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Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: General Science Files

OA/ID Number: 62045
Folder ID Number: 62045-005

Folder Title:
Physical Sciences: Space [1992]

Stack:	Row:	Section:	Shelf:	Position:
	0	0	0	0

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9203035
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: REIS, Victor H.: DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 10/06/92

SUBJECT: HE IS FORWARDING A COPY OF THE DEFENSE SCIENCE
BOARD'S STUDY OF THE NATIONAL AEROSPACE PLANE
PROGRAM.

DIRECTORATE STAFF
ASSIGNED: D. Allan Bromley ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 10/22/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: PHYSICAL SCIENCES
NATIONAL SECURITY

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS: REPORT IS SENSITIVE, AND IS WITH DR. BROMLEY.

*No action necessary!
Close out!*

OSTP RECEIVED: 10/06/92 DEPT RECEIVED:
FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:



DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

WASHINGTON, DC 20301-3010

6 OCT 1992

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

Dear Dr. Bromley: *Allan*

I appreciate your interest in the Defense Science Board's study of the National Aero-Space Plane Program. In response to your request, I have attached a copy of the DSB Report for your personal review. I would make note of the fact that this report is the advice of the DSB, and not necessarily the position of the Department.

You are welcome to cite the technical assessments, findings and recommendations in the report as you deem necessary, but I must respectfully request that access to the report be limited to you and your staff and that the report not be reproduced.

I hope the report is useful as you consider the NASP Program and its important research and technology objectives.

Sincerely,

Victor H. Reis
Victor H. Reis

Enclosure

cc:
Secretary of the Air Force
NASA Administrator
DSB Chairman
NASP JPO

FAX: _____ MAIL: ☒

OSTP #: 9203035

Date of Correspondence: 10/6/92

Date of Receipt of Correspondence: "

From: Victor H. Reis

Affiliation: Director of Defense
Research & Engineering

Subject: Defense Science Board's Study of the
Nat'l Aero-Space Plane Program

Action:
FYI: KERb, MVC

Assign to: DAB

Due Date: _____

Copies to: _____

Comments: Report is sensitive & w/ DAB
↓
(Enclosure)

"Document Control"

TYPE: INFORMATION DOCUMENT NUMBER: 9202985
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: MACLEOD, Richard P.: UNITED STATES SPACE FOUNDATION

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 09/10/92

SUBJECT: HE IS WRITING TO INFORM DR. BROMLEY THAT THE
PROCEEDINGS FROM THEIR NATIONAL SPACE SYMPOSIUM IS
BEING FORWARDED, AND TO INFORM HIM OF THE DATES FOR
THEIR NEXT SYMPOSIUM.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

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

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 10/01/92 DEPT RECEIVED:
FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:

2985



UNITED STATES SPACE FOUNDATION

GENERAL JAMES E. HILL, USAF (RET)
CHAIRMAN

RICHARD P. MACLEOD
PRESIDENT

September 10, 1992

Dr. Allan Bromley
Assistant to the President & Director
White House
Office of Science & Technology Policy
Washington, DC 20500

Dear Dr. Bromley:

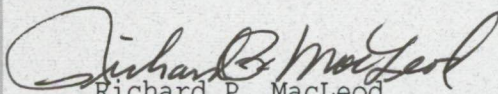
Your complimentary copy of the **Proceedings Report of the Eighth National Space Symposium** has been sent under separate cover. The **United States Space Foundation's 1992 Symposium** was the most timely yet. When you read the proceedings you will recall what's behind the recent headlines whether the topic is international cooperation in space or the promise and challenges of Space Station Freedom.

Perhaps, the Symposium is best summed up by one speaker's thoughts:

"Over the past three days, we've been exposed to a very rich agenda from a wide body of experts who have presented our national space programs in very clear and demanding tones. They are programs that generally are very large, very far reaching, with a great deal of vision and forethought."

The **Ninth National Space Symposium** will be held **April 13-16, 1993**. Plan now to attend this important dialogue that will help shape the future of America in Space.

Sincerely,


Richard P. MacLeod
President

RPM:11

9202819

ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: BURKE, Bernard F.: MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SEP 23 1992

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 09/02/92

SUBJECT: HE IS WRITING TO ASK FOR DR. BROMLEY'S ASSISTANCE IN
DEVELOPING EFFECTIVE LINES OF COMMUNICATION BETWEEN
THE U.S. SPACE VLBI SCIENTISTS AND THE U.S OFFICIALS
WHO ARE ACTING ON BEHALF OF THE U.S. IN THE
FORTHCOMING G-7 DISCUSSIONS THIS FALL CONCERNING

DIRECTORATE STAFF
ASSIGNED: PHYSICAL SCIENCES ASSIGNED:

ACTION
REQUIRED: AS NECESSARY

STAFF *Draft prepared in consultation with*
ACTION: *Jeff Schweitzer. Ltr 10/5/92*

SENDER'S DUE DATE:
OSTP DUE DATE: 09/30/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
INTERNATIONAL/POLICY

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 09/21/92 DEPT RECEIVED:
FILE: P-PHYSICAL SCIENCES-SPACE
CENTRAL FILES:



THE WHITE HOUSE
WASHINGTON

October 8, 1992


Dear Professor Burke:

Thank you for your letter of September 2nd expressing interest in developing effective lines of communication between U.S. space VLBI scientists and the U.S. representatives preparing for the upcoming G-7 discussions this fall concerning megascience in the Former Soviet Union. We share your interest in enhancing communication in this important area.

The United States has taken the lead in establishing a Megascience Forum at the Organization for Economic Cooperation and Development to address the issue of communication. The Forum's objective is to influence the approach of both governments and scientists toward the consideration, management and funding of megaprojects in the sciences, including those in the Former Soviet Union. Specifically, we believe the Forum will be a success if these decisions in the future are made in an international rather than national context, and if the international considerations are initiated at an early conceptual stage. Through expert preparatory meetings, the Forum will serve as an important vehicle for scientists to participate in our efforts to enhance international cooperation in science and technology.

Sincerely yours,



D. Allan Bromley
The Assistant to the President
for
Science and Technology

Professor Bernard F. Burke
Department of Physics
Massachusetts Institute of Technology
Cambridge, MA 02139-4307

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DEPARTMENT OF PHYSICS

CAMBRIDGE, MASSACHUSETTS 02139

2819
92 SEP 21 A 9: 58

September 2, 1992

OSTP
MAIL ROOM

Dr. Allan Bromley
Science Advisor to the President
Office of Science and Technology Policy
Old Executive Office Building, Room 358
Washington, DC 20506

Dear Dr. Bromley:

In this time of great difficulty for our scientific colleagues in the Former Soviet Union, it is important to seek ways to sustain collaborations, thus giving them support and encouragement. It is in our national interest that FSU scientists, particularly those engaged in space science and in fields closely related to nuclear technology, should continue working in their home institutions, and that our scientific contacts and collaborations should be maintained.

In this light, I call your attention to the space Very-Long-Baseline (VLB) Interferometry project known as RADIOASTRON, which was one of a number of major scientific projects submitted to the G-7 members under the title "MegaScience". A meeting of G-7 technical experts was held in Paris on 6 July 1992, at which the "MegaScience" projects were presented by Dr. I. Bortnik of Russia.

The RADIOASTRON collaboration has a noteworthy connection to the interests of the US science community. On 8 March 1990, shortly after Andrei Sakharov's death, the Vice President, in his capacity as Chairman of the National Space Council, announced that the US would participate in the project. In his remarks, the Vice President noted that the collaboration would be an effective way of honoring the memory of Dr. Sakharov, who was known to be keenly interested in the RADIOASTRON project.

I ask, therefore, for your good offices in developing effective lines of communication between the US space VLBI scientists and the US officials who are acting on behalf of the US in the forthcoming G-7 discussions this fall, concerning "MegaScience", the large scientific projects in the Former Soviet Union.

