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12/1/83

860860

(1) Fiori
(2) Lynch

BACKGROUND FOR CCCT MEETING ON U.S. SPACE STATION OPTIONS WITH THE PRESIDENT IN THE CABINET ROOM DECEMBER 1, 2:00 p.m.

THIS IS A COVER SHEET

This information in the attached document is classified and as such will be treated according to provisions set forth in EO 12065.

(This cover sheet is unclassified when separated from classified documents)

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OSTP Form 4, August 1978

860860

THE WHITE HOUSE
WASHINGTON

SECRET
(ATTACHMENT)

CABINET AFFAIRS STAFFING MEMORANDUM

Date: November 22, 1983 **Number:** 175198CA **Due By:** --

Subject: CCCT Meeting on U.S. Space Station Options

	Action	FYI
ALL CABINET MEMBERS	☐	☐
Vice President	☑	☐
State	☑	☐
Treasury	☑	☐
Defense	☑	☐
Attorney General	☑	☐
Interior	☑	☐
Agriculture	☑	☐
Commerce	☑	☐
Labor	☑	☐
HHS	☐	☑
HUD	☐	☑
Transportation	☑	☐
Energy	☑	☐
Education	☐	☑
Counsellor	☑	☐
OMB	☑	☐
CIA	☑	☐
UN	☐	☑
USTR	☑	☐
GSA	☐	☐
EPA	☐	☐
OPM	☐	☐
VA	☐	☐
SBA	☐	☐

	Action	FYI
CEA	☑	☐
CEQ	☐	☐
OSTP	☑	☐
NASA	☑	☐
	☐	☐
	☐	☐
Baker	☐	☐
Deaver	☐	☐
Darman *(For WH Staffing)*	☑	☐
Jenkins	☐	☐
Mc Farlane	☐	☐
Svahn	☐	☐
Rye	☑	☐
	☐	☐
	☐	☐
	☐	☐
	☐	☐
CCCT/Gunn	☐	☑
CCEA/Porter	☐	☐
CCFA/	☐	☐
CCHR/Simmons	☐	☐
CCLP/Uhlmann	☐	☐
CCMA/Bledsoe	☐	☐
CCNRE/	☐	☐

REMARKS:

Attached is a background paper on U.S. Space Station Options for your review prior to the CCCT meeting with the President in the Cabinet Room at 2 pm, Thursday, December 1. The meeting will consist of a summary of the options by Gil Rye for NSC SIG/SPACE and a presentation by NASA followed by a general discussion.

Thanks.

SECRET
(ATTACHMENT)

RETURN TO:

☑ Craig L. Fuller
Assistant to the President
for Cabinet Affairs
456-2823

☐ Katherine Anderson ☐ Don Clarey
☐ Tom Gibson ☐ Larry Herbolsheimer
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860860

THE WHITE HOUSE

WASHINGTON

UNCLASSIFIED
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MEMORANDUM FOR MEMBERS OF THE CABINET COUNCIL ON COMMERCE AND TRADE

FROM: CRAIG L. FULLER

SUBJECT: Space Station

A meeting of the Cabinet Council on Commerce and Trade, chaired by the President, will be held on December 1, 1983 at 2:00 p.m. in ~~Room 208 of the Old Executive Office Building.~~ The issue will be whether or not to proceed with the NASA development of a permanently based, manned Space Station. This issue was reviewed by the Senior Interagency Group for Space on August 10, 1983. The attached SIG(Space) report should provide sufficient background for the meeting.

Please note that the attached report contains three options for the President's consideration. The Secretary of Commerce recommends that the President approve both Space Station and enhanced Shuttle capability (i.e., both Options 1 and 2). Therefore, four options are available for the President's consideration. At the SIG(Space) meeting on August 10, the majority of members supported either Options 1 or 3.

If you have any questions please contact me. Also, Gil Rye of the NSC Staff will be glad to answer any questions concerning the SIG(Space) Report.

Attachment
SIG(Space) Report on
Space Station

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~~SECRET~~/NOFORN

REPORT

BY

THE SENIOR INTERAGENCY GROUP FOR SPACE

ON

SPACE STATION

AUGUST 1983

TABLE OF CONTENTS

PREFACE

President Reagan has directed via NSSD 5-83 that a study be conducted to establish the basis for an Administration decision on whether or not to proceed with the NASA development of a permanently based, manned Space Station. NSSD 5-83 gave guidance on specific policy issues and scenarios to be addressed. (U)

A Space Station Working Group under the Senior Interagency Group for Space was established to conduct the NSSD 5-83 study. The Working Group was chaired by NASA and included representatives from DCI, DoD, DoC, DoS, ACDA, OMB and OSTP. The Space Station Working Group developed a report entitled "Summary of Issues" which assessed the policy issues and presented possible approaches for the continuation of this nation's manned space program. (U)

An NSC-led drafting team was established to summarize options for presentation to the President. Based on the "Summary of Issues" report and subsequent interagency discusions, options for the President are:

1. Commit now to a permanently manned Space Station.

   - This option is for an immediate commitment to develop a permanently manned Space Station.

2. Commit now to an evolutionary development of expanded Space Transportation System capabilities and umanned platforms.

   - This option is for the development of selected new STS-based space capabilities.

3. Defer commitment to either Option 1 or Option 2 pending additional definition of requirements, costs and risks.

   - This option requires the development of better documentation on Space Station missions and the utility of man in space before major hardware commitments are made. (U)

BACKGROUND

Introduction

The President's National Space Policy declares that it is his intent to maintain U.S. space leadership. The U.S. has had a vigorous and successful space program since the launch of the first American earth satellite, Explorer I, in 1958. The Soviets reached space before the U.S. with Sputniks I and II in 1957, but the U.S. soon gained a clear lead and remains ahead of its major competitors today. The Space Shuttle is the most advanced launch vehicle in the world, and gives the U.S. new capabilities for a wide spectrum of space operations. American-built communications satellites still dominate the commercial communications field. U.S. national security space systems play an important role in maintaining stability and peace in the world. And, the U.S. leads the world in space science and exploration. Our endeavors in space demonstrate the peaceful intent of U.S. policy, but provide to all a clear reminder of the power that resides in the United States. (U)

Competition with the Soviets has been an important aspect of the American space program since 1957. Both the U.S. and Soviets recognize that space achievements are considered a measure of national prestige and national competence by people around the world. Both parties also recognize the value of man in space for capturing world attention. (For example, consider the contrast between the manned American Apollo Program and the unmanned Soviet Luna Program. Millions of people around the world watched Americans walk on the moon; but the Soviet robotic sampler made no impact other than on the surface of the moon itself.) The Soviets are intensifying their manned space program--they have announced their intention of establishing their Salyut as a permanently manned Space Station. Furthermore, Soviet cosmonauts have already spent far more time on orbit than American astronauts, gaining insight into man's role in space. (U)

