developing coordinated proposals for the President's consideration by September 1.

We will keep you informed on an "early warning" basis of programmatic and reorganizational developments in NASA.

Sincerely yours,

T. O. Paine
Acting Administrator

Enclosures (2)

June 19, 1969

MEMORANDUM FOR GENERAL O'CONNELL

MF

Thank you for your memorandum of June 16th regarding correspondence between your office and NASA on the procurement of communications satellite service to support the Apollo program.

Your position seems eminently reasonable with regard to the timing of a conference with the terrestrial carriers. However, I still have reservations about the authorized user question and the question of certification of national interest. I would like to discuss this with you before a final decision is reached in this matter.

Clay T. Whitehead
Staff Assistant

cc: Mr. Flanigan
Mr. Whitehead
Central Files

CTWhitehead:ed

EXECUTIVE
UT1
FG999-10
FG118
FG6-1
FG6-8

June 27, 1969

MEMORANDUM FOR GENERAL LINCOLN

Attached is the draft memorandum I referred to in our telephone conversation of the 25th.

I am not strongly wedded to the final recommendation, but proceed on the assumption that a slight challenge evokes the most interesting discussion.

Give me a call at your earliest convenience when you want to discuss this. I am not distributing this to anyone else at this time, pending our discussion.

Clay T. Whitehead
Staff Assistant

Attachment

cc: Gen. O'Connell
Mr. Flanigan
Mr. Whitehead
Central Files

CTWHITEHEAD:ed

Nothing also sent to
Central Files as of 3-20-70
WR

July 8, 1969

MEMORANDUM FOR

Dr. Willis Shapley
Associate Deputy Administrator
National Aeronautics and Space Administration

Attached is a rough draft of a proposed working paper to be discussed at a Thursday meeting at 2:30 in my office with other executive branch agencies and the FCC.

May I have your comments by telephone either this afternoon or early tomorrow morning -- to be sure that the role described for NASA is not totally out of line.

Clay T. Whitehead
Staff Assistant

Attachment

cc: Mr. Whitehead
Central Files

CTWhitehead:ed

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July 14, 1969

MEMORANDUM FOR

Dr. Willis Shapley
Associate Deputy Administrator
National Aeronautics and Space Administration

Would you please arrange a 30-45 minute briefing for me on the general subject of communications satellite technology, current and projected near future. I am interested primarily in those aspects relevant to the relative capabilities of the space segment and the ground stations, tradeoffs between the two and the interaction between power, beam width, and orbital parking capacity.

Mr. Walter Hinchman has been working with me on a number of communications issues and I would appreciate it if you would have the appropriate people work with him in planning the content of the briefing. He can be reached on Code 145, Ext. 2161.

Clay T. Whitehead
Staff Assistant

cc: Mr. Flanigan
Mr. Hinchman
Mr. Whitehead
Central Files

CTWhitehead:ed

THE PRESIDENT HAS SEEN.

C. F.

IDENT HAS SEEN.

FI4
PR7-1
FG6-1
FI1-2

THE WHITE HOUSE
WASHINGTON

August 8, 1969

MEMORANDUM FOR

THE PRESIDENT

Subject: President's Meeting with Samuel Hughes and James Schlesinger, 10:30 a.m., Saturday, August 9, 1969.

Messrs. Hughes and Schlesinger will discuss with you the status of the $3.5 billion budget cut for the Fiscal Year 1970. A brief on this subject is attached.

It is expected that this meeting will be approximately 30 minutes in duration.

Stephen B. Bull

PERSONAL AND CONFIDENTIAL

PERSONAL AND CONFIDENTIAL

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

THE PRESIDENT HAS SEEN.

OFFICE OF
THE DIRECTOR

August 8, 1969

BRIEF FOR THE PRESIDENT

Status of Additional
$3.5 Budget Cut for Fiscal 1970

Military

Military expenditures for the current year must be reduced by $3 billion -- from $80 billion to $77 billion -- if we are to live within your $192.9 billion expenditure ceiling for 1970.

Defense representatives believe a $2 billion cut can be made in nonforce related areas (civilian personnel, flying hours, etc.). They state that ships, aircraft, certain military units must be reduced in order to reduce expenditures another $1 billion. Secretary Laird wants your specific approval of these force reductions before he orders them done.