Sincerely,


Bernard F. Burke

BFB/wh

Charlie
SEP 2 1992

"Document Control"

TYPE: ACTION
ORIGINATOR: 02

DOCUMENT NUMBER: 9202629
STATUS I
DIRECTORATE STATUS

FROM: BOWLES, Norman C.: U.S. DEPARTMENT OF TRANSPORTATION

TO: DR. D.A. BROMLEY

Rec'd
Nat'l Sec
9/15

DATE OF
CORRESPONDENCE: 08/19/92

SUBJECT: HE IS FORWARDING INFORMATION REGARDING THE LAUNCH OF
RADIOACTIVE MATERIAL INTO SPACE.

DIRECTORATE
ASSIGNED: ~~PHYSICAL SCIENCES~~
Michelle Van Cleave
STAFF
ASSIGNED: National Security /
Fred Tarantino

ACTION
REQUIRED: REVIEW/COMMENT FOR DAB
STAFF
ACTION: Comments attached
(cc: Karl Erb)

SENDER'S DUE DATE:
OSTP DUE DATE: 09/14/92
DATE COMPLETED:
STAFF DUE DATE
DATE COMPLETED/DEPT: 9/25/92

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:
REMARKS: Michelle Van Cleave is the cognizant
OSTP person re this issue
CONTACT PERSON:
PHONE:
EXT:
KOE

9/12/92

OSTP RECEIVED: 09/01/92
FILE: P-PHYSICAL SCIENCES-SPACE
CENTRAL FILES:

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

September 25, 1992

MEMORANDUM FOR D. ALLAN BROMLEY

THROUGH: MICHELLE K. VAN CLEAVE *mkv*
FROM: FRED TARANTINO *F.T.*
SUBJECT: COMMENTS ON COMMERCIAL LAUNCH OF
RADIOACTIVE MATERIAL
REFERENCE: DOT OCST LETTER OF AUGUST 19, 1992

The referenced letter is a courtesy notification to you of the expected space launch of 49.4 uCi of ^{85}Kr . The Commercial Space Launch Act of 1984 makes the Department of Transportation responsible for regulating commercial space launches. Since the amount of radioactivity launched in this case is well under the minimum threshold of 20 Ci that PD/NSC-25 specifies, OSTP review and approval of this launch was not required. Of course, the launch was required to be fully compliant with U.S. environmental law, and this was satisfied by the DOT.

To date, DOT has not received any commercial launch applications involving large amounts of radioactive material. Although DOT would certainly coordinate its review process with other government agencies, it has had no opportunity to exercise the process. The procedural requirements for such a case are ambiguous. For example, the reference raises the issue that "user agency" does not apply to commercial launches. We are currently working with the DOT OCST to review the Commercial Space Launch Act and related DOT regulations, in order to understand and establish procedure by which commercial launches would be reviewed and approved by the OSTP.

I thought you might be interested in the results of the August 22 launch referenced in the DOT letter. General Dynamics attempted to place the Hughes Galaxy 1-R television satellite into orbit using an Atlas I rocket with a Centaur second stage. When only one of the two Centaur engines fired, the vehicle began to tumble, and Air Force safety officers commanded it to self destruct after it had completed 7 minutes of flight and achieved an altitude of 102 miles. The ^{85}Kr is used as a fill gas for a voltage control device on the Centaur engine.

cc: Karl Erb

U.S. Department of Transportation
Office of the Secretary

Date: August 21, 1992

Office of Commercial Space Transportation
Phone: 202-366-2929, Fax: 202-366-7251

From: Gary Ralensky

To: Honorable D. Allan Bromley

Company: CLD Executive Office

Fax number: (202) 395-3269

Number of pages, including this cover sheet: 3

Message:

Karl G. B.
Michelle R.
Comments please
DB

Please contact originator or the Division's secretary if you do not receive all the indicated pages.

Licensing and Safety Division
Office of Commercial Space Transportation
400 7th Street, S.W. Room 5402A
Washington, D.C. 20590

Office hours: 9:00 a.m. - 5:30 p.m.
Fax line: 24 hours a day, seven days a week

2629



U.S. Department of
Transportation
Office of the Secretary
of Transportation

RECEIVED

400 Seventh St., S.W.
Washington, D.C. 20590

92 SEP 1 P5:23

AUG 19 1992

OSTP
MAIL ROOM

The Honorable D. Allan Bromley
Assistant to the President for Science and Technology
Old Executive Office Building - Room 358
Washington, D.C. 20500

Dear Dr. Bromley:

Under the National Aeronautics and Space Council (NASC) guidelines (June 16, 1970), the "user agency" with programmatic responsibility is required to report to your office on radioactive materials launched into space.

With the emergence of privately conducted launches, the concept of "user agency" is no longer applicable to certain activities covered by the reporting requirement. Under the Commercial Space Launch Act of 1984, as amended (PL. 98-575, 100-657), the Office of Commercial Space Transportation (OCST) is responsible for regulating protection of public safety of commercial space launches. Since these launches are evaluated and licensed by OCST, we are in a position to provide your Office with the information necessary of radioactive materials to be launched.

Enclosed is information on the radioactive material forecasted to be launched this quarter. Per the above NASC guidelines, this material is exempt from Presidential approval because of its extremely small risk.

If you have any questions concerning this information, please call Gary Kalansky of my staff at (202) 366-2437.

Sincerely,

Norman C. Bowles
Associate Director
Licensing and Safety Division
Office of Commercial Space
Transportation

Enclosure

cc: Col Thomas Oldenburg, DOS, OBS/SAT
Ms. Pam Pearson, DOS, OBS/N
Mr. James Turi, DOE, NE-53
Mr. Robert Lange, DOE, NE-52

LIST OF RADIOACTIVE SOURCES TO BE LAUNCHED ON
COMMERCIAL SPACE LAUNCH VEHICLES
FOR THE 4th QUARTER, FY 1992

<u>VEHICLE</u> <u>(MISSION)</u>	<u>LAUNCH</u> <u>SCHEDULE</u>	<u>LAUNCH</u> <u>SITE</u>	<u>NO. OF</u> <u>SOURCES</u>	<u>ISOTOPE</u>	<u>TOTAL</u> <u>ACTIVITY</u>	<u>CATEGORY</u>	<u>REMARKS</u>
Atlas I/ Centaur (Galaxy 1R)	08/19/92	CCAFS	2	⁸⁵ Kr	49.4 µCi	B	Discharger Electron Tubes - orbit duration < 10 years.

"Document Control"

TYPE: ACTION

DOCUMENT NUMBER: 9202455

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: LONGMIRE, Don

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 08/11/92

SUBJECT: HE IS WRITING EXPRESSING HIS VIEWS ON SDI. HE ASKS
DR. BROMLEY TO ADVISE THE PRESIDENT THAT THE GOALS
OF THE SDI PROJECT ARE NOT FEASIBLE.

DIRECTORATE

STAFF

ASSIGNED: PHYSICAL SCIENCES

ASSIGNED:

ACTION

STAFF

REQUIRED: DIRECT REPLY

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 09/09/92

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

PHONE:

EXT:

*No response
necessary.*

OSTP RECEIVED: 08/26/92

DEPT RECEIVED:

FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:

AUG 11 1992

DEAR MR BROMLEY,

WILL YOU PLEASE ADVISE PRESIDENT THAT THE GOALS OF SDI, ARE NOT AT ALL FEASIBLE, THAT WE ARE WASTING OUR NATIONAL RESOURCES AND THE PUBLIC'S CONFIDENCE IN THIS IGNORAMUS-REAGAN-TELLER FANTASY IS NIL.

TELL HIM WE HAVE HAD ENOUGH OUT HERE ~~WHERE~~ ^{OSTP MAIL ROOM} THE TAXES COME FROM.

TELL HIM WE HAVE NOTED THE PATRIOT MISSILES FAILURE IN THE NEAR EAST. IT DOES NO GOOD TO UPSET A MISSILE IF THE WARHEAD CONTINUES INTACT TO STRIKE THE GROUND IT IS INFINITELY MORE DIFFICULT TO TOTALLY DESTROY A MIRVED MULTIPLE WARHEAD AND IF THIS WARHEAD IS THERMONUCLEAR, AND IT IS NOT DESTROYED THE INTECEPT IS VOID. SO ARE WE.