Space is an arena of competition, not only between the U.S. and the Soviet Union, but also between the U.S. and its friends in Western Europe, Canada and Japan. This competition is commercial, scientific and technological. U.S. developments in space technology have provided much of the base to those nations which have active, sophisticated space science and technology programs. They have also developed capabilities that reflect a strong awareness of growing international markets for space products and services. Foreign space budgets focus on R&D and public-private consortia to enhance commercial competitiveness. These national strategies are challenging U.S. dominance of the space market. The European ARIANE system is now competing in the area of launch services. Foreign firms, in some instances in consortium with U.S. firms to obtain U.S. proven technology, now manufacture communications satellites and associated ground equipment. The Europeans, Canadians and Japanese all are developing earth observation satellites, and the Germans and the Japanese are concentrating on materials processing in space. (U)

Government-funded research provides technology options for space systems and develops technology to extend U.S. capabilities beyond the current state of the art. Much of this research is directly supportive of both national

security and civil space missions; much also proves to be beneficial to U.S. industry for commercial space endeavors. There are also some useful spin-offs that benefit non-space-related activities here on Earth.

National Space Policy

On July 4, 1982, President Reagan issued his National Space Policy (NSSD-42) to guide the conduct of the U.S. Space Program and related activities. This new Policy established key policy guidelines for the future of U.S. space activities. (U)

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

NASA Civil Space Program

At its peak in the early 1960s, NASA's budget exceeded $20 billion per year (in FY 1984 dollars). These levels were required to support President Kennedy's commitment to put a man on the Moon. NASA's budget then declined in the late 1960s and early 1970s, and has remained relatively level since the mid-1970s. (U)

The FY 1984 NASA budget for space activities is $6.5 billion. Recognizing the importance to the nation of the STS, NASA's highest priority provides for the development, production and operation of a four orbiter Space Shuttle fleet including ancillary systems such as Spacelab and upper stages. Furthermore, in order to maintain orbiter production capability and to assure reliable Shuttle operations, the production of structural and component spares also represent a high priority. (U)

General and preliminary Space Station definition activities have been on-going in NASA over the past few years. During FY 1983, as activities became more focused, approximatley $14 million was spent studying advanced development, focused technology, and mission requirements. (U)

In Space Science and Applications, and Technology, on-going activities provide for studies of the solar system and the universe, studies in remote sensing of the Earth's resources and environment, development of advanced satellite communications technology, development of instrumentation for materials processing in space, and life sciences research related to the safety and productivity of humans in space. Major projects in development are: the Space Telescope, an optical instrument designed to observe distant objects undisturbed by the Earth's atmosphere; the Gamma Ray Observatory, designed to study deep space phenomena in the gamma ray region of the electro-magnetic spectrum; Galileo, designed to explore Jupiter and its moons; the Earth Radiation Budget Experiment to be launched in 1984, designed to provide

global measurements of the level of solar and cosmic radiation absorbed by the Earth and to map the levels of aerosols in the stratosphere; the Advanced Communications Technology Satellite, a cooperative government and industry project to improve communication satellite capability in the next decade. (U)

New initiatives in 1984 are a cloud-penetrating Venus Radar Mapper spacecraft to map Venus and increase our understanding of the evolution of Venus and our Solar System, and a new explorer class mission to enhance research in ultraviolet astronomy. Research in space technology is designed to ensure a sound foundation for new efforts through research in such areas as chemical propulsion, spacecraft systems, and materials and structures. (U)

In Tracking and Data systems, the budget continues to support the Tracking and Data Relay Satellite System which will replace a substantial portion of the existing tracking network. (U)

Soviet Space Programs

This section is based on NIE 11-1-83, Soviet Space Programs, which was approved by the NFIB on 19 July. The principal goals of the Soviet space program are to provide global support to Soviet military forces, enhance the worldwide influence and prestige of the Soviet Union, deny enemies the use of space in wartime, and contribute to the Soviet economy. (S/NF)

The main capabilities of the Soviet space systems for 1983 to 1990 as they relate to manned space activities are summarized as follows:

- o Existing Capabilities and Expected Improvements:
  - Space Station: Current Soviet Space Stations are manned 40 percent of the time with two persons and conduct military experiments, reconnaissance, materials processing, and other research. Future stations, with crews of six to 12 persons, will provide permanently manned platforms for similar activities and weapons components testing. (S/NF)
  - Lunar and Planetary Exploration: Unmanned exploration of the lunar far side and a Mars soil sample return mission are likely within the next decade. Venus probes will continue to be frequent in the near term and a Jupiter probe may be launched by about 1990. A lunar base could be established in the late 1990s, if decisions are made to reinstitute the manned lunar project cancelled in 1974. More likely is a manned mission to orbit Mars by the late 1990s. (S/NF)
- o New Capabilities:
  - A Reusable Space Transportation System: This system is similar to the U.S. Space Shuttle. It will transport bulk cargo to and from Space Stations. It also will enable delivery, recovery, refueling, and repair of satellites. It also may be a test bed for laser weapons. (S/NF)

- A smaller space plane is also being developed, possibly for reconnaissance, satellite inspection, and transportation purposes. A space tug, if perfected, would assist the Space Station and Shuttle in their logistic mission by transferring satellites between high and low orbits for servicing. (S/NF)

Manned space activities are receiving increased interest in the Soviet space program. A comprehensive manned space program is under way and includes the development of several complementary components including a modular space complex, a reusable space transportation system, and a space tug. The Soviet leadership has announced the national objective of establishing a continuously manned Space Station, which the Intelligence Community believes will be achieved by about 1986. By then, the manned space program, which is predominantly military in nature, will account for about one-fourth of Soviet space expenditures. Beyond research and development, the military purposes of manned Space Stations remain unclear, but reconnaissance, to include ocean surveillance, is likely to be the main military mission. In addition, the Soviets probably are developing a military space plane whose mission we cannot yet determine, but which is likely to include reconnaissance. (S/NF)

In addition to the manned space activities anticipated above, there are several other possibilities in the Soviet space program that could occur in the next 10 to 20 years, but the evidence is insufficient to make firm judgments. Other possible developments in the 1990s that relate to Soviet manned space activities are summarized as follows:

- o Geosynchronous Space Station (Low to Moderate Likelihood of Testing by the Year 2000): The ambitious Soviet manned Space Station program could include placing a Space Station in geosynchronous orbit. Such a station could provide continuous observation of certain geographic areas and could be less vulnerable to attack than low-orbiting Space Stations. The new heavy-lift launch vehicle could place a Salyut-class Space Station or module in geosynchronous orbit. Similarly, an upgraded Proton (SL-12) space launch vehicle could place a Soyuz T-class transport vehicle in geosynchronous orbit. Space stations in these high orbits could serve as research platforms, intelligence collection stations, satellite repair bases, weapons test beds, or as staging areas for further exploration of the moon or planetary expeditions. (S/NF)