Cuts in 1970 can be imposed in a variety of ways, need not be detrimental to overall military effectiveness, and need not affect announcements you may wish to delay for congressional, Paris negotiation or SALT talk purposes. However, steps must be taken immediately, lest our choices be anticipated and foreclosed by congressional actions.

Since the cuts in fiscal '71 promise to be more painful and more difficult, the cut in '70 should be a prelude to what we hope to accomplish in '71.

We should decide what we want to do in '71 and make the '70 cuts to be arranged in such a way that they are conducive to the force posture and allocation pattern that we must reach in '71. We recommend you indicate your longer-run intentions of a further restrictive goal beyond 1970 so that the choice among the potential patterns of cuts for this year will contribute to 1971 and later year reductions.

PERSONAL AND CONFIDENTIAL

THE PRESI

Civilian

The attached table shows civilian agency targets.

The overall reduction target of $4.0 billion, over and above the $4.0 billion cut in April, and with impoundment of congressional add-ons, should enable us to achieve your $192.9 billion commitment. We are also reducing another 60,000 civilian personnel by next June (more than half of them in Defense).

Attachment

PERSONAL AND CONFIDENTIAL

August 8, 1969

REDUCTION IN 1970 SPENDING
FOR CIVILIAN AGENCIES

	Millions
Agriculture	$100
Refuse to spend some congressional increases or find offsets for special milk ($105), Agriculture conservation program ($73), and Farmers Home loan and grant programs ($44).	
HEW	200
Most of the reduction ($175) will result from constraints on Medicare and Medicaid costs.	
HUD	200
At least $150 million reduction is specified for model cities.	
DOT	280
A $180 million reduction in the Highway trust fund is made by cutting obligations in the second, third and fourth quarters by about half to $600 million. Remaining cut will be applied widely.	
Other agencies	290
Cuts to be applied generally by the agencies including some reductions in personnel.	
Interior -- mostly reestimates 70	
OEO -- largely manpower programs 50	
NASA 50	
AEC 50	
Labor 20	
Post Office -- personnel only 19	
AID -- economic assistance 15	
Justice -- reflects only expected reduction by Congress in personnel 6	
Other specified cuts in personnel 10	
Total reduction, civilian agencies	1,070

PERSONAL AND CONFIDENTIAL

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August 19, 1969

MEMORANDUM FOR THE PRESIDENT

I concur in Dr. Paine's recommendation that the Administration concentrate its support of bills recognizing accomplishments in space to two of the proposals. Both the astronauts medal and the Commission to erect an astronaut memorial at Kennedy Space Center are appropriate at this time. Other proposals are inappropriate or would be better enacted at a later time.

Peter Flanigan
Assistant to the President

cc: Mr. Flanigan
Mr. Whitehead
Central Files
Mr. Kriegsman

CTWhitehead:ed

August 21, 1969

MEMORANDUM FOR DR. PAINE

FROM: PETER FLANIGAN

Thank you for the excellent report on the NASA-Contractor Cost Reduction Program for the six months ending December 31, 1968. I understand from the Bureau of the Budget that both the contractor and internal cost reduction programs of NASA are among the best in Government and have continually achieved impressive results.

As you indicated in your memorandum of July 28, 1969, the Bureau of the Budget is now working on strengthening and broadening the present cost reduction program to include all aspects of management improvement, of which cost reduction will remain a significant element. I can assure you that the President intends to continue to emphasize the necessity for efficiency and economy in Government operations and in concerns that are doing business with the Government.

THE WHITE HOUSE

ACTION MEMORANDUM WASHINGTON LOG NO.: 2518

Date: Wednesday, December 17, 1969 Time: 4:00 P.M.

FOR ACTION: F Peter Flanigan 12/22 cc (for information): J. Campbell

FROM THE STAFF SECRETARY

DUE: Date: Friday, December 19, 1969 Time: 2:00 P.M.

SUBJECT: NASA's appeal to the President regarding their FY 1971 budget level.

ACTION REQUESTED:

____ For Necessary Action
____ Prepare Agenda and Brief
____ For Your Comments
X For Your Recommendations
____ Draft Reply
____ Draft Remarks

REMARKS:

12/23 Complete to Campbell

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately.