SDI IS THE MAGINOT LINE OF OUR AGE. IT WILL NOT WORK IF ALMOST PERFECT. ALMOST PERFECT IS NOT GOOD ENOUGH. SURPRISE IS AND SURPRIZE WILL CRUSH ANY GOOD SDI CAN PRODUCE.

TELL HIM HIS LAME EXCUSE THAT SDI IS NEEDED TO PROTECT US FROM ROGUE NATION ATTACKS OR TERRORISTS IS WRONG. THEY WILL DELIVER THEIR ATTACK BY UPS OR FED EX OR BY RUSTY COASTAL FREIGHTER DO YOUR JOB-ADVISE. CORRECT THE FALLACIES REAGAN WAS SOLD ON.

SINCERELY

DON LONGMIRE SR AEROSPACE ENGR,
6816 SHEPARD MESA RD
CARPINTERIA CA 93013

"LIFE SCIENCES (CORRESPONDENCE TRACKING)"

TYPE: ACTION DOCUMENT NUMBER: 9123435
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS C

FROM: VIOLA, V.E.: INDIANA UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 08/06/91

SUBJECT: CONCERN OVER THE RAADIATION LEVELS TO WHICH
PERSONNEL (AND EXPERIMENTS) ON THE SPACE STATION
WILL BE EXPOSED.

DIRECTORATE STAFF
ASSIGNED: LIFE SCIENCES ASSIGNED: Alicia K. Dustira

ACTION STAFF
REQUIRED: FOR DAB'S SIGNATURE ACTION: Bromley Signature

SENDER'S DUE DATE:
OSTP DUE DATE: 08/26/91 STAFF DUE DATE 08/26/91
DATE COMPLETED: DATE COMPLETED/DEPT:09/18/91

COPIES TO: D. Allan Bromley D.A. Henderson
PHYSICAL SCIENCES
Carl Bretscher

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 08/12/91
DEPT RECEIVED: 08/12/91

FILE: P-LIFE SCI-RADIATION*PS-SPACE

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

September 18, 1991

Dear ~~Dr. Viola:~~ *vic*

Thank you for your letter of August 6, 1991, outlining your concerns about the radiation levels to which personnel and experiments on the space station will be exposed. You should be reassured that the National Aeronautics and Space Administration has in fact given serious consideration to the radiation environment of the space station, as evidenced by the attached letter from Dr. Schimmerling that addresses each of your concerns in detail.

I appreciate your taking the time to bring these matters to my attention, and I would encourage you to contact Dr. Schimmerling at NASA if you have any further questions.

Sincerely,



D. Allan Bromley
Director

Enclosure

V. E. Viola
Distinguished Professor of Chemistry
Department of Chemistry
Indiana University
Bloomington, IN 47405

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202583
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: SUNDERMAN, Duane N.: NATIONAL RENEWABLE ENERGY LABORATORY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/21/92

SUBJECT: HE IS FORWARDING INFORMATION REGARDING RENEWABLE
ENRGIES IN RESPONSE TO DR. BROMLEY'S ARTICLE IN
"POPULAR SCIENCE" MAGAZINE. HE OFFERS TO BREIF DR.
BROMLEY ON THE SUBJECT.

DIRECTORATE STAFF
ASSIGNED: PHYSICAL SCIENCES ASSIGNED:

ACTION STAFF
REQUIRED: FOR DAB'S SIGNATURE ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/07/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:

REMARKS: KE, DAB and Lee Schvede
will meet 11/30/92.

OSTP RECEIVED: 07/27/92 DEPT RECEIVED:
FILE: P-PHYSICAL SCIENCES-ENERGY

CENTRAL FILES: 1

2583

National Renewable Energy Laboratory

1617 Cole Boulevard
Golden, Colorado 80401-3393
(303) 231-1000



OSTP
MAIL ROOM

02 JUL 27 AM : 28

RECEIVED

July 21, 1992

Dr. D. Allan Bromley
National Science Advisor
New Executive Office Building
Washington, D.C. 20506

Dear Dr. Bromley:

I have just finished reading, with great interest, your interview comments regarding environmental and energy concerns in the July issue of *Popular Science*. I was impressed not only with your environmental concern, but also the depth of your commitment regarding the problems of ozone depletion and global warming. It is reassuring to see this type of care and energy being devoted to these problems by the President's Science Advisor.

I was also gratified by your generally complimentary views on solar energy. As you may be aware, at NREL we share your view of renewables not as the single solution for the future, but as one component of a broad-based energy supply strategy. We may be biased toward renewables, but we also like to think we are realistic about their potential.

Some of your specific comments on renewables--particularly wind energy--were disappointing, however. As you accurately pointed out in the interview, there has been a failure (until quite recently) to get the word out on the real advantages and disadvantages of the various alternative energy sources. There are several reasons for this failure, but whatever the reason for the information not getting out, lack of accurate information was reflected in your comments on wind energy.

In the interview, you made three points regarding wind energy: 1) its reduced value because of the lack of adequate storage, 2) excessive noise emissions from wind turbine rotors, and 3) unacceptable safety hazards and human costs associated with the wind turbine life cycle. I'd like to discuss these points in turn, in the spirit of your call elsewhere in the interview to "get the message out" about alternative energy sources.

THE VALUE OF WIND ENERGY WITHOUT STORAGE

The wind turbines operating in Hawaii and in four areas of California (the Altamont, Tehachapi and San Geronimo passes and the Suisun Bay) have shown that wind technology does not need storage to be attractive to utilities. Pacific Gas & Electric has learned that the value of the energy produced by wind turbines is not its steadiness, but rather its statistical predictability. The diurnal pattern of energy output of the Altamont and Suisun Bay wind farms coincides fairly closely with periods of peak energy use. Carl Weinberg of PG&E has said that these wind farms "provide a proven concept for how to operate wind plants efficiently and economically." There are many other areas where similar resource and load matches occur. In still other areas, fuel-saving, reductions in emissions, or even its ability to create jobs will make wind energy very valuable. Of course, an economical electrical storage technology would enhance the value of wind and photovoltaics even further.

EXCESSIVE NOISE

Modern wind turbines do not create excessive amounts of noise. One or two of the large experimental machines tested 10 to 12 years ago did have severe noise problems because the rotors were located downwind of the tower. The low frequency sound created when the blades passed through the tower wake was objectionable to people whose homes were located in areas where terrain and atmospheric effects amplified the noise. As a result, designers have learned to locate the rotors of large wind turbines upwind of the tower. The typical modern 300-500 kW wind turbine is not noisy. At distances of 100 yards from such a wind turbine operating in high winds, a typical measurement would be 60 to 65 dBA, about the noise level of a busy office. At distances of a mile, even the "noisiest" machines are barely audible.

The subjective experience of being in the middle of a wind farm operating in high winds is much quieter than standing next to a busy commuter highway. Our wind engineers do not think it is wise to locate wind farms immediately adjacent to residential areas, but there is really no reason to do so. Recent surveys by Pacific Northwest Laboratory indicate that there is an abundance of usable, non-residential land with good wind resource.

Despite the lack of a real noise problem, we do have the perception of a noise issue. Because of this, we have been working with the American Wind Energy Association and with the International Energy Agency to create domestic and international noise standards for wind turbines. These standards are being closely coordinated with siting standards also under development. The International Electrotechnical Commission is presently adopting U.S. acoustics standards documents as working papers for new international standards.

SAFETY HAZARDS AND ENVIRONMENTAL FACTORS

We are extremely concerned by the occasional injuries (and even deaths) associated with the wind industry's operation of wind farms in California. These incidents are usually falls and electrical accidents. We have been working closely with U.S. and European industry and research groups to develop internationally recognized safety standards that will help eliminate these unfortunate incidents. But we are aware of no scientific study that would rate the danger of wind farms as higher than other types of

Dr. D. Allan Bromley
July 21, 1992
Page 3

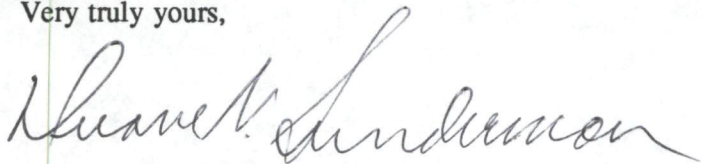
power plants. In fact, the industry is so new that a statistical study (favorable or unfavorable) would probably be misleading. Certainly, there is risk involved with all mechanical appurtenances of modern life. However, our recent experience with the DOE ES&H Tiger Team has reinforced our conviction that all accidents involving electrical and mechanical power systems are avoidable if the proper operating procedures and an active safety culture are in place. This would include the identification and analysis of safety hazards, education and training, safety-oriented design, appropriate use of safety equipment, and a "safety first" philosophy.