- o Large Space Base (High Likelihood of Testing by the Year 2000): The modular Soviet Space Station, designed for crews of 6 to 12 persons could be followed by a larger Space Station capable of accommodating 12 to 20 persons. Some Soviet scientists have even discussed the development of a large space base in the 1990s with provisions for as many as 100 people. (S/NF)

- o Manned Lunar (Low Probability of Testing by the Year 2000) and Planetary Exploration (Moderate Probability of Testing by the Year 2000): Soviet statements frequently discuss manned exploration of Mars and occasionally mention lunar expeditions. Also, Soviet

studies in the mid-1970s addressed the establishment of a lunar base, but the concept seems to have been dropped in the late 1970s. More recent comments by Soviet scientists and officials suggest that a manned mission to Mars is planned for the mid-to-late 1990s. (S/NF)

Increased Soviet space activities will also enhance Soviet prestige. A visible, highly publicized, continously-manned Soviet Space Station will receive frequent worldwide attention. A manned lunar base or manned Mars mission, which could be undertaken within the next 15 years, and increased unmanned lunar and planetary exploration such as the upcoming Venus-Halley Comet mission, could enhance the Soviets desired image as a peaceful and technologically advanced nation. (S/NF)

Europe, Canada, and Japan

Foreign space programs reflect awareness of growing and technically challenging international markets for space products and services. Trends of R&D support and public-private cooperation to enhance competitiveness are clear. (U)

Foreign space budgets have remained relatively constant since the mid- to late-1970's. Foreign space programs have shown an increased emphasis on areas of potential commercial payoff: communications, remote sensing and launch vehicle development. National strategies for increasing the output of space good and services have emerged. For example, the French goal is to double the size of their space industry through increased exports; Japan has been devoting much of its space expenditures to the development of a space infrastructure for subsequent export transition; and Canada recently approved a five-year plan financing efforts in remote sensing, communications, and broadcasting. (U)

Other nations are now beginning to share in the international space market that has been dominated by the U.S. The European ARIANE launch vehicle is now providing commercial launch services in competition with the Shuttle and U.S. commercial ELVs. The Japanese are also considering the development of a larger launch vehicle, but no significant Japanese competition for the sale of launch services is foreseen for the next ten years. Foreign firms now manufacture communications satellites and associated ground equipment. In addition, Canada is perceived as the leader in direct broadcast telecommunications services. France, Canada, ESA, and Japan are now developing remote sensing satellites, where again the U.S. has possessed a virtual Western monopoly. Canada is the current leader in the development of civil space-based synthetic aperture radar systems. The French have proposed an automated space factory for the early 1990's which would be used for pharmaceutical and mixed density alloy productions. (U)

SUMMARY OF ISSUES

(From NSSD 5-83)

President Reagan directed via NSSD 5-83 that a study be conducted to establish the basis for an Administration policy guiding the potential NASA development of a permanently based manned Space Station. This section reproduces the summary section of the Working Group Study. The study was conducted by the SIG(Space) Manned Space Station Working Group with representation from NASA, DoD, DCI, DoS, DoC, ACDA, OMB and OSTP. (U)

Scenarios

Four alternative scenarios for continuation of this nation's manned space program were reviewed:

- o Scenario I: Continue to use the Space Shuttle and unmanned space satellites.
  - This scenario also considers the extension of the Space Shuttle stay-time in orbit to about 20 days through the development of a power extension package.
- o Scenario II: Add unmanned space platforms, accessed by the current Shuttle or an extended on-orbit Shuttle capability, to the inventory.
  - This scenario would undertake the development of unmanned space platforms to operate in conjunction with the current Space Shuttle or with expanded on-orbit capability.
- o Scenario III: Develop a permanently manned Space Station that will grow in an evolutionary manner.
  - This scenario entails the development of a permanently manned Space Station. Enhancements will occur by increments. The first increment will have the capability to provide a permanent manned presence in space by the early 1990's.
- o Scenario IV: Commit to immediate development of a "fully functional" permanently manned Space Station.
  - This scenario envisions the commitment to an Apollo-like program for the development of a fully functional permanently manned Space Station by the early to mid-1990's. (U)

Issues

NSSD 5-83 also directed the examination of five issues in the context of the four scenarios, as follows:

- How will a manned Space Station contribute to the maintenance of U.S. space leadership and other goals contained in our National Space Policy?
- How will a manned Space Station best fulfill national and international requirements versus other means of satisfying them?
- What are the national security implications of a manned Space Station?
- What are the foreign policy implications, including arms control implications, of a manned Space Station?
- What is the overall economic and social impact of a manned Space Station? (U)

The views of the SIG(Space) Space Station Working Group on these five issues are summarized as follows:

The NASA representatives believe that, in order to maintain leadership in the civil space program, an evolutionarily developed, permanently manned Space Station (Scenario III) is the preferred vehicle for the majority of space missions needed through the end of the century, and that it probably presents the most cost-effective alternative for satisfying these requirements. NASA does not recommend pursuit of Scenario IV because it would be expensive and would represent an unnecessarily ambitious expansion of current space operations. The NASA representatives further believe that the time is right for beginning this venture as part of the nation's civil space program: the Space Shuttle--the key to providing routine access to space--is operational, the technology is within reach, and the civil requirements for a permanently manned Space Station exist now. (U)

The National Security Community believe that, because of the absence of any current national security requirements for a manned Space Station, a more evolutionary approach to manned space activity is appropriate. They believe that, from a national security standpoint, man's role in space requires better understanding and that this understanding can be obtained most efficiently by using Space Shuttle capabilities and by extending the duration of Space Shuttle flights (Scenarios I and II). With this knowledge, they believe that a permanently manned Space Station may provide a capability for the National Security Community at some future time. They believe that a commitment to a manned Space Station program must not adversely affect current and projected National Security Community space programs and overall priorities. This includes national policy guidance to make the Space Shuttle fully operational and cost effective. (S)

Leadership: How will a manned Space Station contribute to the maintenance of U.S. space leadership and other goals contained in our National Space Policy? At present, the U.S. retains its position of leadership in civil and national security space operations. However, perception exists that U.S. civil space leadership is being adversely affected by the Soviet Salyut Station Program. NASA believes that maintenance of a leadership position in

the full range of civil space operations would become prohibitively expensive and leadership would probably be lost without a commitment to a permanently manned Space Station. The national security community believes that maintenance of U.S. national security space leadership is better served by continuation and augmentation (to include study of potential uses for man-in-space) of present programs rather than immediate investment in a permanently manned Space Station program. The Intelligence Community believes that the Soviet Union can and will assemble a large permanently manned Space Station earlier than any of the proposed NASA program options. (S/NF)

