

Originally Processed With FOIA(s):
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FOIA Number:
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OA/ID Number: 62086
Folder ID Number: 62086-006

Folder Title:
Physical Sciences: National Academy of Sciences/National Research Council - Space Studies Board
[1991]

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"CORRESPONDENCE TRACKING"

TYPE: For Your Information

DOCUMENT NUMBER: 9120814

FROM: TRULY, Richard; NASA

TO: DAB

DATE OF
CORRESPONDENCE: 03/15/91

SUBJECT: Initial response to NRC's paper on Life Sciences and
Materials Science Capabilities aboard the Redesigned
Space Station

ASSIGNED TO: D.A. Henderson

ACTION REQUIRED: None

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED: 03/21/91

COPIES TO: Rachel Levinson

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 03/20/91
DATE RECEIVED DLS: 03/21/91

FILE: SPACE

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9120814

FROM: TRULY, Richard H.: NASA

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 03/15/91

SUBJECT: AN INITIAL RESPONSE TO THE NATIONAL RESEARCH
COUNCIL'S PAPER ON LIFE SCIENCES AND MATERIALS
SCIENCE CAPABILITIES ABOARD THE REDESIGNED SPACE
STATION.

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
Dr. Wong
Life Sciences

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 03/20/91

FILE: SPACE



National Aeronautics and
Space Administration

Washington, D.C.
20546

Office of the Administrator

9120914

RECEIVED

31 MAR 20 March 15 1991
4:36

OFFICE OF THE
DIRECTOR

The Honorable D. Allan Bromley
Assistant to the President
for Science and Technology and
Director, Office of Science and
Technology Policy
Executive Office of the President
Washington, DC 20506

Dear Dr. Bromley: *Allen*

As I promised on the telephone this morning, we developed the enclosed material as an initial response to the National Research Council's paper on life sciences and materials science capabilities aboard the redesigned Space Station.

Our aim was to satisfy congressional budget restraints, honor international commitments and maintain the long-term capability to meet user requirements. We believe the Station redesign does this.

Sincerely,

Richard H. Truly
Richard H. Truly
Administrator

Enclosure

NASA COMMENTS ON THE SPACE STUDIES BOARD REPORT

The basic premise of the Space Station Freedom restructuring was that the Congressionally mandated constraints on budget runout and the International Agreements with Europe, Japan, and Canada, would not be violated.

Having done that, the basic design, timing of Permanent Manned Capability, and priorities for science, applied research, and technology utilization of the Station were effectively determined.

The Space Studies Board concerns would require that NASA violate one or both of the basic premises in order to effect the changes implied by their recommendations. NASA does not unilaterally possess the authority, nor does it believe it is appropriate, to take such action.

NASA believes that the restructured Space Station, during its evolution, will meet the requirements of the principal scientific research for which it is intended, and that it will provide for world-class research in microgravity and life science.

The Space Studies Board listed a number of specific criticisms of the restructured Space Station. In most cases these criticisms are an inaccurate reflection of the Station's current or planned capabilities. The attached comments address specific points made by the Boards' subcommittee reports.

SPACE BIOLOGY AND MEDICINE RESEARCH REQUIREMENTS

The Committee on Space Biology and Medicine and the Space Studies Board conclude that Space Station Freedom, in its present redesigned form, will be inadequate to meet the requirements for space biology and medicine research described above because of the following:

1. *The plan to share limited power among multiple users in all laboratory modules suggests that there will be insufficient power to conduct the volume of long-term biological experiments required to support a human space exploration initiative.*
 - An analysis of the life sciences power requirements indicates that the life sciences share of the OSSA projected 65% allocation allows the full utilization of the proposed life sciences experiment hardware during all phases of operation.
 - At PMC and beyond, power equates to more than the power provided to three simultaneous dedicated Spacelab module missions, such as SLS-1.
2. *Plans for the size and location of a centrifuge and of animal-holding facilities are insufficiently defined for proper evaluation. As emphasized in the Boards 1987 strategy report, an adequate centrifuge is essential to provide a 1-g control for 0-g experiments and also to explore the adequacy of artificial gravity for long-duration spaceflight.*
 - The Space Station Freedom Program Requirement Definition (PRD) document has accepted a baseline requirement for a 2.5 meter centrifuge and the associated animal holding facilities on the Station. Options for specific location and accommodations are still being evaluated.
 - The Japanese module has both the proper plumbing and space for a 1.8 meter centrifuge.