In addition, the environmental costs of wind energy are very low. The "energy payback period" of a wind turbine is between 6 months and a year, one of the lowest among all modern energy sources. The only metal used in modern wind turbines is in the tower and drive train components. There is no need to mine, transport and store fuel; or to dispose of spent fuel, tailings, or residue. Wind turbines directly offset hydrocarbon emissions (an estimated 2.7 billion pounds of CO₂ in 1991 alone). Wind farms are compatible with farming, ranching, and other low-intensity land uses. When they are removed from the land, they leave only superficial, easy-to-heal marks. Recently, we have been concerned about evidence that wind turbines are causing deaths of avian raptors in Altamont Pass. However, cooperative studies by industry and people from the State of California are indicating that this may be a largely avoidable, site-specific problem.

The foregoing is not to say that wind energy does not have problems (real or perceived) in the areas you discussed in the interview. However, we are convinced that these problems are solvable, given a positive policy environment that views the energy source in a fair and realistic manner. For a while, renewables like wind energy may be "niche" energy sources in isolation, but taken together they can have a real impact. In the near future, our analysts think that wind energy can be attractive to utilities in most areas of the U.S. If they're right, wind plants can help eliminate the negative effects that CO₂ reduction may have on the Western economies.

We would be more than happy to discuss these issues with you in more detail or to provide additional information on wind energy and other renewables. We would be most happy to provide a personal briefing if your travels take you close to NREL.

Very truly yours,



Duane N. Sunderman
Director

cc R. Stokes
 R. Thresher
 D. Dodge
 M. Davis
 P. Kearns
 J. McKelvey

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202552
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: BABCOCK, Horace W.: THE OBSERVATORIES

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/17/92

SUBJECT: HE IS WRITING WITH HIS COMMENTS ON THE SCIENCE AND
TECHNOLOGY REPORT.

DIRECTORATE STAFF
ASSIGNED: PHYSICAL SCIENCES ASSIGNED:

ACTION STAFF
REQUIRED: AS APPROPRIATE ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/06/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT: 8/4/92

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

Dr. Eib responded.

OSTP RECEIVED: 07/23/92 DEPT RECEIVED:
FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

August 4, 1992

Dear Dr. Babcock:

Thank you for your kind remarks on the President's Science and Technology Report and Outlook.

With respect to your comments concerning the Space Station, neither Dr. Bromley nor I have sought to justify the station on the basis of pure science. We view it as an essential step in the development of our capability for space exploration. If such exploration is planned then we will need the space station.

I resonate with your remarks concerning adaptive optics. This is a very powerful technique and we in OSTP have worked to help transition this technology from the classified into the public sector. I am planning a visit to the Phillips Laboratory later this month to learn more about this intriguing technology.

Again, we appreciate your response to the report as well as your reactions to it.

Sincerely yours,



Karl A. Erb

Associate Director for
Physical Sciences and Engineering

cc: Dr. D.A. Bromley

Dr. Horace W. Babcock
The Observatories of the Carnegie
Institution of Washington
813 Santa Barbara Street
Pasadena, CA 91101-1292

THE OBSERVATORIES

OF THE CARNEGIE INSTITUTION OF WASHINGTON

REC

17 July 1992

Dr. D. Allan Bromley
The Assistant to the President
for Science and Technology
The White House
Washington, D.C.

MAIL ROOM

Dear Dr. Bromley:

Thank you for sending the President's Science and Technology Report and Outlook.

I believe that you have indeed made the Report comprehensible and informative for a wide audience. On the whole, I give it high marks, but with certain qualifications.

One specific objection that I have is to the support of Space Station Freedom (p. 10). I do not believe that this extremely costly project can be justified by its potential for accomplishments in science. My opinion coincides closely with that of Dr. Maxine Singer in her testimony before a task force of the Committee on the Budget, U.S. House of Representatives, on April 28, 1992. While I am sure you know of Dr. Singer's testimony, I enclose a sheet that provides excerpts from her comments.

Some references to the peer review system suggest that it functions well. Yet I know from experience that serious errors can result. The peer review system, I think, easily goes awry if reviewers, too often trained in a single discipline, lack the breadth of competence that is implied by the "thematic approach" as mentioned on p. 16 of the Report.

On pages 20 and 21 there is reference to Federal funds for basic research in 1991, with the indication that NSF was responsible for 14 percent, and NASA also for 14 percent. I feel uneasy for lack of better knowledge as to how "basic research" is defined in these instances. My feeling is that NSF is better oriented toward basic science than is NASA. Many of the expansive and far flung operations of the latter are generally perceived as basic science when this is far from the truth.

In my own field of astronomy there is, at last, a rapidly growing interest in the development of adaptive optics. The basic technology was invented some 40 years ago for improving the useable resolving power of astronomical telescopes by compensating atmospheric turbulence. Yet, lacking a multi-disciplinary approach, nearly all astronomers, until quite recently, have failed to recognize its possibilities. Now performance has been demonstrated (notably by Europeans) and adaptive optics clearly has the potential for great advances in

ground-based astronomy. Yet Federal expenditures by NSF for development of adaptive optics in astronomy are recommended, I believe, to total \$32M for the current decade. There is a vast lack of balance between this figure and the tremendous expenditures that are going -- and have gone for some 20 years -- into the Hubble Space Telescope and its support. Yet the single most important purpose of each program is the same: to achieve optical resolution close to the diffraction limit by avoiding the distortion of the earth's atmosphere.

Adaptive optics improves the useable resolving power of ground-based telescopes by an impressive factor. Performance has been demonstrated, but full system development will require several more years. R&D is proceeding, but should be accelerated. This technology will reform much of ground-based astronomy. Support by NSF at a level of \$3M annually for a decade is definitely inadequate, to say the least.

Although originally invented for astronomy, adaptive optics has been promoted for classified military uses by DOD for the past decade. Budgets, by all indications, have been comparatively lavish for some of these purposes. Recently there has been an effort to convert in part to astronomical applications. In this there are varying degrees of success, depending upon the laboratories involved. I believe that the Phillips Laboratory at Kirtland AFB near Albuquerque is outstanding.

One could go on to compare progress in astronomy in the United States with that of the seven European countries that operate the European Southern Observatory (ESO) with headquarters near Munich. Many of the current advances are being made by the ESO scientists and engineers, who decided in 1985 that their array of four 8-meter telescopes, to be erected in Chile, will depend upon adaptive optics. Furthermore, ESO is admirably organized and administered, with funding that is reliable and predictable. It has been announced that the American astronomer Dr. Ricardo Giacconi will leave the Space Telescope Science Institute in Baltimore to assume the directorship of the European Southern Observatory at the beginning of 1993.

Thank you for the opportunity to express my comments and reactions to the Report. My response has been delayed a little as I wanted to assure myself that there is a workable solution to a technical problem (tilt anisoplanatism) that has been under discussion in connection with adaptive optics. A brief preprint on multiplexing is enclosed.

Sincerely,



Horace W. Babcock

Enclosures (2)

Singer testifies on Capitol Hill

On April 28, Maxine Singer gave testimony before a task force of the Committee on the Budget, U.S. House of Representatives. Excerpts from her comments, given as an individual, on planning for the Space Station Freedom are given here:

[On the effects of space on human beings.] I believe that we must surely examine the ethical issues that arise from subjecting humans to what we already know to be a debilitating environment: low gravity and the radiation characteristics of space.

... present and future technological advances will permit us to explore and study space without a human presence. Moreover, extensive data concerning the effects of space on humans and animals have already been acquired by space scientists and astronauts in the United States and the former Soviet Union. Surely these data could now be more carefully analyzed in a joint international project before we again jeopardize the health and safety of Americans.