K.R. COLE, JR.
For the President

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

OFFICE OF THE ADMINISTRATOR

December 17, 1969

The President
The White House
Washington, D. C. 20500

Dear Mr. President:

Faced with the necessity, for fiscal reasons, to reconfigure NASA's FY 1971 Budget well below the level required for a progressive and balanced space program, we have taken another hard look at the implications of a NASA FY 1971 Budget below $4,250 million. NASA can press forward with a curtailed and spartan program that keeps the Saturn V rocket in production at a level of $4,075 million. By suspending Saturn V production, we can reduce this further to a level of $3,935 million while still retaining a minimum tenable U.S. position in space during your Administration. At the $3,700 million level proposed in your meeting with Budget Director Mayo, I believe that the nation's progress in space would not be acceptable to you and, therefore, must appeal for reconsideration. Let me summarize the impact of these levels, so the final decisions can be reached with a clear understanding of the consequences. Supporting details have been provided to the Bureau of the Budget.

The Space Program I recommend for your Administration is that developed by the Space Task Group. The STG report has been very well received. It provides a well-thought-out and flexible United States space program with sound long-term objectives which will surely stand the test of time. The STG Program should become the Nixon Space Program, and, as a result, I am confident that your Administration will go down in history as having established man's future in space, both nationally and internationally. If, because of today's severe fiscal constraints we must sacrifice some current operations using previously-developed systems, so be it. The important thing is to press forward now with our new program, which represents this Administration's initiatives in space.

At a NASA budget level of $4,075 million, we can produce two Saturn V rockets per year, thus maintaining production of the free world's only large booster, developed at a cost of $7 billion. The Soviet Union is expected to introduce soon a new, even larger rocket with 10-15 million pounds thrust, versus the Saturn V's 7.5 million pounds. The new Russian rocket undoubtedly will be used to orbit very large

payloads, although it will not greatly surpass the Saturn V in pounds of payload delivered to orbit because of the higher efficiency of our hydrogen-oxygen upper stages. If we are willing to accept a suspension of U.S. manned flight activity after 1974, when Soviet cosmonauts will probably be carrying out major missions with their new big boosters, we can postpone further Saturn V production now and save $140 million in the NASA 1971 Budget. Production of the first two stages of Saturn V will have to be resumed in a few years to launch the first module of the space station in the late 1970's. Stopping Saturn V production would allow us to cut the NASA Budget back to $3,935 million, which in our assessment is the minimum tenable level.

At a FY 1971 budget level of $3,935 million (with outlays at $3,900 million--representing no increase above 1970), we would accept a three-year gap in U.S. manned space flight from the last of the existing Saturn V's in 1974 to the first test flight of the new space shuttle in 1978.

At both the $4,075 and $3,935 million levels, we would have to cut a number of promising scientific and applications projects, reduce further our work in advanced space technology, and incorporate in our plan a number of other reductions suggested by the Bureau of the Budget. Although these are very serious actions indeed, NASA can still carry out the following projects of major importance to the nation:

First -- We can make an effective and credible start on the key space station and space shuttle programs that are at the heart of the Space Task Group recommendations. This will clearly focus the long-term goals of this Administration's space program on building the bridge to space over which people of many nations will pass in future years to participate in exploration and utilization programs. True international involvement--including space station modules and shuttle components developed by other countries and foreign astronauts--can result from these new initiatives.

Second -- We can move forward with economically viable space applications in Earth Resources, communications, weather, navigation-traffic control, and other fields offering prospects of early substantial practical benefits. This Administration would be in an untenable position if the space program presented with your 1971 Budget did not contain a balance of practical applications of space that are technically and economically feasible.

Third -- We can carry to completion significant and visible major programs like the Viking unmanned mission to land on Mars

in the 1973 opportunity, the manned Apollo Applications orbital workshop flight in 1972, and other significant but less well-known and less expensive programs of great scientific value.

Fourth -- We can make very effective use of the remaining Saturn V and Saturn IB vehicles previously procured for the Apollo program. We will change and stretch out the plans on which our past launch preparations and training have been based and fly future missions at the longest intervals that are safe and practical. We will complete the first phase of lunar exploration with only four more Apollo flights: Apollo 13 and 14 in 1970, and Apollo 15 and 16 in 1971. These flights are essential for a first look at the very different lunar regions we can reach with our present vehicles. Apollo 11 and 12 have shown that areas of the moon thought to be quite similar have surprising differences; the next four flights will undoubtedly turn up new surprises. In addition, they will keep our manned flight organization together for the launching in 1972 of the Apollo Applications orbiting space workshop. This spectacular mission, during which astronauts will be living and working in space for periods up to 56 days, should provide a new U.S. space climax in 1972 similar to Apollo 11 in 1969.