3. *The proposed crew size is insufficient to conduct the requisite experiments in a reasonable time period.*

- The reduction to an initial crew size of four from the eight previously baselined will necessarily extend the time required to develop appropriate statistics on areas related to long-term exposure to the space environment.
- The inherent capability to restore crew size to eight after PMC has been retained in the restructured Space Station and its implementation is paced only by budget availability.

4. *The absence of a dedicated life sciences laboratory will prohibit some experiments and will severely restrict most others, prolonging the acquisition of data required to answer fundamental questions related to the feasibility of long-duration human space exploration.*

- We are unaware of any validated science rationale which can only be met by a dedicated laboratory for life sciences.
- We are aware of proximity requirements for selected life sciences suites of instruments and those requirements are being met.

MICROGRAVITY RESEARCH REQUIREMENTS

The redesigned Space Station Freedom would be inadequate to meet the requirements of microgravity science and applications because it lacks the following:

1. *A low, quiescent acceleration environment unhampered by crew activities, docking maneuvers, and other system activities necessary to sustain a permanently occupied presence.*
 - The National Academy of Sciences Report of the Committee on a Commercially Developed Space Facility, 1989, found ". . . that over 85 per cent of the proposed [*microgravity sciences*] experiments could be accommodated in a 16-day mission, and that a 28-day mission would accommodate virtually all of the remainder. Experiments or processes needing on-orbit duration greater than presently available include such things as a biotechnology research with living cells and crystal growth."
 - During the Man Tended phase of Space Station utilization, periods of up to 45 days will be available and provide a quiescent microgravity acceleration environment unhampered by crew activities and docking maneuvers.
 - Post-PMC, the baselined Station specification for the restructured Station will provide a microgravity environment for periods of up to 30 days free of significant disturbances .
 - The Space Station program has baselined a U.S. Laboratory Acceleration Mapping System which allows for monitoring and will facilitate control of the acceleration environment. Additionally, the Station has committed to implementing a vibro-acoustic control plan.

2. *A crew that would spend sufficient time working with the experiment equipment.*

- During Man Tended phase utilization flights a dedicated payload crew of up to four will be available to operate with experiments.
- Inherent capability to restore crew size to eight after PMC has been retained in the restructured Space Station and its implementation is paced only by budget availability.
- However, even beyond PMC when a crew of eight could be available, dedicated experiment crew time will still be one of Space Station's most precious resources.

3. *Sufficient power, data-handling capabilities, and research volume.*

- An analysis of the microgravity sciences power requirements indicates that the microgravity sciences share of the projected OSSA 65% allocation allows the full utilization of the proposed microgravity sciences experiment hardware.
- As a minimum, the data handling and down link capabilities of the restructured station equals or exceeds the current Spacelab capability.
- The inherent capability to restore a 300 mbps data handling system after PMC has been retained in the restructured Space Station, is still a high priority, and its implementation is paced only by budget availability.
- However, on-orbit data storage and processing for user payloads remain unresolved issues which are subjects of continuing study.
- The inherent capability to restore the Station to the full volume of user laboratory racks previously baselined has been retained in the restructured Space Station in the form U.S. Laboratory B (which offers 12 additional U.S. user payload racks) and its implementation is paced only by budget availability.

4. *The flexibility to upgrade systems; this deficiency is especially disconcerting in the area of computers, in which obsolescence is extremely rapid.*

- Current station design has incorporated state of the art data standards (e.g., Fiber Distributed Data Interface - FDDI). This basic fiber optic system is capable of handling higher data rates with future upgrades in terminating hardware, data handling and computational systems.
- Modularity of experiment and infrastructure systems will be applied to both payload and station design/utilization.