It would also provide another opportunity to engage scientists in the former Soviet Union in open research for peaceful purposes....

[On spaceborne experiments on cellular processes in normal and diseased cells and organisms.] I do not believe that there is any obvious merit to this activity. It is extremely difficult to imagine how the conditions of space, such as low gravity, could possibly add significantly to our understanding of normal growth, cancer, AIDS, or any other disease of man or other organisms on the planet.

Notice I do not say that it is impossible that we would learn such things, only that it is extremely difficult now to imagine how we

would. After all, the sick people in our world are sick for very earthly reasons—infectious bacteria and viruses, abnormal cell growth, malfunctioning immune systems, the process of aging, and poor nutrition. It is also difficult to imagine what special conditions space would provide for answering the questions that we have about the cause, diagnosis, and treatment of human disease....

In terms of the time of trained biomedical scientists and the cost of the experiments, we are many more times likely to achieve significant knowledge sooner here on the planet than in space.



Maxine Singer

[On the problem of inflexibility in planning for space experiments.] Once, in the mid-70's, I spent two years with a colleague determining the sequence of a rather small piece of DNA. It was 172 base pairs long. As you know, the human genome is three billion base pairs.

Well, just as we were finishing up the work and preparing it for publication, the new methods for DNA sequencing came out, and then in the next three

weeks we repeated what we had taken two years to do. That kind of situation has recurred frequently in the history of biomedical science in the last several decades, and that is why I think that almost by definition anything that requires very-long-term planning is very likely to be answered or seen as the wrong question by the time you get to do it....

MULTIPLEXING AN ADAPTIVE OPTICAL SYSTEM
TO COMPENSATE TILT ANISOPLANATISM

H. W. Babcock

Observatories of the Carnegie Institution of Washington
813 Santa Barbara Street, Pasadena, California 91101

Submitted to Publ. Astron. Soc. Pacific. July 10, 1992

ABSTRACT

Multiplexing of a single adaptive optics system may be the simplest method of solving the problem of tilt anisoplanatism when laser guide stars are used.

Tilt anisoplanatism is a problem encountered in the planning and development of high quality adaptive optics for astronomical use. In particular it may degrade resolution of objects in the visible region of the spectrum as compared to the infrared, and in other situations where suitable natural guide stars are so scarce that laser guide stars must be used.

Pilkington (1987) showed that the problem arises because a real star will appear to wander as a result of outer scale (long spatial wavelength) atmospheric turbulence, and that this is not so for laser guide stars: their apparent positions remain unaffected by turbulence because each laser pulse projected into the atmosphere travels up and down along the same path. Consequently the laser guide star cannot provide information on the apparent wandering of a natural star.

The compensated image of a real star within the isoplanatic patch of a laser guide star may be diffraction-limited on a short time scale of the order of a few

milliseconds, but except at such times as the long-wave turbulence is absent, the wandering will degrade the resolution for longer exposures.

There is new, empirical evidence that, at a very good site, outer-scale turbulence may be intermittent or absent at times, and that the Kolmogorov model should not be relied upon for predicting it (Bester et al. 1992). This is a welcome finding for astronomers concerned with optimizing the performance of large telescopes. Nevertheless, it can not be expected that even at an excellent site, outer-scale turbulence can be routinely neglected when the aim is to achieve diffraction-limited performance with adaptive optics.

The tilt determination problem has been discussed recently by Rigaut and Gendron (1992). They show that the tip-tilt correction is a significant problem, for if natural stars are used for compensation of the isoplanatic field containing the astronomical target, the sky coverage (fraction of the sky that can be compensated) in the visible region of the spectrum is below one percent.

To obtain full sky coverage on large telescopes at visible wavelengths without allowing tilt residuals to compromise the accuracy of the compensation, Rigaut and Gendron proposed the concept of dual adaptive optics: two separate adaptive optical systems, one for compensation of the target, the other for compensation of the tilt reference star. Such a dual adaptive optical system increases significantly the accuracy of tilt sensing, as well as increasing the sky coverage. But, as Rigaut and Gendron emphasize, it has severe technological implications: duplication of every component (adaptive mirror, wavefront sensor, laser guide star, and fast guider) of the adaptive optics system.

Here I wish to propose the use of multiplexing to provide the advantages of dual adaptive optics while avoiding

the need for duplication of system components. Multiplexing permits use of a single adaptive optical system with relatively minor additions for switching alternately between two optical inputs. The two inputs that are alternately admitted to the system are isoplanatic fields centered on two laser guide stars that are typically a few arcminutes apart. These fields contain, respectively, the compensated natural tilt-reference star and the compensated astronomical target. Both of these in the short term have resolution close to the diffraction limit, but they are similarly affected by relatively slow wandering that results from any outer-scale (long-wave) turbulence that may be present.

The square wave that controls optical switching can be generated by the system clock that governs pulsing of the laser(s) and readout of the CCDs. There is the option of using a single laser whose beam is optically switched. Switching of the two optical fields at the input (and of the outgoing laser beam as well) can be done with an inclined plane-parallel plate that is given a small incremental tilt by the square wave. As the target will generally be fainter than the tilt reference star, efficiency may be improved by using an asymmetrical square wave for switching.

The natural tilt-reference star and the astronomical target, each in the isoplanatic patch of its respective laser guide star, can both be imaged at the output end of the multiplexed adaptive optics system, with the laser guide stars suppressed by gating. The tilt-reference star is centroided as by a CCD guider, and the centroiding corrections are applied also to the target, resulting in high quality compensation that approaches the Airy limit.

REFERENCES

Bester, M., Danchi, W. C., Degiaconi, C.G., Greenhil, L.J.,
and Townes, C. H., *Astrophys. J.* in press.

Pilkington, J.D.H., 1987, *Nature* 330, 116.

Rigaut, F. and Gendron, E. 1992, *Astr. Astrophys.* in press.

"Document Control"

TYPE: INFORMATION
ORIGINATOR: 02

DOCUMENT NUMBER: 9202188
DIRECTORATE STATUS

FROM: DAILEY, Brian D.

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/10/92

SUBJECT: THE NATIONAL SPACE COUNCIL "REPORT TO THE PRESIDENT"

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

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

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 06/17/92 DEPT RECEIVED:
FILE: 1-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:

2188

NATIONAL SPACE COUNCIL
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20500

June 10, 1992

02 JUN 17 P3:18

Dear Dr. Bromley:

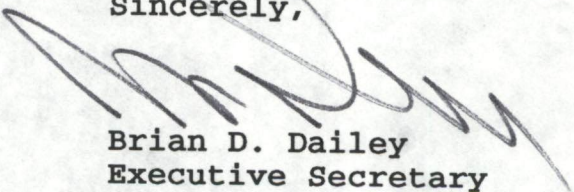
OSTP
MAILED

Enclosed you will find a copy of the National Space Council "Report to the President." The administration's accomplishments in space, which are documented in the report, reflect great credit on each and every Space Council member.

I am very pleased to have been chosen to be the new Executive Secretary of the Space Council and I look forward to assisting you and the Vice President in every way to assure America's continuing leadership in space.

If I can be of assistance, please do not hesitate to call upon me at (202) 395-6175.

Sincerely,



Brian D. Dailey
Executive Secretary

The Honorable D. Allan Bromley
Assistant to the President for Science
and Technology and Director, Office
of Science and Technology Policy
Room 358, OE0B
Washington, D.C. 20500

NATIONAL SPACE COUNCIL

Report to the President
May 1992



D. ALLEN BROMLEY



"Document Control"

TYPE: ACTION

DOCUMENT NUMBER: 9201427

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: HARWIT, Martin: NATIONAL AIR & SPACE MUSEUM

APR 22 1992

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 04/15/92

SUBJECT: HE IS WRITING TO INFORM DR. BROMLEY THAT HE HAS
ARRANGED FOR AIR & SPACE MAGAZINE TO BE SENT TO HIM.
HE WOULD WELCOME ANY COMMENTS OR SUGGESTIONS FOR
FUTURE ARTICLES.