Finally -- At the $3,935 (or $4,075) million level we can avoid a prolonged suspension of U.S. manned flights after the 1972 AAP workshop flight, which would otherwise see no U.S. astronauts in space from 1973 to 1978. With FY 1971 provision for necessary modifications and equipment, we can use the last remaining Apollo hardware to undertake significant new manned missions after 1972, including two or three trips to the moon which would be major advances beyond earlier flights. In 1973 a jeep-like electric vehicle can be carried to allow U.S. astronauts to explore--with live television--exciting new terrain unlike lunar areas previously reached. The scientific returns should be great and popular interest will be high. Alternatively, one of the last three remaining Saturn V's could be used to launch a second earth orbiting workshop.

If the budget were cut to $3,700 million, U.S. manned flight activity would end in 1972 with an uncertain date for resumption many years in the future. We would also have to make further significant and serious reductions in other important programs, as described in the detailed material furnished to the Bureau of the Budget. I strongly urge you to select one of the bolder courses at $4,075 million or $3,935 million, depending on your final decision on the desirability of continued production of Saturn V's for manned flight after 1974. A hiatus in U.S. manned flights from 1975 to 1978 could be acceptable

with an advanced new shuttle and space station in final development, and U.S. and free world astronauts in training together for future shuttle and space station operations. I cannot recommend to you, however, the prolonged suspension of U.S. manned flight operations after 1972 that would result from a $3,700 million Budget.

In conclusion, let me address two matters which the Director of the Budget asked that I bring specifically to your attention:

1. Work at Universities -- NASA does need at least $10 million of the funds deleted by the BOB for our space work at universities. These funds are required to support NASA's current missions and the nation's long-term objectives in space. Inclusion of these funds is consistent with the policy Dr. DuBridge discussed with you--with which I agree--that mission agencies like NASA should continue to support university work they need done in their fields, while general support of university science remains a question for the National Science Foundation.

2. Electronics Research Center -- I believe strongly that NASA should not be required to close this important Center, and that it is essential to restore the $17 million in question to the NASA Budget. Future aerospace operations of greater reliability and economy require major technical advances in electronics systems. Nearly half of NASA's Budget is in electronics, and we must drastically reduce our costs here--a prime mission of this Center. In addition, advanced air traffic control is a vital part of future aeronautical system developments. Non-NASA considerations reinforce this view. Other agencies face serious long-term problems whose solutions require advances in electronics technology. For example, John Volpe and Jim Beggs at the Department of Transportation have strongly urged me and the Director of the Budget to maintain NASA's Electronics Research Center in connection with the NASA-DOT joint work on vital air traffic control R&D.

   Both the university and ERC budget items are included in the $3,935 million recommendation.

I have written frankly, Mr. President, to lay the nation's space needs before you in realistic terms. The integrity and reputation that NASA has painstakingly earned by delivering on extremely difficult tasks within stated budget and time limits are assets we cannot afford to diminish. Since 1966 our space program has already been reduced

$2 billion--a greater percentage than any other sector of the Budget. We have in the last four years reduced direct employment on NASA work from 420,000 down to 190,000. A FY 1971 Budget of $3,935 million will further reduce nation-wide direct employment on NASA projects to about 170,000. This is a major decrease in aerospace employment, but one NASA can live with in this time of austerity.

I believe I would be extremely remiss and do you and your Administration a disservice if I did not place before you as you reach these important decisions on America's future in space the relevant facts, consequences, and potentialities. I firmly believe that no other part of your Administration offers you as fine an opportunity for forward-looking and timely leadership. It is in this spirit that I request additional consideration of NASA's Budget. I strongly recommend that you establish the NASA FY 1971 Budget at $4,075 million or $3,935 million, depending on your decision to keep the Saturn V in production to eliminate the gap in U.S. manned space flight after 1974. This strong leadership will have an enduring impact on man's future in space.

I look forward to the opportunity to discuss these critical matters with you at your earliest opportunity. You can be sure that whatever your decision, the entire NASA organization will continue to do its very best to ensure that you and the nation are proud of the resulting accomplishments.