Other Issues

"During the crew-tended phase, NASA plans to fly Spacelab experiment hardware on the Space Station Freedom because other, newer hardware will not be available. Most of this Spacelab hardware will require manual intervention and therefore will be operable only when people are present."

- During the initial man tended phase of Space Station (1997 - 98), NASA plans to fly hardware developed for Spacelab to support peer-reviewed science investigations that continue into this timeframe. The transition to station is evolutionary, as is the science performed in space. Accommodating this class of hardware on the restructured Station during the initial utilization period precludes discontinuities in the science program were NASA to stand down to retool for the new spacecraft.

"Unfortunately, the crew-tended phase is a time when significant acceleration disturbances will exist due to concurrent hardware integration and assembly and construction activities. Therefore, the man-tended phase will not be suitable for many microgravity experiments."

- The concept of utilization flights during the assembly sequence of Space Station was to ensure that the science, applied research, and technology activities during the man tended phase were distinct and isolated from the construction and verification activities. This promotes efficiencies in utilization during the assembly period, while providing continued research in space as we transition from Spacelab to Space Station.

"Document Control"

TYPE: Information DOCUMENT NUMBER: 9129183
ORIGINATOR: 03 STATUS DIRECTORATE STATUS C

FROM: Frank Press; NRC

TO: D. Allan Bromley

DATE OF
CORRESPONDENCE: 03/14/91

SUBJECT: Sending a position paper prepared by the NRC's Space
Studies Board on the recent redesign of Space
Station Freedom for review and discussion.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED: Karl Erb

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

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FILE: PS-NAS/NRC-SPACE STUDIES BOARD
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183
NATIONAL RESEARCH COUNCIL

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01 MAR 15 10:08

March 14, 1991

OFFICE OF THE CHAIRMAN

OFFICE OF THE
DIRECTOR

Dr. D. Allan Bromley
Assistant to the President
for Science and Technology
Old Executive Office Building
17th Street & Pennsylvania Avenue NW
Washington DC 20506

Dear Allan:

I am forwarding a position paper prepared by the National Research Council's Space Studies Board on the recent redesign of Space Station Freedom—specifically, the suitability of that redesign for space research. The Board evaluated the results of this redesign effort, as presented by NASA space station officials, in the context of published Board research recommendations. The evaluation was conducted by the Board and its discipline committees in microgravity research and space biology and medicine. The enclosed cover letter addressed to Admiral Truly provides a brief history of the evolution of the statement.

We look forward to the opportunity to discuss this report with members of the OSTP, OMB, and Space Council staffs tomorrow morning.

Yours sincerely,



Frank Press
Chairman

Enclosures

SPACE STUDIES BOARD POSITION

ON

PROPOSED REDESIGN OF SPACE STATION FREEDOM

SUMMARY

The United States has contemplated for many years the construction of a space station that would further a variety of national goals, one of which is space science and applications. The recent report of the presidentially appointed Advisory Committee on the Future of the U.S. Space Program, chaired by Norman Augustine, recommended that the development of a U.S. space station with research facilities must give top priority to life sciences research, with microgravity research assuming a significant but secondary role.¹ The Board notes that this recommendation is fully consistent with the 1983 Space Studies Board position on the space station, as well as with the 1988 National Academy of Sciences/National Academy of Engineering report to then newly-elected President Bush.^{2,3} *In the judgment of the Board, Space Station Freedom, at the present stage of redesign, does not meet the basic research requirements of the two principal scientific disciplines for which it is intended: (1) life sciences research necessary to support the national objective of long-term human exploration of space, and (2) microgravity research and applications.* This conclusion as to the station's research capabilities is based upon an assessment of its redesign as of March 1991.⁴ Attachments 1 and 2 summarize the research requirements for space biology and medicine and for microgravity research and their relationship to the redesigned space station.

The Space Studies Board's membership is not constituted such that it can provide an engineering judgment on the feasibility of the redesign, and therefore has not done so.