DIRECTORATE

STAFF

ASSIGNED: PHYSICAL SCIENCES

ASSIGNED:

ACTION

STAFF

REQUIRED: AS/IF NECESSARY

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 05/04/92

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT: 4/27/92

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:

PHONE:

EXT:

REMARKS: Please prepare for DAB's signature:

Dear Dr

Thank you for sending Air & Space magazine to
us at OSTP. It is a fine publication. We enjoy
reading it and will give some thought to suggestions
for future articles.

OSTP RECEIVED: 04/22/92

DEPT RECEIVED:

FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:



Sincerely,
DAB



"Document Control"

TYPE: ACTION
ORIGINATOR: 02

DOCUMENT NUMBER: 9201427
DIRECTORATE STATUS

FROM: HARWIT, Martin: NATIONAL AIR & SPACE MUSEUM

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 04/15/92

SUBJECT: HE IS WRITING TO INFORM DR. BROMLEY THAT HE HAS
ARRANGED FOR AIR & SPACE MAGAZINE TO BE SENT TO HIM.
HE WOULD WELCOME ANY COMMENTS OR SUGGESTIONS FOR
FUTURE ARTICLES.

DIRECTORATE
ASSIGNED: PHYSICAL SCIENCES

STAFF
ASSIGNED:

ACTION
REQUIRED: AS/IF NECESSARY

STAFF
ACTION:

OSTP DUE DATE: 05/04/92 SENDER'S DUE DATE:
DATE COMPLETED: STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:
PHONE:

EXT:

REMARKS:

Indicated above

OSTP RECEIVED: 04/22/92 DEPT RECEIVED:
FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:

NATIONAL AIR AND SPACE MUSEUM

FAX (202) 786-2262 TELEX 264729



SMITHSONIAN INSTITUTION

WASHINGTON, D.C. 20560

RECEIVED

92 APR 22 1992 April 15 1992

OSTP
MAIL ROOM

Dr. D. Allan Bromley
Assistant to the President for Science/Technology
Office of Science and Technology Policy
17th Street and Pennsylvania Ave. N.W. O.E.O.B.
Washington DC 20506

Dear Dr. Bromley:

Because of your interest in this Museum and America's heritage in aviation and space, I have arranged for AIR & SPACE/Smithsonian magazine to be sent to you for the next twelve months with our compliments. I would welcome any comments you might have about the magazine, as well as suggestions for future articles.

With best regards,

Sincerely,

Martin Harwit
Director

THE WHITE HOUSE
WASHINGTON

April 27, 1992

Dear Martin:

Many thanks for your note of April 15 with the very pleasant news that you have arranged for me to receive the **Air and Space** magazine. I have been picking up copies of the magazine and have been much impressed by both its contents and its production.

I know that I will look forward to receiving each copy and that it will be one of the few magazines that I read from cover to cover.

Warmest thanks and all best wishes,

Sincerely yours,



D. Allan Bromley
The Assistant to the President
for
Science and Technology

Dr. Martin Harwit
Director
National Air and Space Museum
Smithsonian Institution
Washington, D.C. 20560

"Document Control"

TYPE: ACTION

DOCUMENT NUMBER: 9201369

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: KOHMAN, Truman P.: CARNEGIE MELLON

TO: DR. D.A. BROMLEY

APR 20 1992

DATE OF
CORRESPONDENCE: 04/13/92

SUBJECT: HE IS WRITING TO URGE DR. BROMLEY TO RECONSIDER HIS
STANCE ON THE SPACE STATION PROJECT.

DIRECTORATE

STAFF

ASSIGNED: PHYSICAL SCIENCES

ASSIGNED:

ACTION

REQUIRED: AS NECESSARY

STAFF

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 05/01/92

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:

PHONE:

EXT:

REMARKS:

We have already responded once to this gentleman,
on the same issue.

KAE

OSTP RECEIVED: 04/17/92

DEPT RECEIVED:

FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:



**Carnegie
Mellon**

1369
Department of Physics
Carnegie Mellon University
Pittsburgh, Pennsylvania 15213-3890

RECEIVED

92 APR 17 AM 11:03

1992 April 13

Dr. Allan Bromley
Science Advisor to the President
The White House
Washington, DC 20500

OSTP
MAIL ROOM

Dear Dr. Bromley,

Thank you for the reprint of your article *Space Station Freedom - Embrace a New Age of Exploration* from the *Washington Post* for 1991 October 7. This was presumably sent as a reply to my letter of February 24 pointing out that continuation of the Space Station program is having disastrous effects on scientific research and education and will yield trivial benefits for the billions of dollars being and to be spent on it.

Your article was presumably written before the Administration's submission of a budget proposal for 1992-1993. The details confirm fears that the Space Station is taking money away from NASA's scientific projects and missions, and having indirect effects on the NSF, NIH, and other agencies supporting science and education.

You state that killing the Space Station would simply reallocate every dollar saved to "nonscience". There would be nothing wrong with that, considering the country's enormous social and economic needs. However, I believe that it should be possible to reallocate money saved from the Space Station to other scientific and educational programs, mainly within NASA. It should be your obligation to promote this course of action by the Administration and Congress.

You refer to the Space Station as an investment in the future. However, it does not share the attribute of wise investing, that there should be a worthwhile return. To "take humans away from the home planet into an endless frontier" is hardly justified in the light of the enormous problems and needs on the home planet. You yourself acknowledged that the Space Station has never been primarily a science project, recognizing that the scientific yield will be unimportant. Any technological returns would be matched or even exceeded by more extensive and sophisticated unmanned space missions.

As the Science Advisor to the President, your chief responsibility should be to promote science, both in its creation (research) and dissemination (education). Support for the Space Station has the opposite effect. I urge you to reconsider your stance on this matter, if changed circumstances and logic have not already caused you to change it.

Sincerely,

Truman P. Kohman

Truman P. Kohman
Professor of Chemistry Emeritus
Senior Research Associate in Physics

"Document Control"

TYPE: INFORMATION

ORIGINATOR: 02

STATUS C

DOCUMENT NUMBER: 9200638

DIRECTORATE STATUS

FROM: KOHMAN, Truman P.: CARNEGIE MELLON UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 02/24/92

SUBJECT: A LETTER EXPRESSING HIS VIEWS ON SPACE STATION
FREEDOM AND THE SSC.

DIRECTORATE
ASSIGNED: STAFF
ASSIGNED:

ACTION
REQUIRED: STAFF
ACTION:

OSTP DUE DATE: SENDER'S DUE DATE:

DATE COMPLETED: STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

PHONE:

EXT:

OSTP RECEIVED: 02/26/92 DEPT RECEIVED:
FILE: P-PHYSICAL SCIENCES-SPACE

CENTRAL FILES:

**Carnegie
Mellon**

0638 I
Department of Physics
Carnegie-Mellon University
Pittsburgh, Pennsylvania 15213-3890

RECEIVED

92 FEB 26 AIO: 07 1992 February 24

OSTP
MAIL ROOM

Dr. Allan Bromley
Science Advisor to the President
The White House
Washington, DC 20500

Dear Dr. Bromley,

I feel that you, like most scientists in the United States, should be concerned about the disastrous effect the Space Station is having on scientific research in our nation. The Administration's proposed 1992-1993 budget allocates \$2.2 billion for this program, an increase of 13% over 1991-1992 expenditures, and tens of billions more will have to be spent over the next decade if the facility is to be built and operated.

At the same time, many of NASA's scientific activities have been or will be curtailed, including the Comet Rendezvous and Asteroid Flyby mission, and others are to be delayed, including the Advanced X-Ray Astrophysics Facility and the Space Infrared Telescope Facility. Even more importantly, support for individual researchers by NASA, NSF, DOE, and NIH continues to be woefully inadequate to maintain our country's leadership in science and technology and to train young scientists at the graduate and postdoctoral levels. Many of my colleagues have been unsuccessful in obtaining support for their research for several years.

There is a tendency to consider the Space Station and the Superconducting Super Collider together as "big science" which is in competition with "little science". I believe this is misguided. The SSC is a scientific project, and will support scientists and their students at many universities and several national laboratories. The Space Station will be virtually worthless for science, and should not be regarded as a scientific program. The SSC will carry nuclear and particle physics into a new and unexplored energy domain. The Space Station will not explore new regions of space.