Requirements: How will a manned Space Station best fulfill national and international requirements versus other means of satisfying them? A permanently manned Space Station is not an end in itself but rather is a vehicle upon which important missions can be performed in space. It uniquely provides the coupling of manned presence with unlimited stay-time on-orbit. The permanently manned Space Station would fulfill many projected civil space missions, both research and operations, in the fields of science, commerce and technology development. Moreover, the permanently manned Space Station would serve as a necessary stepping stone for future national endeavors in space, such as a permanent lunar base or a manned mission to Mars. NASA believes that an evolutionarily developed, permanently manned Space Station (Scenario III) is the preferred vehicle for the majority of civil missions needed through the end of the century, and that it probably presents the most cost-effective alternative for satisfying these requirements. (U)

The National Security Community concluded that there are no currently identifiable national security requirements which could be uniquely satisfied or significantly enhanced by a permanently manned Space Station; they did, however, identify example areas of long-term interest that, while not requiring the development of a Space Station, could be pursued on a Space Station if one were developed. The National Security Community believe that from a national security standpoint, man's role in space requires better understanding and that this understanding can be obtained most efficiently by using Space Shuttle capabilities and by extending the duration of Space Shuttle flights to allow its increased use as an R&D platform and for manned experiments (Scenarios I and II). With this knowledge, a permanently manned Space Station may provide a capability for use by DoD and the Intelligence Community at some future time. (S)

National Security: What are the national security implications of a manned Space Station? The national security community has no currently identifiable requirements for a manned Space Station. However, should additional studies determine that a manned Space Station could meet some national security needs, it must be recognized that there will be areas of potential conflict between civil and national security operations. It is important to ensure, for example, that international involvement in the Space Station program be conducted so as to protect the special access compartmentation for some national security functions. It is extremely unlikely that classified national security activities would permit coincident foreign involvement such as long duration mixed crew manned activities, although NASA believes that architectural and operational solutions can significantly alleviate this problem. (S)

Although the Soviets have expended significant resources in evaluating man's role in space, the DoD and the Intelligence Community do not believe that they need to replicate these activities. The U.S. approach to technology advancement and resource allocation differs markedly from that of the USSR. (S)

Given the U.S. commitment to the Space Shuttle and the fact that it is a major factor in the future evolution of the U.S. space program, the national goal of making the Space Shuttle fully operational and cost-effective in providing routine access to space must remain the first priority of the Space Transportation System. Further, the national security community believes that this priority should not be adversely impacted by the Space Station program. (S)

Foreign Policy: What are the foreign policy implications, including arms control implications, of a manned Space Station? Perceived and actual U.S. strength clearly contributes to realizing U.S. foreign policy objectives. A U.S. decision to proceed with a major new civil space program (such as a manned Space Station) could demonstrate to the world America's willingness to maintain leadership in space. Foreign participation in a highly visible permanently manned Space Station program would give our allies the opportunity to share in the benefits of our civil space program. Furthermore, international involvement in the program could be used to counter Soviet propaganda attempts related to U.S. space programs. (U)

Economic and Social: What is the overall economic and social impact of a manned Space Station? A manned Space Station is not likely to have macroeconomic consequences on the economy. Furthermore, a decision to develop a Space Station cannot and should not be made on the basis of macroeconomic analyses. However, studies have also indicated that a manned Space Station could produce new commercial endeavors in space. (U)

OPTIONS FOR THE PRESIDENT

In the summary of issues in the previous section, two possible approaches for continuing the nation's manned space program were identified. On that basis, two programmatic options for Presidential consideration have been prepared. Option 1 corresponds to Scenario III; Option 2 corresponds to Scenario II. An option to develop an additional programmatic approach based on future studies and experiments was included as Option 3. (U)

Option 1: Commit Now to a Permanently Manned Civil Space Station

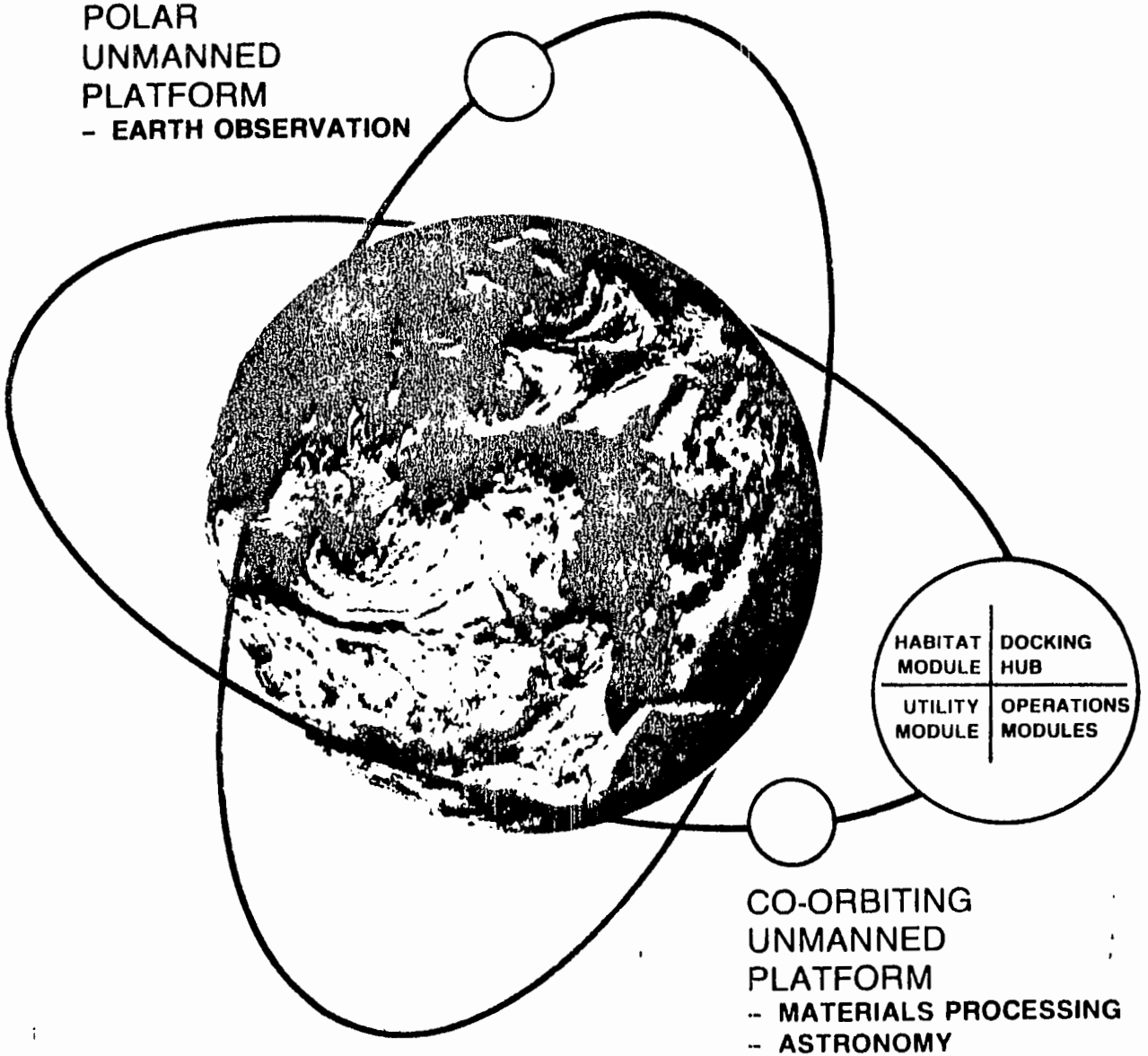
System Descripton--Major Elements: Under this option, the President would commit to the development of a permanently manned civil Space Station. The preliminary process of defining a permanently manned Space Station so as to generate the best design for taking advantage of the many existing and projected civil and commercial opportunities has already begun. NASA states that the start date for actual construction could be as soon as 1987. The civil Space Station could be operational as soon as 1991. Timing, of course, would depend on the level of funding available to NASA. NASA estimates that this schedule would require approximately $8.0 billion with FY 1985 costs of approximately $225 million. (U)