RESEARCH RETURN ON TAXPAYER INVESTMENT

The Space Studies Board considered the quantity and quality of research that might be conducted on the proposed redesigned space station in the context of the level of investment that will be required to bring it to completion. The Board believes that neither the quantity nor the quality of research that can be conducted on the proposed station merits the projected investment. As redesigned, a maximum of \$2.6 billion per year would be expended on the station to achieve an initial crew-tended capability by the mid-1990s, not including associated Space Transportation System and user costs.⁵ Additional funding at a comparable rate of expenditure would be required to achieve a permanently occupied capability late in the decade. In the initial, crew-tended configuration, the redesigned station would be devoted primarily to microgravity research. Life sciences research unique to the space station would not begin until the end of the decade, when the permanently occupied configuration would be established. For comparison, the 1991 NASA budget allocates roughly \$102 million to microgravity research. In other words, during each of the next five years, the amount of funding devoted to space station construction for microgravity research would be approximately 20 times the level of the current research program for this discipline. In addition, the monthly cost of constructing the redesigned station would approach the annual total funding devoted to both NASA's life sciences and microgravity science and applications divisions during the current fiscal year.

SPACE RESEARCH REQUIREMENTS, OPPORTUNITIES, AND ALTERNATIVES

Life Sciences Research

The Augustine Committee recently concluded that the primary objective of a space station should be life sciences research.¹ The Space Studies Board strongly endorses the position that a space-based laboratory is required to study the physiological consequences of long-term space flight.^{7,8} The Board notes that many of the fundamental problems in life sciences research involve a long period of time for their pursuit and solution. In its present form, the redesigned space station does not provide the facilities required for such research. (See Attachment 1.)

Microgravity Research

In the judgment of the Board, the limited microgravity research that could be conducted on the redesigned space station as currently proposed does not merit the investment. If such funds were made available, the research community would likely choose to spend them in a very different way. (See Attachment 2.) The Board believes specifically that more research progress could be achieved in a shorter period of time and at a fraction of the cost through an expanded program of Spacelab missions and of free-flyer experiments.^{6,8,9}

NATIONAL GOALS AND THEIR ACHIEVEMENT

In conclusion, the SSB recognizes that there are national considerations for building a space station other than scientific research. Included among these are the possibilities of enhancing international prestige, stimulating the nation's educational achievement, stimulating the U.S. technology base, and supporting a long-term human space exploration initiative.

In the judgment of the Board, the proposed redesign of Space Station Freedom does not meet the stated national goal of enabling the life sciences research necessary to support extended human space exploration, nor does it meet the stated needs of the microgravity research community—most of whose goals could be achieved in both a more timely and more cost-effective manner by alternative means. Continued development of Space Station Freedom, as currently redesigned, cannot be supported on scientific grounds. If the present station redesign is implemented, this major national investment must be justified on the basis of considerations other than research in these two disciplines.

ATTACHMENT 1

SPACE BIOLOGY AND MEDICINE RESEARCH REQUIREMENTS

Requirements for conducting space biology and medicine research are described in detail in the 1987 report, *A Strategy for Space Biology and Medical Science for the 1980s and 1990s*.⁷ The major goals established in that report for this area of research are:

- a. "To describe and understand human adaptation to the space environment and the readaptation upon return to Earth."
- b. "To use the knowledge so obtained to devise procedures that will improve the health, safety, comfort, and performance of the astronauts. Specifically, we must improve our understanding of the microgravity induced alterations in physiologic and psychological processes as well as effects of radiation before long duration human exploration can be safely and effectively pursued."

Critical Requirements for Conducting Space Biology and Medicine Research

The Board's 1987 report⁷ emphasizes that a space station is **pivotal** to the conduct of life sciences research, and it documents the following as critical requirements for a space station:

1. A dedicated life sciences laboratory with adequate scientific crew to conduct research.
2. A variable speed centrifuge of sufficient radius to accommodate small primates.
3. Sufficient numbers of experimental subjects (humans, plants and animals) to address the stated scientific goals.
4. Sufficient laboratory resources, i.e., power, equipment, space, and atmosphere, to support the above research requirements.