I believe that a wise course of action would be to immediately discontinue planning for and work on the Space Station, and to concentrate on completion and operation of the SSC. Both of these projects are having difficulty in attracting collaborative support from Japan and Europe. If the United States were to solicit support for only one, success would much more likely. Elimination of the wasteful Space Station would also allow much needed expansion of programs of small grants and contracts for the work of individual researchers at universities, particularly young faculty members.

I hope that you consider as your chief responsibility the promotion of science by our government. I respectfully submit that continuation of support for the Space Station is contrary to this objective.

Sincerely,

Truman Kohman

Truman P. Kohman
Professor of Chemistry Emeritus
Senior Research Associate in Physics

Space Station Freedom

D. Allan Bromley

Embrace a New Age of Exploration

Since he became president, George Bush has sought to cast the annual budget negotiations with Congress in a new light. He has emphasized investments in the future—in education, preventive health care, the transportation infrastructure, environmental protection, the exploration of space and scientific research. In particular, George Bush has given stronger support to science and space than has any president during the past two decades.

Congress also recognizes the importance of investing in science, technology and space, and it has taken a number of steps to increase those investments. But the tight fiscal climate created by the need to reduce the deficit has presented both Congress and the administration with difficult choices. The whole point of last fall's budget agreement was to encourage priority-setting. As the budget season progresses, we must keep in mind the consequences of the choices Congress makes in setting priorities for the nation's future.

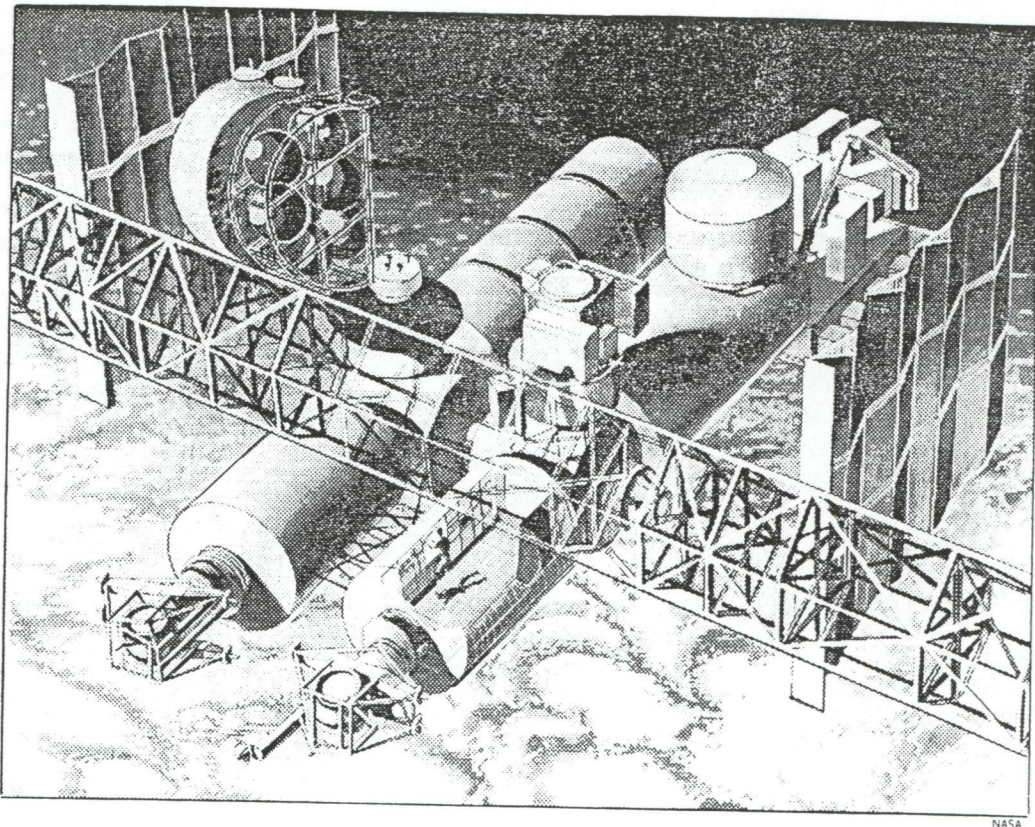
One difficult choice for Congress involves Space Station Freedom. Last month a House Appropriations subcommittee voted to eliminate funding for the space station, with the funds going instead to other programs, including those of the Veterans Administration and the Department of Housing and Urban Development. The full House later reversed the subcommittee's decision on the space station, but chose to offset that by freezing all of NASA's funding. Although space science would continue to constitute about 10 percent of NASA's activities, needed growth in NASA programs requested by the administration would be lost.

Opponents of the space station have presented the tradeoff as being between space and science, but the administration does not believe that the debate should be cast in these terms. Nor is it a matter of big science vs. little science. It is between investments in the future and current consumption.

The administration believes that its budget strikes a careful balance between our current needs—including our commitments to veterans and the homeless—and future investments. By ending the Veterans Administration and HUD at levels higher than the increases requested by the administration, the House is tilting this balance and contributing to a long-term decline in future investments by the federal government.

Space Station Freedom has never been primarily a science project, just as the Apollo program was not primarily a science mission. Rather, the space station is our initial permanent step into space, the critical next chapter in a grand story of exploration that will take humans away from our home planet into an endless frontier.

There is also one form of scientific research that can be done only with a permanent, manned outpost in space. We need to know how humans adapt to the harsh and unforgiving environment of space and to prolonged weightlessness. This is a major scientific effort, involving substantial



numbers of astronauts in space, will be needed to understand the physiological and behavioral changes that occur in space and to devise methods for coping with them. Much work needs to be done to carry out such a program. Scientists and engineers need to work constructively with NASA, the administration and Congress toward this end.

Like the scientific returns, the technological returns from the station are impossible to predict but are certain to be rich. The Apollo program offers a good analogy. When the National Academy of Engineering recently picked the top 10 engineering projects of the past quarter-century, the Apollo program ranked first, ahead even of the microprocessor and communication satellites. The Apollo program also represented the first time in the history of our species when a quantum leap in both science and technology took place without the impetus of a global war.

Those who argue that money saved from the station will go to research and development overlook the pressures being exerted on Congress. The point missed is that the probability of funding both science and space is maximized when the two stick together as part of one future-oriented coalition. As Budget Director Richard Darman said in testimony before the House Committee on Science, Space and Technology, "The reality is that appropriators will tend to do exactly what the station-killing committee has proposed to do: give no more to science than in the president's budget; reduce

station to zero; and reallocate every single dollar thus 'saved' to nonscience."

Killing the space station would also threaten our ability to fund areas of science and technology far removed from space. The public supports scientific research and manned space exploration for two primary reasons: because it believes these investments pay off and because of the intellectual excitement and adventure these activities provide. Space exploration has captured the imagination of much of the American public, especially our youth. In the 1960s the Apollo program inspired many of them to become scientists and engineers, even if they did not work directly in the space program. To attract the next generation of scientists and engineers, and to promote science and technology much more broadly in our society, a manned space program is essential as part of a balanced space exploration program.

The House's decision to save the space station has set the stage for more positive actions by the Senate. But Congress now faces a choice: By expending only one-third of one percent of our GNP on NASA, we can embrace a new age of exploration. Or we can choose to spend the money on the political system's insatiable consumption habits, thereby closing the door on space—the next great frontier—and on America's leadership on that frontier. The choice, to me, seems clear.

The writer is assistant to the president for science and technology.