The civil Space Station of 1991 (Figure) would consist of a manned base in a low inclination orbit which would house a crew of 6-8. In addition to a living quarters module, the manned base would have a utility module to provide electrical power, thermal control, attitude control and data processing; it would also have a docking hub to allow tending by the Shuttle for crew rotation and resupply at 3-6 month intervals. The work of the Space Station would be conducted in two attached operations modules and on two unmanned platforms, which are part of the Space Station system. The operations modules would support scientific research and technology development requiring extensive manned interaction; the co-orbiting and polar unmanned platforms would provide changeable payload accommodations for activities requiring minimum disturbance. This combination would be designed to satisfy a broad spectrum of needs for scientific research, technology development and commercial activities. A Space Station-based Teleoperator Maneuvering System with appropriate operating equipment is also included. This would allow the Space Station the capability for satellite servicing such as retrieval, simple repair, and deployment. (U)

This presumes that civil, commercial, foreign and other USG users, as well as NASA, will provide for the utilization of the Space Station. Thus, the $8 billion program does not include the cost of development or acquisition of scientific and applications instruments or transportation to and from the Station. In many cases, these costs will be carried by the responsible parties. In addition, it does not include any O&M costs (except for development costs of operations capability and spare parts through initial operating capability). Nor does it include the development costs of the TMS and other items which are not unique to the Space Station, but which also serve the STS. Support for the Space Transportation System to serve national

THE 1991 SPACE STATION

– A Modular, Multi-purpose Facility–



needs and to serve the Space Station will remain a high NASA priority. (U)

System Description--Possible Future Elements: The above civil Space Station is modular in design, permitting additions to its complement of capabilities. NASA has identified several possible enhancements for additional future capabilities. These options could, for example, enlarge the size of the Space Station and increase the power available. This could allow manning by a crew of 12-18 and could enhance the station's capacity for research and commercial activities, particularly in the materials processing area. An additional enhancement could be the development of a space-based reusable orbital transfer vehicle for transfer of payloads to other orbits. This would allow the station to serve as a transportation node to geostationary orbit and to planetary trajectories, and also to serve as a stepping stone for future major missions such as a manned lunar base or mission to Mars. Other enhancements could provide the Space Station with a more sophisticated satellite servicing capability. In addition, a manned base with a crew of 4-5 could operate in a polar orbit to develop and service earth-oriented capabilities. The cost for development and acquisition of these Space Station enhancements would depend on the capabilities selected, but NASA estimates they could range up to approximately $20 billion through the end of the century if the full set of capabilities were selected. (U)

Discussion--Pro's: Those who believe that this nation should commit to the development of a permanently manned Space Station argue that:

- United States space leadership is being actively challenged by the Soviets. NASA believes that what the Soviets have learned during their Salyut program has led them to commit to developing a permanently manned, primarily military Space Station. The Intelligence Community believes that the Soviets will succeed by 1986, and that a visible, highly publicized, continuously manned Soviet Space Station will receive frequent worldwide attention and enhance Soviet prestige. Thus, some believe that a U.S. Space Station would define a "race" which the U.S. would be widely perceived as having lost. However, proponents of this option are confident that the U.S. Space Station will be more capable and even more highly visible. An immediate commitment to a U.S. Space Station is essential to counter the Soviet challenge to our space leadership and to put us in a position to learn as much about man's permanent role in space as the Soviets have learned. Furthermore, a Space Station will enable us to compete in "races" yet to be defined, such as a manned lunar base or a manned Mars mission which the Intelligence Community believes could be undertaken by the Soviets within the next 15 years. (S/NF)

- A Space Station is the fulfillment of the President's July 4, 1982, statement that "we must look aggressively to the future by demonstrating the potential of the Shuttle and establishing a more permanent presence in space." A Space Station is necessary to maintain real and perceived U.S. leadership in space and also to best satisfy many of the other goals and objectives of the National Space Policy. In particular, a Space Station will enable us to

conduct civil and commercial activities in space that will satisfy the National Space Policy goal of obtaining economic and scientific benefits through the exploitation and exploration of space. (U)

- o A permanently manned Space Station is the preferred vehicle for conducting the vast majority of existing and projected civil and commercial space missions. A Space Station presents the most efficient and effective alternative for satisfying the full range of these needs. Furthermore, the number of civil and commercial needs that are better served by other alternatives is limited. (U)

- o A U.S. decision to develop a permanently manned Space Station would be a reaffirmation to the world of America's commitment to technological superiority and to space leadership. (U)

- o Foreign participation in this highly visible program would give our allies the opportunity to continue to share in the benefits of our civil space program. Foreign participation in the Space Station would also reap the benefit to the U.S. of limiting foreign resources available for cooperation with the Soviets or for undertaking large, potentially competing programs of their own. At the same time, international involvement in a Space Station could be used to counter Soviet propaganda attempts related to the U.S. space program. (U)