Respectfully yours,

T. O. Paine
Administrator

REQUIRED REDUCTIONS TO NASA BUDGET AT VARYING LOWER FY 1971 LEVELS

NASA Budget Submission (to support STG Report)		$4.503
1.	Apollo/Lunar - Reduce from 3 flights to 2 flights in FY 1971 and rephase LEP#2	-45
2.	Space Station and Shuttle - Reduce funding from $268M to $150M - slip completion of Phase B&C	-118
3.	Reduce Advanced Missions and Supporting Technology for Manned Space Flight from $21M to $14M	-7
4.	Slip Nimbus, ATS F&G, and Physics Explorers, and reduce Launch Vehicle Support	-28
5.	Reduce Nuclear Program from $60M to $48M	-12
6.	Reduce Space Technology ($10M) and Aeronautics ($5M)	-15
7.	Reduce Sustaining University Program ($26M to $11M)	-15
8.	Reduce Technology Utilization from $5M to $4M	-1
9.	Reduce Facilities	-12
	New Total	$4.250
10.	Eliminate LEP#2	-40
11.	Revise Lunar schedule and defer modifications until after AAP	-95
12.	Provision for start on 2nd Workshop or last lunar payload	+39
13.	Reduce Shuttle engine facilities from $75M to $15M	-10
14.	Slip OSO, Reduce OSSA SRT and Launch Vehicle Support	-24
15.	Reduce Space Technology effort	-20
16.	Reduce OTDA	-10
17.	R&M - Delete proposed new positions	-6
18.	CofF - Delete proposed facilities	-9
	New Total	$4.075
19.	Suspend Saturn V production	-100
20.	Application of FY 1970 Saturn V funds	-40
	New Total	$3.935
21.	Delete ERTS C&D	-10
22.	Apollo Lunar - Delete all modifications, payload effort, and flight plans after 1972	-121
23.	Delete plans for 2nd Workshop	-29
24.	Delete Navigation and Traffic Control Satellite	-7
25.	Delete HEAO	-4
26.	Reduce Aeronautics to FY 1970 level	-20
27.	Reduce OTDA	-6
28.	Eliminate University Program	-11
29.	Eliminate ERC or further reduce Apollo/Lunar	-17
	New Total	$3.700

3.700

3.8

National Aeronautics and Space Administration

CHANGES TO NASA BUDGET REQUEST

	NASA Submission	Δ	$4.250 Billion Level	Δ	~~$4.075~~ $4.025 Billion Level	Δ	$3.935 Billion Level	Δ	$3.700 Billion Level
MSF	$2,109.2	$-170.0	$1,939.2	$-96.0	$1,843.2	$-100.0	$1,743.2	$-160.0	$1,583.2
Apollo	1,160.0	-25.0	1,135.0	-95.0	1,040.0	---	1,040.0	-121.0	919.0
AAP	500.2	---	500.2	---	500.2	---	500.2	---	500.2
Saturn V	100.0	---	100.0	---	100.0	-100.0	---	---	---
LEP #2	60.0	-20.0	40.0	-40.0	---	---	---	---	---
Space Station	98.0	-48.0	50.0	---	50.0	---	50.0	---	50.0
Space Shuttle	170.0	-70.0	100.0	---	100.0	---	100.0	---	100.0
Adv. Sc./Supp. Dev.	21.0	-7.0	14.0	---	14.0	---	14.0	---	14.0
Workshop #2 or Lunar	---	---	---	+39.0	39.0	---	39.0	-39.0	---
SSA	893.0	-28.0	865.0	-25.0	840.0	---	840.0	-21.0	819.0
Viking	250.0	---	250.0	---	250.0	---	250.0	---	250.0
Lunar SRT/Data Anal.	11.0	---	11.0	-5.0	6.0	---	6.0	---	6.0
Other L&P	104.9	---	104.9	---	104.9	---	104.9	---	104.9
OSO A-K	18.7	---	18.7	-4.0	14.7	---	14.7	---	14.7
HEAO	4.0	---	4.0	---	4.0	---	4.0	-4.0	---
Physics Explorers	15.4	-4.0	11.4	---	11.4	---	11.4	---	11.4
Other P&A	86.9	---	86.9	---	86.9	---	86.9	---	86.9
Bioscience SRT	6.9	---	6.9	-5.0	1.9	---	1.9	---	1.9
Planetary Bioscience	8.0	---	8.0	---	8.0	---	8.0	---	8.0
Biosatellite	1.5	---	1.5	---	1.5	---	1.5	---	1.5
ERTS A-B	41.5	---	41.5	---	41.5	---	41.5	---	41.5
ERTS C-D	10.0	---	10.0	---	10.0	---	10.0	-10.0	---
ERS Aircraft	13.0	---	13.0	-2.0	11.0	---	11.0	---	11.0
NIMBUS	33.4	-6.0	27.4	---	27.4	---	27.4	---	27.4
ATS	55.5	-10.0	45.5	---	45.5	---	45.5	---	45.5
SATS Phase B	1.0	---	1.0	-1.0	---	---	---	---	---
Nav./Trf. Control	7.0	---	7.0	---	7.0	---	7.0	-7.0	---
Other Applications	57.6	---	57.6	---	57.6	---	57.6	---	57.6
Launch Vehicle Hardware	71.4	---	71.4	---	71.4	---	71.4	---	71.4
Launch Vehicle Support	95.3	-8.0	87.3	-8.0	79.3	---	79.3	---	79.3

