

Originally Processed With FOIA(s):
2005-0336-F

FOIA Number:
2005-0336-F

FOIA MARKER

**This is not a textual record. This is used as an
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Library Staff.**

Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: National Security Council
Series: Barth, Richard, Files
Subseries: Subject Files

OA/ID Number: CF00957
Folder ID Number: CF00957-016

Folder Title:
PCAST [President's Council of Advisors on Science Technology]

Stack:	Row:	Section:	Shelf:	Position:
V	3	8	5	0

File
PCAST

5AUG91

DON,

ATTACHED DRAFT FYI. IT IS EXPECTED TO BE SIGNED WITH LITTLE
OR NO CHANGE.

PRESIDENT'S GUIDANCE AND NATIONAL SECURITY STRATEGY PARTS OF
THE DRAFT ARE HIGHLIGHTED.

A handwritten signature in cursive script, appearing to read "Tom", written in dark ink.

TOM WELCH



DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

WASHINGTON, DC 20301-3010

21 AUG 1991

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARY OF DEFENSE FOR POLICY
ASSISTANT SECRETARY OF DEFENSE (COMMAND, CONTROL,
COMMUNICATIONS AND INTELLIGENCE)
ASSISTANT SECRETARY OF DEFENSE (PRODUCTION AND
LOGISTICS)
ASSISTANT SECRETARY OF DEFENSE (PROGRAM ANALYSIS
AND EVALUATION)
COMPTROLLER
GENERAL COUNSEL
ASSISTANT TO THE SECRETARY OF DEFENSE
(INTELLIGENCE POLICY)
DIRECTOR, ACQUISITION POLICY AND PROGRAM
INTEGRATION
DIRECTOR, ADMINISTRATION AND MANAGEMENT
DIRECTOR, DEFENSE ADVANCED RESEARCH PROJECTS
AGENCY
DIRECTOR, DEFENSE NUCLEAR AGENCY
DIRECTOR, STRATEGIC DEFENSE INITIATIVE
ORGANIZATION

SUBJECT: Direction for the DoD Science and Technology Program

Your coordination on the memorandums and associated attachments at TAB A and TAB B is requested. These documents were prepared in collaboration with senior science and technology representatives from the Military Departments, Defense Agencies and Director, Defense Research and Engineering staff. It is my desire to forward both documents to the Deputy Secretary of Defense for signature prior to September 13, 1991. Accordingly, I request your coordination no later than September 6, 1991.


Charles E. Adolph

By Direction of the Secretary of Defense

Attachments

cc:

DOT&E

USD(A), Ms Spector; Col Mushala

TAB A

COORDINATION SHEET

SUBJECT: SCIENCE & TECHNOLOGY STRATEGIC FRAMEWORK AND ACTION PLAN

OFFICE/DEPARTMENT/AGENCY	<u>CONCUR</u>	<u>DATE</u>
ARMY	_____	_____
NAVY	_____	_____
AIR FORCE	_____	_____
JCS	_____	_____
USD(P)	_____	_____
ASD(C3I)	_____	_____
ASD(P&L)	_____	_____
ASD(PA&E)	_____	_____
COMP	_____	_____
OGC	_____	_____
ASD(IP)	_____	_____
AP&PI	_____	_____
DA&M	_____	_____
DARPA	_____	_____
DNA	_____	_____
SDIO	_____	_____



THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

DRAFT

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
ASSISTANT SECRETARIES OF DEFENSE
COMPTROLLER
GENERAL COUNSEL
INSPECTOR GENERAL
DIRECTOR OF OPERATIONAL TEST AND EVALUATION
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTOR OF ADMINISTRATION
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: SCIENCE AND TECHNOLOGY STRATEGIC FRAMEWORK AND ACTION
PLAN

As President Bush said last summer, "The nature of national defense demands that we plan now for the threats on the distant horizon." The rapidly changing world situation has made those threats increasingly uncertain and placed even more emphasis on the requirement to maintain the technological lead. To ensure a robust program in science and technology and to focus our research and development work throughout the Department the Director of Defense Research and Engineering has developed the attached Strategic Framework and Action Plan and I am directing their execution. ✓

The Director of Defense Research and Engineering is hereby delegated the authority and responsibility for ensuring implementation of this memorandum. In this regard, he shall issue such directives as may be necessary, review progress on a continuing basis, and report to me periodically on that progress.