- o NASA's civil space program is consistent with the priorities established in the President's policy guidance and honors the Administration's prior commitments embodied in on-going NASA programs. Because the Space Transportation System is the primary launch system for both national security and civil government missions, and because the first priority of the STS program is to make the Space Shuttle fully operational and cost-effective, high NASA priority is placed in this area. NASA is convinced that the development of a permanently manned Space Station is necessary to maintain real and perceived U.S. leadership in space and also to best satisfy many of the other goals and objectives of the National Space Policy. In particular, a Space Station would enable the U.S. to conduct civil and commercial activities in space to satisfy the National Space Policy goal of obtaining economic and scientific benefits through the exploitation and exploration of space. Because of this conviction, NASA believes that the U.S. should undertake a Space Station program at any NASA budget level. However, to conduct the Space Station program effectively and to utilize it to its fullest, the level and pace of total NASA funding should be sufficient to maintain focused and vigorous efforts in all areas of the civil space program. Furthermore, a civil Space Station program should not adversely affect current and projected space programs and overall priorities in the military and intelligence sectors. (U)

NASA and private industry have looked at civil and commercial needs for space missions. This NASA assessment* indicates that a permanently manned civil Space Station is the preferred means for conducting the majority of those missions. Proponents of this option argue that the 1991 civil Space Station would provide the following capabilities:

- A permanently manned Space Station is absolutely necessary if we are to understand man's role in space. What we have learned so far makes it clear that the physical and psychological aspects of long-duration visits cannot be extrapolated from short-visit data. Furthermore, we only learn by doing--the facilities and equipment to allow us to work in space are part of this Space Station. (U)

- This Space Station could enable extensive commercial exploitation of space by providing capabilities that are not currently available to the private sector. These capabilities arise because the Space Station would uniquely couple manned presence with unlimited stay-time in orbit. (U)

- This Space Station would be a permanent base for the efficient tending, servicing and repair of unmanned platforms and satellites, thereby increasing the lifetime of expensive space assets and offering the flexibility to upgrade space systems as technology improves. This efficiency derives from the fact that the servicing equipment is stored on the station and does not have to be brought up on the Shuttle for each individual servicing mission. (U)

- This Space Station would also enable the on-orbit assembly and check-out of large space structures such as antennas, astronomical telescopes, and satellites prior to their deployment. (U)

- This Space Station would enable the commercial production in quantity of critical materials that are not obtainable on earth, such as extremely pure pharmaceuticals. Manned intervention on a continuous basis is required in the development phases for such production processes. To quote an official of McDonnell Douglas Astronautics Company, a firm which is pioneering in this area, "the future size of the pharmaceutical manufacturing in space industry depends on having a manned US Space Station." (U)

- This Space Station would provide a system allowing changeable payload accommodations for commercial earth and ocean remote sensing instruments. (U)

- This permanently manned Space Station would provide unique national capabilities to conduct space-based scientific research in fields such as astrophysics, solar system exploration, earth science and applications, life sciences, materials processing and communications. (U)

* The result of this NASA assessment, "A NASA Capabilities Evaluation Document," was distributed as an attachment to the SIG(Space) Space Station Working Group Report.

- This Space Station would stimulate the development of new technology just as every previous technological undertaking of this magnitude has done. Much of this technology would be spun-off and utilized by the private sector for non-space-related endeavors here on earth. (U)

- Space Station research focused on extending man's stay-time in space could permit future manned exploration and exploitation. Thus, in the longer term, a Space Station would provide the necessary first step for future historical advances in space, such as a permanent lunar base, a manned mission to Mars, a manned survey of the asteroids, a manned scientific and communications facility in geosynchronous orbit, or a complex of advanced scientific and industrial facilities in low earth orbit. (U)

In conclusion, proponents believe:

- The time is right to begin the development of a Space Station venture as part of the nation's civil space program: the Space Shuttle--the key to providing routine access to space--is available, the technology is within reach, and the civil and commercial needs for it exist now. (U)

Discussion--Con's: Opponents of this option argue that a commitment now to a permanently manned civil Space Station would be premature and a serious error. There are major risks to making a commitment now to a permanently manned Space Station:

- There is a major risk that the estimated cost for the proposed program is understated because of the number of major related items not defined or costed, the "technology push" character of the program, the inflationary effects of the competition for resources in the industrial base, and the history of cost growth for other major space projects. The effect of cost growth (e.g., technical problems, schedule slips imposed by outside requirements, necessary enhancements) on programs of this magnitude would likely require abandonment of other priority activities or overall funding increases unacceptable to either the Administration or the Congress. (U)

- Regardless of the accuracy of the cost estimates, diversion of resources to pursue a permanently manned Space Station at this time could:

  - Threaten NASA's ability to satisfy the national priority of making the STS fully operational and cost effective. While the STS has been declared programmatically operational, the full range of capabilities required to make it fully operational or cost-effective have not been demonstrated. (U)

  - Threaten NASA's ability to adequately fund a balanced set of science, technology, and planetary exploration programs, as was the case during the STS development. (U)

- The justification for a Space Station presumes a large number of activities which are not yet approved or funded. This civil Space Station could adversely affect current and projected national security programs and priorities as well as other NASA programs. (U)

- The space-oriented segment of the industry is heavily committed to ongoing efforts. A large new program on the scale of the proposed manned Space Station would likely result in serious inflationary pressures as resources in short supply are placed in further competition. Also, important technical manpower resources could be diverted. The anticipated recovery of the commercial aircraft market will further increase this competitive pressure for fiscal and technological resources. (U)

- A commitment now to a civil Space Station could result in major problems later for both civil and national security programs. Although there are currently no national security requirements for a permanent Space Station, there would be inevitable pressures for national security programs to apply the civil Space Station capabilities to meet national security requirements that might be later defined. This would likely result in significant cost and schedule problems for both civil and military programs. (S)

- The justification for a civil Space Station is predicated upon several unsubstantiated assertions, thereby increasing the risk of a commitment now.

  - The projected mission model developed by NASA for this option does not reflect the lessons learned from the STS program. Initial projections of Shuttle launch requirements have so far decreased by 60%. If similar shrinkage is experienced in the Space Station mission model, the efficiency and effectiveness of the Space Station option would be seriously reduced; there is a significant risk that this shrinkage will occur. (U)

  - The contractor-developed mission model did not assume any fiscal restraint on the definitions of future missions and may have led to more Space Station missions than could be reasonably funded. (U)

  - The statement that a manned Space Station offers significant technology benefits is incomplete. Automated space programs may offer greater technology spinoffs than would be achieved by pursuing a manned Space Station program. (U)

  - The claim that the Space Station could enable extensive commercial exploitation of space by providing capabilities currently not available to the private sector is unsupported. The assertion that the contribution of man in space to the manufacturing process outweighs the high cost of supporting his presence is also not justified. (U)

- The utility, cost-effectiveness, and desirablity of servicing and repairing satellites in orbit has yet to be demonstrated. Nevertheless, it is not clear that a signficiant increase in capability to perform these functions would be afforded by a Space Station over the Shuttle. In fact, the Shuttle can go to a wide range of satellite orbits whereas these satellites would have to be brought to the Space Station. (U)