	NASA Submission	Δ	$4.250 Billion Level	Δ	$4.025 Billion Level	Δ	$3.935 Billion Level	Δ	$3.700 Billion Level
ART	$349.0	$-27.0	$322.0	$-20.0	$302.0	---	$302.0	$-20.0	$282.0
NERVA	49.0	-9.0	40.0	---	40.0	---	40.0	---	40.0
Nuclear Stage Studies	3.0	-3.0	---	---	---	---	---	---	---
Shuttle Technology	51.0								
Space Station Base Tech.	36.8								
Near Space Veh. Applic. Sci.	18.5	-10.0	162.0	-20.0	142.0	---	142.0	---	142.0
Deep Space Vehicles	25.4								
100 kw Power Supply	3.7								
Advanced Research	23.0								
Other Space Technology	13.6								
Aviation Technology	125.0	-5.0	120.0	---	120.0	---	120.0	-20.0	100.0
TDA	318.0	---	318.0	-10.0	308.0	---	308.0	-6.0	302.0
OUA	26.0	-15.0	11.0	---	11.0	---	11.0	-11.0	---
OTU	5.0	-1.0	4.0	---	4.0	---	4.0	---	4.0
R&D Total	$3,700.2	$-241.0	$3,459.2	$-151.0	$3,308.2	$-100.0	$3,208.2	$-218.0	$2,990.2
CofF	90.2	-12.0	78.2	-18.2	60.0	---	60.0	---	60.0
R&FM	712.6	---	712.6	-5.6	707.0	---	707.0	-17.0	690.0
Total NASA	4,503.0	-253.0	4,250.0	-174.8	4,075.2	-100.0	3,975.2	-235.0	3,740.2
Application of FY 1970 Sat V funds	---	---	---	---	---	-40.0	-40.0	---	-40.0
Total, Budget Authority	$4,503.0	$-253.0	$4,250.0	$-174.8	$4,075.2	$-140.0	$3,935.2	$-235.0	$3,700.2

ADMINISTRATIVELY CONFIDENTIAL

C.F. (3)
FI4/FG214
FG6-11-1 Flanigan
FG214 Peter
FI4

THE WHITE HOUSE

WASHINGTON

December 18, 1969

MEMORANDUM FOR

THE PRESIDENT

FROM: Peter M. Flanigan

SUBJECT: Renegotiation Board Budget Appeal

The Renegotiation Board has appealed the $1,152,000 reduction of its budget. Its budget was originally approved at $4,235,000. The Renegotiation Board is one agency in government which is more than fully self-supporting. Next year it can be expected to produce $25 to $30 million of revenue through excess profit determinations. The Board estimates that this figure will be substantially reduced -- by $12 to $15 million -- if this budget reduction is sustained. I believe that this estimate of decline in excess profit determinations is a bit high. However, I do think it is entirely conceivable that we will loose $10 to $12 million of revenue by this budget cut.

The jurisdiction of the Renegotiation Board covers DoD, NASA, and GSA contracts, as well as those of certain other specified agencies. The Board's current large volume of work is directly related to the Vietnam buildup. To lose the revenue which can be generated by an adequately staffed Renegotiation Board would seem to be a false economy.

I would therefore support a full restoration of the Board's budget to the amount originally approved by the Bureau -- $4,235,000.

12/23 6?