"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9200172

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: ALBRECHT, Mark J.: NATIONAL SPACE COUNCIL

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 01/14/92

SUBJECT: A THANK YOU LETTER TO DR. BROMLEY FOR PROVIDING
NOMINEES FOR THE VICE-PRESIDENT'S SPACE POLICY
ADVISORY BOARD. A LIST OF THE MEMBERS IS PROVIDED.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #:

CONTACT PERSON:
PHONE:

EXT:

REMARKS:

OSTP RECEIVED: 01/17/92 DEPT RECEIVED:
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CENTRAL FILES:

NATIONAL SPACE COUNCIL
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20500

RECEIVED

January 14, 1992 92 JAN 17 P 2: 23

OSTP
MAIL ROOM

The Honorable D. Allan Bromley, PhD
Assistant to the President for Science
and Technology and Director, Office
of Science and Technology Policy
Washington, D.C. 20500

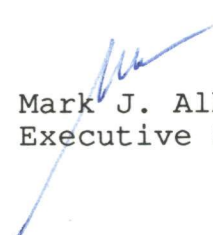
Dear Dr. Bromley: 

I'd like to take this opportunity to thank you for providing nominees for the Vice President's Space Policy Advisory Board. Your nominations, along with many others submitted from a variety of government, academic, and private sector sources, provided us with an impressive pool of expertise to select from.

Enclosed for your information is a list of the full membership of the Board which the Vice President will announce today.

We look forward to working with the Board and thank you for your valuable input.

Sincerely,



Mark J. Albrecht
Executive Secretary

Enclosure
Vice President's Space Policy Board
Members Press Release

OFFICE OF THE VICE PRESIDENT
Office of the Press Secretary

FOR IMMEDIATE RELEASE

JANUARY 14, 1992

SPACE POLICY ADVISORY BOARD MEMBERS APPOINTED

Vice President Quayle announced today the appointment of thirty-three members to his Space Policy Advisory Board. The Vice President had earlier announced that Dr. Laurel L. Wilkening, Provost and Vice President for Academic Affairs of the University of Washington, would chair the Board.

The Vice President's Space Policy Advisory Board was established by Executive Order #12675, signed by President Bush on April 20, 1989. This executive order also established the National Space Council and named the Vice President Chairman of the Council.

At the specific request of the Vice President, ad hoc sub-committees of the Board will be formed to review current civil, commercial, or national security space policy issues and will assess scientific, technological, engineering, manufacturing, economic, international, or other factors bearing on national space policy issues.

The Vice President solicited nominations for the Board from a variety of government, academic, and private sector sources.

The new Board members represent a broad spectrum of expertise: nine were members of the Committee on the Future of the U.S. Space Program (the "Augustine Committee"), eleven are former NASA employees, three are former astronauts, fifteen have academic backgrounds, four have worked in the Department of Energy's National Laboratories, seven have Department of Defense civilian experience, seven are former military officers, three have other executive branch experience, one is a former U.S. Congressman, six have worked in small aerospace firms, and ten have had experience in large aerospace firms.

Members serve for a two year term.

A copy of the list of Board members is attached.

For additional information call:

Elizabeth Prestridge, National Space Council, 202-395-6175

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VICE PRESIDENT'S SPACE POLICY ADVISORY BOARD

Laurel L. Wilkening (Chairman)
Provost and Vice President for Academic Affairs,
University of Washington

James A. Abrahamson
Executive Vice President for Corporate Development,
Hughes Aircraft Corporation

Edward C. Aldridge
President, McDonnell Douglas Electronic Systems Company

Buzz Aldrin
Space Consultant and former Astronaut

Joseph P. Allen
President and CEO, Space Industries Incorporated; Former
Astronaut

Robert Anderson
Chairman Emeritus, Rockwell International Corporation

Donald James Baker
President, Joint Oceanographic Institutions Incorporated

Paul J. Coleman, Jr.
Director, Institute of Geophysics and Planetary Physics, UCLA

Philip Culbertson
Senior Vice President, External Tanks Corporation

Daniel J. Fink
Space Consultant and President, D.J. Fink Associates Incorporated

John S. Foster, Jr.
Consultant and former Vice President for Science and Technology,
TRW Incorporated

Edward Frieman
Director, Scripps Laboratory, University of California

Allen Fuhs
Consultant and former President, American Institute of
Aeronautics and Astronautics

Craig Fuller
President and CEO, Hill & Knowlton Incorporated

Don Fuqua
President, Aerospace Industries Association

Robert T. Herres

President, Property and Casualty Division, United Services Automobile Association; Former Vice Chairman, Joint Chiefs of Staff

Louis J. Lanzerotti

Physicist, AT&T Bell Laboratories

John M. Logsdon

Director, Space Policy Institute, George Washington University

Alan M. Lovelace

Corporate Senior Vice President and Chairman of Commercial Launch Services, General Dynamics Corporation

Richard P. MacLeod

President, United States Space Foundation

Richard J. Messina

President, Messina and Graham Management Consultant Firm

Walter E. Morrow, Jr.

Director, Lincoln Laboratory, MIT

Bruce C. Murray

Professor of Planetary Science, California Institute of Technology

Thomas O. Paine

Consultant and former NASA Administrator

Frederick W. Perkins

President and CEO, Standard Space Platforms Corporation

John L. Piotrowski

Consultant and former Commander in Chief, U.S. Space Command/NORAD

Robert W. Poole, Jr.

President, Reason Foundation

Glenn H. Reynolds

Professor of Law, University of Tennessee

Richard Ringeon

Former Chairman and CEO, Ball Corporation

Joseph F. Shea

Professor of Aeronautics and Astronautics, MIT; Former Senior Vice President, Raytheon Company

Thomas P. Stafford

Vice Chairman, Stafford, Burke, and Hecker Incorporated;
Former Astronaut

Edward Teller

Physicist and Director Emeritus, Lawrence Livermore National
Laboratory

Thomas A. Tombrello

Professor of Physics, California Institute of Technology

Charles R. Trimble

CEO, Trimble Navigation

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9200029
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: TRULY, Richard H.: NASA

TO: DR. D.A. BROMLEY

① Doug ✓
② Karl

DATE OF
CORRESPONDENCE: 01/03/92

SUBJECT: HE REQUESTS DR. BROMLEY'S PERSONAL VIEWS IN ADVANCE
OF THE OMB CLEARANCE PROCESS FOR THE NASA STRATEGIC
PLAN.

DIRECTORATE STAFF
ASSIGNED: PHYSICAL SCIENCES ASSIGNED:

ACTION STAFF
REQUIRED: AS APPROPRIATE ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 01/20/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:

REMARKS: I gave DAB a draft talking paper on "Vision 21" per
his request. Doug 1/9/92

P-
OSTP RECEIVED: 01/06/92 DEPT RECEIVED:
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National Aeronautics and
Space Administration

Washington, D.C.
20546

Office of the Administrator

RECEIVED

92 JAN 6 P 2: 55

January 3, 1992

OSTP
MAIL ROOM

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:

Because of your personal interest in NASA and the civil space program, I wanted you to have a copy of an important NASA document and to solicit your personal views in advance of the formal OMB clearance process. I've also provided an advance copy to Mark Albrecht, Dick Darman, and Bob Grady.

During the course of the last year, members of the NASA management team have been working to formulate a multiyear strategic plan. This effort involved the active participation of NASA Headquarters and Field Center personnel and culminated with a senior management review of the proposed plan in Washington, D.C., this past December.

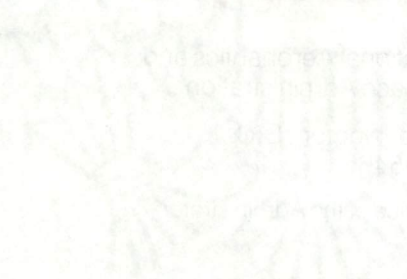
The final product generated by this effort is "Vision 21 - The NASA Strategic Plan" which I have endorsed and intend to submit to the Congress in conjunction with the fiscal year 1993 NASA budget. The strategic plan should serve as a very useful roadmap of the future for the NASA team, as well as respond to the Congressional requirement contained in House Report 102-226, the VA-HUD-Independent Agencies FY 1992 Appropriations Bill Conference Report, that NASA submit a strategic plan concurrently with the fiscal year 1993 budget.

Best wishes for a successful and productive new year, and thank you for your sustained commitment to NASA and the civil space program.

Sincerely,


Richard H. Truly
Administrator

Enclosure



1930

Bellevue

[Faint, mostly illegible text in the middle section of the page, possibly bleed-through from the reverse side.]

[Handwritten signature or name, possibly "J. J. ..."]

Thank you very much
for the (1930) and the
all ones



Vision 21

The NASA Strategic Plan