- There may be high risk in designing a capability to assemble and check out large space structures given our limited experience to date. It is premature to commit to an extensive development program for second generation construction and check-out missions before any demonstrations of the first generation capabilities have taken place with the Shuttle. (U)

- Many of the capabilities ascribed to this option are not unique to a permanently manned Space Station. Data has not been presented which makes clear which missions require permanent manned presence versus those that may be better supported by unmanned platforms. (U)

- It is not clear that many of the potential "opportunities" could justify the investment cost of the Space Station, especially if users had to ultimately bear a fair share of that cost. (U)

o The Presidential commitment to an accelerated program for a manned Space Station could define a "race" in which the U.S. would be widely perceived as having already lost. The Soviets have a Space Station on-orbit and plan to have a more advanced station in place well before any of the NASA program options. This is comparable to the situation the Soviets find themselves in with regard to the Shuttle where their version cannot be operational until years after the start of the highly publicized U.S. program. (U)

o NASA's interpretation that the Soviet manned space program is the primary challenge to U.S. civil leadership in space is overstated. The Soviet manned Space Station program appears to be driven, at least in part, toward manned involvement because of the lack of a technology base to support more complex automated systems. By contrast, U.S. objectives are being met through extensive reliance on highly successful, technologically advanced automated systems. (S)

- The suggested ultimate benefits from manned Space Stations, such as enabling national programs to establish a manned lunar base or a manned mission to Mars, would require additional resources far beyond those suggested in Option 1 and might be more efficiently enabled by other means. (U)

Option 2: Commit now to evolutionary development of expanded STS capabilities and unmanned platforms

This option begins a more evolutionary program that builds upon the capabilities of the Space Shuttle to understand better the role of man in space and the value of permanently manned space facilities. It is based on Scenario II which was identified as a possible approach for continuing the nation's manned space program in the Summary Report produced by the SIG(Space) Space Station Working Group. (U)

System Description--Major Elements: This option would continue the current Shuttle and Spacelab efforts and supplement them with additional evolutionary development. It would capitalize on our substantial investment in the present STS and develop a Power Extension Package (PEP) and associated orbiter improvements which would extend the Shuttle's on-orbit stay-time from seven to approximately twenty days. With the PEP, the extended duration Shuttle would have the capability to sustain a crew of four for a period of twenty days or a crew of six for ten days and could be available by 1990. (U)

This option also envisions the development of two man-tended platforms--one in a low inclination orbit and one in a polar orbit. These platforms would be operated in conjunction with the Space Shuttle with expanded on-orbit capability and could be available by 1990. (U)

This option presumes the availability of a Shuttle-based Teleoperator Maneuvering System (TMS) to provide the basis for satellite servicing, such as retrieval, simple repair, and deployment. (U)

The major cost of this option lies in the platforms at $1.0 billion for both. Estimates of the PEP costs are $300 million, bringing the total cost to approximately $1.3 billion with FY 1985 costs of $190 million. (U)

System Description--Possible Future Elements: Future enhancements, such as the development of a space-based reusable orbital transfer vehicle and an associated manned OTV service station for transfer of payloads to other orbits, could be achieved for approximately $8.4 billion. These enhancements would provide a transportation node to geostationary orbit and to planetary trajectories. (U)

The experience gained during this evolutionary expansion of manned space flight capabilities will develop a better understanding of man's value by extended interaction with the man-tended platforms, TMS, servicing, retrieval, repair and deployment of free-flying satellites, and possible OTV operations. (U)

Discussion--Pro's: Proponents of this option argue for this evolutionary and affordable approach that builds upon Space Shuttle capabilities to understand better the role of man in space and the value of permanent space facilities. Proponents of this option believe that:

- The extended duration Shuttle with its capability to reach a wide range of inclinations, together with the TMS, would allow the tending, servicing and simple repair of satellites, thereby

increasing the lifetime of expensive space assets and offering the flexibility to upgrade space systems as technology improves. (U)

- o The unmanned platforms, tended by the extended duration Shuttle, would allow changeable payload accommodations for long duration astrophysics missions, commercial earth and ocean remote sensing instruments, and long duration earth science and applications missions. (U)

- o Research on materials processing in space, which currently requires extensive manned interaction, could be enhanced by longer duration Shuttle sortie flights. Future space-based automated production facilities could be tended by the extended duration Shuttles. (U)

- o Continued use of the Shuttle and Spacelab would explore the advantages of man in space for achieving civil and national security objectives. The enhancements which would extend the Shuttle stay-time in orbit, together with a Teleoperator Maneuvering System, would help evaluate man's role in satellite inspection, servicing, and repair. (U)

- o This option will permit better definition of requirements and utility of manned interaction and potentially lead to a permanent manned presence in space. (U)

  - For example, an augmented Shuttle, Teleoperator Maneuvering System, and space platforms could all be complementary parts of a permanently manned Space Station that would have value to both satisfaction of civil needs and definition of potential national security requirements. The platforms could provide for laboratory studies, earth resources observation, and space manufacturing processes that would not necessarily require man's continuous presence. (U)

  - If national security requirements were later established as a result of further understanding of man's role in space, the investment in the program up to that time would be convertible into usable sub-elements of a permanently manned Space Station. By that time, technologies leading to firm system design for a permanently manned Space Station would be more mature and the option for it becoming a viable national (as opposed to purely civil) asset would be significantly enhanced. (U)

  - An evolutionary approach would meet the objectives of the President's space policy and be consistent with the Administration's other fiscal and national security objectives. (U)

Discussion--Con's:

- o NASA believes that this option, although technically feasible, would not represent an effective use of USG resources. The vast majority of existing and projected civil and commercial space needs are best

satisfied by Option 1. The number of these needs that are better served by Option 2 is small. Given the dearth of civil and commercial requirements, NASA believes that it would be necessary to justify a budget request for Option 2 on the basis of national security requirements. (U)

- This option would not improve on the U.S. understanding of man's permanent role in space. It provides only 20-day increments of stay-time on orbit. Understanding man's permanent role requires that man live and work in the space environment for long periods of time. Man must have the support facilities, perform the experiments and do the work which will teach him about living in space. Only a permanently manned Space Station satisfies these requirements. With this option we would be unlikely to advance our understanding of man's role much beyond what we were able to learn in Skylab or what we are learning in the current Shuttle/Spacelab program. (U)

- The expanded Shuttle capabilities provided by this option are not comparable, either with respect to scope or cost, to the capabilities provided by Option 1. Although many things could be done utilizing these expanded Shuttle capabilities, the system would fall far short of satisfying the full range of civil and commercial needs that have been identified and projected for the rest of the century. The primary reason is that this option does not provide the manned interaction with payloads over long durations which is critical in many areas. (U)