ADMINISTRATIVELY CONFIDENTIAL

THE WHITE HOUSE

ACTION MEMORANDUM WASHINGTON LOG NO.: 2480

Date: Monday, December 15, 1969 Time: 10:25 A.M.

FOR ACTION: Peter Flanigan cc (for information): J. Campbell

FROM THE STAFF SECRETARY

DUE: Date: Wednesday, December 17, 1969 Time: 2:00 P.M.

SUBJECT: Renegotiation Board's appeal to the President regarding their FY 1971 budget.

ACTION REQUESTED:

____ For Necessary Action
____ Prepare Agenda and Brief
__X__ For Your Comments
____ For Your Recommendations
____ Draft Reply
____ Draft Remarks

REMARKS:

12/22 cc: CF

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately.

K. R. COLE, JR.
For the President

File
Renegotia

THE RENEGOTIATION BOARD
UNITED STATES OF AMERICA
WASHINGTON, D.C. 20446

December 2, 1969

The President
The White House
Washington, D. C. 20500

Dear Mr. President:

The Bureau of the Budget has advised us that our budget request for fiscal 1971, originally approved at $4,235,000, has now been reduced to $3,083,000. The Bureau of the Budget has further advised that, if an appeal is to be made, it must be made directly to you.

We estimate that the reduction in the Board's appropriation request will require a reduction in force involving 18 percent of its staff and will result in a decline of $12 to $15 million in the Board's excessive profits determinations in fiscal 1971.

The Board wholeheartedly supports your efforts to reduce government spending. We are convinced, however, that an appropriation of $4,235,000 would be justified, in view of the substantial increase in the Board's workload under the impact of the Vietnam conflict.

In the last five years the Board has made excessive profits determinations aggregating more than $100 million. With sufficient personnel to handle our increasing activity, we expect the rate of recoveries to rise substantially during the next several years.

We will be happy to meet with you or your staff to discuss this matter.

Respectfully yours,

(Signed) Lawrence E. Hartwig

Lawrence E. Hartwig
Chairman

Original
copy Ehrlichman
Copy Flanigan

THE RENEGOTIATION BOARD
WASHINGTON, D.C. 20446

December 2, 1969

The President
The White House
Washington, D. C. 20500

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We will be happy to meet with you or your staff to discuss this matter.

Respectfully yours,

Lawrence E. Hartwig

Lawrence E. Hartwig
Chairman

~~CONFIDENTIAL~~

THE WHITE HOUSE

ACTION MEMORANDUM WASHINGTON LOG NO.: 2530

Date: Thursday, December 18, 1969 Time: 10:00 A.M.

FOR ACTION: Vice President Agnew
Peter Flanigan
Thomas Paine
Tom Whitehead
Dr. DuBridge
Dir. Mayo
Herb Klein Bill Anders

cc (for information):

FROM THE STAFF SECRETARY

DUE: Date: Monday, December 22, 1969 Time: 9:00 A.M.

SUBJECT: Proposed Presidential statement on space.

SUBSEQUENT ACTION:

Space

Item: Memo

LOG NO.: 4285

From: Kissinger

Dated: July 6, 1970

To: President

Attachment:

Subject:

International Space Cooperation: US - Soviet Activities

Received: Date: July 6, 1970 Time:
Dispatched: Date: July 6, 1970 Time: 4:00 pm

To: President for ACTION

copies to:

Subsequent Action:

Space

Item: Memo

LOG NO.: 4324

From: Kissinger

Dated: July 14, 1970

To: President

Attachment:

Subject:

International Space Cooperation and the Post-Apollo Program

Item: Memo SECRET LOG NO.: 1887

From: Kissinger Dated: Oct. 27, 1969

To: President

DETERMINED TO BE AN
ADMINISTRATIVE MARKING
E.O. 12065, Section 6-102
By NARS, Date 8/16/12

Attachment:

Subject: **Proposed Background Statement on Recent Soviet Manned Space Event.**

Received: Date: Oct. 27, 1969 Time: 10:01 a.m.
Dispatched: Date: " Time:

To: President For ACTION

copies to:

Subsequent Action:

Item: Memo for the President (dated Feb. 28) FROM: V. P. AGNEW

Subject: Request of the President for the VP to chair a task group on coordinated program and budget proposal for U.S. space program (Defense/NASA/Science)

Received: Date:
Dispatched: Date: March 5, 1969 Time:
To: (F) Time: 11:00 am

Subsequent Action:

Date:

Item: Memo

TELECOMMUNICATIONS

From: P. FLANIGAN

Dated: May 13, 1969

To: The President

Attachment: Supporting documents and proposed letter for signature (Dr. Kissinger and Dr. DuBridge concur in recommendation)

Subject: Request from Canadian government that the U.S. provide launch services for their proposed domestic communications satellite.