The Space Studies Board's Committee on Space Biology and Medicine, and the Board itself wish to emphatically emphasize that the above requirements are absolutely fundamental to the acquisition of the data necessary to determine the feasibility of long-term human space exploration.

Inadequacy of the Redesigned Space Station Freedom for Space Biology and Medicine Research Requirements

The Committee on Space Biology and Medicine and the Space Studies Board conclude that Space Station Freedom, in its present redesigned form, will be inadequate to meet the requirements for space biology and medicine research described above because of the following:

1. The plan to share limited power among multiple users in all laboratory modules suggests that there will be insufficient power to conduct the volume of long-term biological experiments required to support a human space exploration initiative.
2. Plans for the size and location of a centrifuge and of animal-holding facilities are insufficiently defined for proper evaluation. As emphasized in the Board's 1987 strategy report⁷, an adequate centrifuge is essential to provide a 1-g control for 0-g experiments and also to explore the adequacy of artificial gravity for long-duration spaceflight.
3. The proposed crew size is insufficient to conduct the requisite experiments in a reasonable time period.
4. The absence of a dedicated life sciences laboratory will prohibit some experiments and will severely restrict most others, prolonging the acquisition of data required to answer fundamental questions related to the feasibility of long-duration human space exploration.

ATTACHMENT 2

MICROGRAVITY RESEARCH REQUIREMENTS

The National Research Council, as well as several NASA advisory committees, has published reports over the years that specifically address the minimum research requirements for this field of space research.^{6,8,9}

The Space Studies Board's Committee on Microgravity Research has advised the Board that, unlike research in the field of space biology and medicine, only a limited amount of the desired research in microgravity, at least over the next decade, can best be accomplished with a space station. The use of crew-tended free-flyers, drop towers, extended duration Spacelabs, and so forth, offer adequate, and in fact more viable, opportunities for the research needs in many cases. There are, however, important experiments requiring measurements and human observation and interaction over extended periods of time. The space station is a means to provide this capability. *If plans proceed to conduct microgravity research on the redesigned Space Station Freedom, the Board and its Committee on Microgravity Research recommend that adequate provisions be made for supporting only those microgravity research questions that can best be addressed using a space station.*

The following minimum facility requirements for microgravity research aboard a space station are based on the conclusions and recommendations described in the cited reports and on recent briefings presented to the Committee on Microgravity Research and the Space Studies Board.⁴

Critical Requirements for Conducting Microgravity Research on a Space Station

1. Adequate power, research volume, and support space.
2. Skilled on-board scientific personnel in sufficient numbers to carry out experiments and to diagnose and correct malfunctions.
3. Suitable acceleration environment and adequate monitoring.
4. Affordable de-integration and re-integration of experiments on orbit.
5. Capability to integrate advanced techniques and instrumentation as these become available.
6. Fast turnaround for specimens that must be characterized on Earth.

Inadequacy of the Redesigned Space Station Freedom for Microgravity Research Needs

The redesigned Space Station Freedom would be inadequate to meet the requirements of microgravity science and applications because it lacks the following:

1. A low, quiescent acceleration environment unhampered by crew activities, docking maneuvers, and other system activities necessary to sustain a permanently occupied presence.

2. A crew that would spend sufficient time working with the experiment equipment (See Attachment 1, item 3.).
3. Sufficient power, data-handling capabilities, and research volume (see Attachment 1, item 1).
4. The flexibility to upgrade systems; this deficiency is especially disconcerting in the area of computers, in which obsolescence is extremely rapid.

Other Issues

During the crew-tended phase, NASA plans to fly Spacelab experiment hardware on the Space Station Freedom because other, newer hardware will not be available. Most of this Spacelab hardware will require manual intervention and therefore will be operable only when people are present. Unfortunately, the crew-tended phase is a time when significant acceleration disturbances will exist due to concurrent hardware integration and assembly and construction activities. Therefore, the man-tended phase will not be suitable for many microgravity experiments. Only a limited number of experiments could be run during the free-flying mode between shuttle visits during the crew-tended phase.