- Materials processing operations require long-duration, uninterrupted time on-orbit with extensive manned interaction. Such missions could not be accommodated by this option. Only a limited amount of research could be accomplished on Shuttle flights. These constrained R&D missions could provide early precursor equipment development leading to eventual product capability. However, the full commercial potential of materials processing in space could not be developed with intermittent missions that cause much lost time and require the expense of re-integrating and relaunching of the instruments for short periods of experimentation. (U)

- Life sciences missions require extended, uninterrupted time on-orbit with extensive crew involvement. These missions could not be fulfilled by this option. Precursor experiments could be accomplished as sortie missions on the Shuttle. The long-term objectives of life sciences missions could only be accomplished with a permanent manned orbiting facility. (U)

- Satellite servicing missions could be accomplished in this option with the Shuttle and the TMS but not as efficiently or cost-effectively as on a Space Station. However, the servicing equipment would have to be brought to orbit on Shuttle flights planned for each mission, thus increasing the cost of such missions. (U)

- This option, because it will tie up Shuttles on-orbit for extended periods of time, may impact the ability of the Space Transportation System to meet its launch requirements. Because of the critical nature of Shuttle launch services, it must be recognized that a potential hidden cost in this option is the purchase of at least one additional Orbiter at approximately $1.5 billion. (U)

Option 3: Defer commitment to either Option 1 or Option 2 pending additional definition of requirements, costs, and risks

Description. This option requires the development of better documentation on Space Station missions and the utility of man in space before major hardware commitments are made. It would also require that a Space Station decision be put in context with other major new space- related activities such as defense against ballistic missiles and future space systems survivability enhancements. (U)

Discussion--Pro's: The proponents of this option believe:

- A Space Station decision should not be made before the results of the pending national security studies, e.g., defense against ballistic missiles, future space system survivability enhancements, are completed. A premature decision to make a major commitment to a civil Space Station may preclude the ability to fund these potentially higher priority initiatives.

- This option would avoid the major risks associated with Option 1.

  - It would permit the better definition required to improve confidence in the cost estimates for a manned Space Station. The better the definition before a program commitment, the less likely will be the risks of significant subsequent cost growth. (U)

  - By deferring a commitment now, NASA can continue to focus on its top priority--making the Shuttle fully operational and cost effective. This continued focus on the Shuttle would also permit experience to be gained with man-intensive operations (e.g., Solar Maximum Mission retrieval, deployment and retrieval of large national security payloads). (U)

  - It would provide more time to explore potential future national requirements before making a commitment to a specific system configuration. This could avoid the potential major costs to both the Space Station and national security programs of later modifying the Space Station if future national security needs are identified. (U)

- The challenge from the Soviet manned space program is not a race in time; it is a competition to achieve the best capability. While they can deploy an advanced Space Station before the U.S., our technological superiority will allow us to achieve a superior capability only if we take the time now to carefully define our

objectives. (U)

- The capability selected now for a manned Space Station will define the space infrastructure into the next century. It is vitally important that our decisions now be based on the best possible information.

Discussion--Con's:

- NASA is ready to begin the development of a Space Station. The Shuttle, always envisioned as a precursor to a Space Station, is now available. The technology requirements are understood and research is under way. Most importantly, the Space Station is needed to satisfy the full range of existing and projected civil and commercial space needs for the rest of the century. (U)

- NASA believes that the undertaking of a civil Space Station is not premature, but rather will provide an important resource for the national security community. The civil Space Station would provide a facility in being for future national security activities at such time that the national security community develops requirements for a manned presence with unlimited stay-time in orbit. That the Soviets have defined their own national security requirements and are meeting them now with an operational system suggests that future U.S. national security requirements will emerge and will need to be satisfied. In the meantime, Americans will be learning how to live and work in space. (U)

- After several years of uncertainty in the previous Administration, the nation's civil space program has now built up substantial momentum. A Space Station will maintain this all-important momentum. A decision now to defer the station's development will damage this momentum. It will act as a brake upon the entire civil program and upon U.S. space commercialization efforts. It will send the wrong signals abroad with respect to U.S. commitment to space leadership and technological superiority. (U)

- Self-generated international interest in a U.S. Space Station has led Europe, Japan and Canada to earmark close to $5 million of their own funds for independent planning studies. They are now approaching major decision points on their own space activities for the next decade. In each case, collaboration on Space Station is juxtaposed against the undertaking of large, competitive national programs. Delay in our proceeding with a Space Station could have the effect of precluding significant international investment in our program, and diverting foreign space expenditures into competing efforts. (U)

- In announcing our National Space Policy on July 4, 1982, President Reagan asserted that "we must look aggressively to the future by demonstrating the potential of the Shuttle and establishing a more permanent presence in space." On April 11, 1983, he personally

directed a study to serve as the basis for a decision on whether or not to proceed with the NASA development of a permanent manned Space Station. NASA is ready to respond to the President. Further study of this issue is not required. The nation has been in space for 25 years and it is this President's opportunity to take the next major step forward. (U)

Dick Johnson
12/6/83

Talking Points - SOU

Manned Lunar Station

1. Manned Lunar Station by Year 2000

   - Build on Apollo experience
   - Utilize Space Shuttle capabilities
   - Use and stimulate advanced technologies
   - Conduct research and exploration

2. Initiate (today) a Lunar Mapping Mission

   - Complete the mapping of the surface of the moon, including polar regions.
   - Basis for station site selection

3. Appoint a Vice Presidential Commission

   - Representatives from industry, universities, and government
   - Recommend science and exploration goals
   - Recommend mission concepts, approaches, and milestones.

Dick Johnson
12/7/83

TALKING POINTS

Budget Features of Manned Lunar Station (MLS)

NASA SPACE STATION

I. MLS Costs are Low for Next 4~~5~~ Years (ROM 1984 $)

235 M$ FY-85: 40 M$ (Polar Lunar Mapper (PLM) and initial Concept Studies)

300 m$ FY-86: 80 M$ (PLM + Phase A Concept Studies)

1.3 B$ FY-87: 600 M$ (PLM + Phase B Systems Studies)

2.3 B$ FY-88: 1.5 B$ (PLM, Phase B Studies, Advanced Developments)

3.2 B$ FY-89: 3.0 B$ (PLM, Advanced Developments, Systems Hardware)

II. Total MLS Costs (ROM 1984 $)

- o Modular Station - 6-12 people initially
- o 40-60 B$
- * o Commercialize Low-Earth Orbit (LEO) Transfer Station (not manned)
- * o Automated Lunar Freight System (not manned)
- o Man-rate only Lunar Passenger System and MLS

III. International Participation and Cost Sharing

- o U.S. retain LEO Station and Lunar Freight System activities
- o Consider sharing costs of Lunar Passenger System and Manned Lunar Station with European Common Market countries and Japan
- o Participation and cost sharing of lunar research activities with many countries.

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