Resolve: 1) Launch provided bilaterally or thru INTELSAT; 2) Canadians arrange bilateral with NASA or thru COMSAT: recommend bilateral with NASA

Received: Date: May 15 Time: 9:04 am

Dispatched: Date: -do- Time:

To: RN for sig.

copies to:

Subsequent Action:

DRAFT

~~SECRET~~

White House
Space Task Grp

SPACE TASK GROUP REPORT

THE POST-APOLLO SPACE PROGRAM: DIRECTIONS FOR THE FUTURE

AUGUST 27, 1969

S&T Cont. No. 964
This document consists of 35 pages
No. 26 of 35 Copies, Series A

EXCLUDED FROM AUTOMATIC DOWNGRADING
AND DECLASSIFICATION

When attachment(s) are removed,

social benefits not now foreseen. These divergent views of social priority will persist and must be recognized in decisions on future space activities.

Manned Space Flight

The manned flight program has stimulated public interest far more than unmanned science or applications programs. There has been a universal personal identification with the astronauts and a high degree of interest in their space activities which reached a peak both nationally and internationally with Apollo. The manned flight program permits vicarious participation by the man-in-the-street in exciting, challenging, and dangerous activity. Sustained high interest, judged in the light of current experience, however, is related to availability of new tasks and new mission activity - new challenges

for man in space. The presence of man in space, in addition to its effect upon public interest in space activity, can also contribute to mission success by enabling man to exercise his unique capabilities, and thereby enhance mission reliability, flexibility, ability to react to unpredicted conditions, and potential for exploration.

While accomplishments related to man in space have prompted the greatest acclaim for our Nation's space activities, there has been increasing public reaction over the large investments required to conduct the manned flight program. Scientists have been particularly vocal about these high costs and problems encountered in performing science experiments as part of Apollo, a highly engineering oriented program in its early phases.

Much of the negative reaction to manned space flight, therefore, will diminish if costs for placing and maintaining man in space are reduced and opportunities for challenging new missions with greater emphasis upon science return are provided.

International Aspects

Achievement of the Apollo goal resulted in a new feeling of "oneness" among men everywhere. It inspired a common sense of victory that can provide the basis for new initiatives for international cooperation.

The U.S. and the USSR have widely been portrayed as in a "race to the moon" or as vying over leadership in space. In a sense, this has been an accurate reflection of one of the several strong motivations for U.S. space program decisions over the previous decade.

Now with the successes of Apollo, of the Mariner 6 and 7 Mars flybys, of communications and meteorology applications, the U.S. is at the peak of its prestige and accomplishments in space. Supporting this position of space leadership has been the expanding Department of Defense use of space capabilities to support the armed forces. The U.S. position of over-all leadership in space science is well-recognized by those involved in space research throughout the world. In addition, U.S. efforts to pioneer the application of space techniques to the fields of communications, navigation, meteorology and earth resources provide a basis for bringing direct benefits from space to a broad segment of the world's population.

One of the great strengths of the U.S. space program has been

its open nature, and the broad front of solid achievement in science and applications that has accompanied the manned flight program.

The attitude of the American people has gradually been changing and public frustration over Soviet accomplishments in space, an important force in support of the Nation's acceptance of the lunar landing goal in 1961, is not now present. Today, new Soviet achievements are not likely to have the effect of those in the past. Nevertheless, the Soviets have continued development of capability for future achievements including possible dramatic missions of high political impact. There is no sign of retrenchment or withdrawal by the Soviets from the public arena of space activity despite launch vehicle and spacecraft failures and the preemptive effect of Apollo 11.

The landing on the moon has captured the imagination of the world. It is now abundantly clear to the man in the street, as well as to the political leaders of the world, that mankind now has at his service a new technological capability, an important characteristic of which is that its applicability transcends national boundaries. If we retain the identification of the world with our space program, we have an opportunity for marginal, yet profound, political effects on nations and peoples and on their relationships to each other.