If the bulk of the microgravity research program planned for Freedom were removed, the station would then be devoted almost exclusively to life sciences research. The benefits of this action would be that (a) the g-level on the station would not have to be strongly controlled, thus resulting in significant cost savings, (b) some low-gravity experiments (e.g., fluids handling, fire safety) could still be done on the space station, and (c) the bulk of the microgravity program could be conducted using independent, more cost-effective facilities.

ENDNOTES

1. *Report of the Advisory Committee on the Future of the U.S. Space Program*, Superintendent of Documents (GPO) December, 1990.
2. Space Science Board Assessment of the Scientific Value of a Space Station and letter to NASA Administrator James Beggs, September 9, 1983. See also Space Studies Board, Testimony to U.S. Senate Subcommittee on Science, Technology and Space, May 10, 1990.
3. *Toward a New Era in Space--Realigning Policies to New Realities--Recommendations for President-Elect George Bush*, Committee on Space Policy, NAS/NAE (NAP) 1988.
4. Briefing to Committee on Microgravity Research, William Taylor, Chief Scientist, Space Station Freedom, January 10, 1991. Briefing to Committee on Space Biology and Medicine, William Taylor, Chief Scientist, Space Station Freedom, February 8, 1991. Briefing to Space Studies Board, William Raney, Special Assistant, Space Station Freedom, and John-David Bartoe, Deputy Director, Space Station Freedom Operations and Utilization, February 28, 1991.
5. Conference Report 101-900, HUD and Independent Agencies, FY 1991.
6. *Microgravity Science and Applications--Report on a Workshop*. Panel on Microgravity Science and Applications, Solid State Sciences Committee, Board on Physics and Astronomy (NAP) 1986. *Review of Microgravity Science and Applications Flight Programs*, Committee To Review the Microgravity Science and Applications Flight Program, USRA, January-March, 1987. Space Studies Board Workshop on Microgravity Research, NAS Beckman Center, January 16-17, 1989.
7. *A Strategy for Space Biology and Medical Science for the 1980s and 1990s* (NAP) 1987. *Space Studies Board Assessment: Space Biology and Medicine Research--1990* (in press). Space Studies Board/Committee on Space Biology and Medicine, letter to Andrew Stofan, Associate Administrator, Office of Space Station, NASA Headquarters, July 21, 1987. Space Studies Board/Committee on Space Biology and Medicine, Testimony to the U.S. Senate Subcommittee on HUD Appropriations, May 1, 1987.
8. Space Studies Board letter to Joseph Alexander, Assistant Associate Administrator, Office of Space Science and Applications, NASA Headquarters, December 12, 1990. *Space Station Summer Study Report*, SESAC Task Force on Scientific Uses of a Space Station, NASA, March, 21, 1985. *Space Station Summer Study Report*, SESAC Task Force on Scientific Uses of a Space Station, NASA, March, 1986.
9. *Materials Processing in Space*, Committee on Scientific and Technological Aspects of Materials Processing in Space, Space Applications Board, (NAS) 1978. *Industrial Applications of the Microgravity Environment*, Space Applications Board (NAP) 1988.

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Executive Secretary

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Joyce M. Purcell
Executive Secretary

NATIONAL RESEARCH COUNCIL
COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND APPLICATIONS

2101 Constitution Avenue Washington, D.C. 20418-0001

SPACE STUDIES BOARD

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March 14, 1991

Rear Admiral Richard H. Truly (Ret.)
Administrator
National Aeronautics and Space Administration
Code A
Washington, D.C. 20546

Dear Admiral Truly:

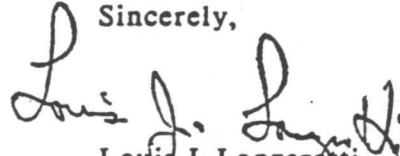
As you know, the research utilization of a manned U.S. space station has been a subject of considerable interest to the Space Studies Board since the inception of the program. In a letter to Mr. Beggs in 1983, the Board expressed reservations about the national requirement for a manned station for supporting space science, other than life science. Since that time, station planning and design have evolved rapidly.

Beginning in late 1990, and particularly after the release of the Augustine Report and its recommendations for development of a U.S. space station, two of the Board's discipline committees have become increasingly concerned about the research capabilities of the station as redesigned under the Congressional mandate. In addition, the Board itself has expressed concern as to whether the redesigned station will adequately support the research required to make important national decisions about long term human spaceflight. The Committee on Microgravity Research and the Committee on Space Biology and Medicine were briefed by space station officials on redesign ground rules and guidelines on January 10 and February 8 of this year, respectively. On February 28, the full Board was briefed on the preliminary results of the redesign study, with the chairmen and several key members of the two committees in attendance. The briefing officials from the space station office were most generous with their time and very frank in their discussions. We thank them for their efforts. Based on this briefing and on known research requirements cited in the attached assessment, the consensus of the Board was that the inadequacy of the redesign in its present state for research was sufficiently grave that a formal Board statement expressing these views to you was in order. Please note that the Board did not formulate and does not express any opinion on the engineering feasibility of the present redesign, nor does the Board address possible reasons other than space research for proceeding with the redesigned station.

Admiral Truly
March 14, 1991
Page 2

Enclosed is the assessment that resulted from the deliberations of the full Board, reflecting the participation of the two discipline committees. I will be happy to discuss with you any questions you might have about the Board's conclusions or the supporting rationale. We all share a common commitment to a vigorous and forward-looking national civil space research program.

Sincerely,



Louis J. Lanzerotti
Chairman

Enclosure

cc: The Vice President J. Danforth Quayle, Chairman, The National Space
Council
M. Albrecht
D.A. Bromley
R. Grady

cc (Enclosure only): Chairs and Ranking Minority Members of Congressional
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DIRECTORATE STATUS C

FROM: Louis Lanzerotti; Chairman of Space Studies Board

TO: D. Allan Bromley

DATE OF
CORRESPONDENCE: 03/29/91

SUBJECT: Forwarding the final position of the NRC's Space
Studies Board on the space station and an original
issue of the Board newsletter.

DIRECTORATE

STAFF

ASSIGNED:

ASSIGNED: Karl Erb

ACTION

STAFF

REQUIRED:

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO:

WHITE HOUSE TRACKING #:

CONTACT PERSON:

PHONE:

EXT:

REMARKS:

OSTP RECEIVED:

DEPT RECEIVED: 04/10/91

FILE: PS-NAS/NRC-SPACE STUDIES BOARD

CENTRAL FILES:

7/2/91 185

NATIONAL RESEARCH COUNCIL
COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND APPLICATIONS
2101 Constitution Avenue Washington, D.C. 20418-0001

SPACE STUDIES BOARD

91 APR 10 10:00

March 29, 1991

OFFICE OF THE
DIRECTOR

Office Location:
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The Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
Old EOB, Suite 358
17th St. and Pennsylvania Ave., N.W.
Washington, D.C. 20506

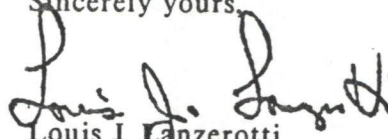
Dear Mr. Bromley:

In its capacity as the National Research Council's principal standing advisory body concerning the civil space research program, the Space Studies Board recently released the enclosed position on the currently proposed space station. The position was forwarded to NASA's Administrator, Admiral Richard Truly, and the Chairman of the National Space Council, Vice President Dan Quayle, on March 14, 1991.

Also enclosed you will find the original issue of our new Board newsletter. Our intention is to issue it approximately quarterly to keep members of the space policy and space research communities up to date on our Board's activities.

If you have any questions about the background for the Board's position or the contents of the position itself, or any suggestions for the newsletter, please contact the Space Studies Board at 202/334-3477.

Sincerely yours,


Louis J. Lanzerotti
Chairman

LJL/mg