The Director of Administration and Management, in coordination with the appropriate officials of the Department, shall prepare directives and revisions to directives to incorporate the substance of the Action Plan as appropriate into the Department of Defense Directives System. No increase in the number of personnel in the Office of the Secretary of Defense shall occur as a result of implementation of the Plan.

Attachments

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01a. Report	Strategic Framework for Defense Science and Technology (5 pp.)		(b)(1)	

Collection:

Record Group: Bush Presidential Records

Office: National Security Council

Series: Barth, Richard, Files

Subseries: Subject Files

WHORM Cat.:

File Location: PCAST [President's Council of Advisors on Science Technology]

Date Closed:	1/19/2010	OA/ID Number:	CF00957-016
FOIA/SYS Case #:	2005-0336-F	Appeal Case #:	
Re-review Case #:		Appeal Disposition:	
P-2/P-5 Review Case #:		Disposition Date:	
AR Case #:		MR Case #:	
AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P-1 National Security Classified Information [(a)(1) of the PRA]
P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P-3 Release would violate a Federal statute [(a)(3) of the PRA]
P-4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

(b)(1) National security classified information [(b)(1) of the FOIA]
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(b)(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01b. Report	Defense Science and Technology Action Plan (3 pp.)		(b)(1)	

Collection:

Record Group: Bush Presidential Records

Office: National Security Council

Series: Barth, Richard, Files

Subseries: Subject Files

WHORM Cat.:

File Location: PCAST [President's Council of Advisors on Science Technology]

Date Closed:	1/19/2010	OA/ID Number:	CF00957-016
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TAB B

COORDINATION SHEET

SUBJECT: SCIENCE & TECHNOLOGY PROGRAMMING GUIDANCE FOR POM94

OFFICE/DEPARTMENT/AGENCY	CONCUR	DATE
ARMY		
NAVY		
AIR FORCE		
JCS		
USD(P)		
ASD(C3I)		
ASD(P&L)		
ASD(PA&E)		
COMP		
OGC		
ASD(IP)		
AP&PI		
DA&M		
DARPA		
DNA		
SDIO		



THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

DRAFT

UNCLASSIFIED

MEMORANDUM FOR: SECRETARIES OF THE MILITARY DEPARTMENT
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
ASSISTANT SECRETARIES OF DEFENSE
COMPTROLLER
GENERAL COUNSEL
DIRECTOR OF OPERATIONAL TEST AND EVALUATION
DIRECTORS OF DEFENSE AGENCIES

SUBJECT: Science and Technology Programming Guidance for POM 94

Defense science and technology strategies, like Defense acquisition strategies, will differ markedly in this FYDP from those of the past. We are faced with a rapidly changing, and increasingly lethal, global environment that demands that we maintain investment hedges against technological surprise by potential adversaries. Such surprises, or our own technological development, could result in significant shifts in the commonly accepted standards at the foundation of our previous defense planning and system acquisitions. At the same time, we are confronted with fiscal realities which collectively demand a more focused effort in ongoing acquisition efforts, possibly sustaining advanced technological development at the expense of more aggressive production programs.

This global environment demands that we sustain a robust S&T program as the foundation for our future defense capabilities. Therefore, the Military Departments and Defense Agencies will program for S&T (6.1, 6.2 and 6.3A) activities across the FYDP not less than zero percent real growth from the level in the FY-92 President's Budget, with a goal of 2% real growth. A healthy Advanced Technology Development (6.3A) program to evolve and realistically test promising technology base efforts and to transition them into engineering and manufacturing development may require a fluctuation above the 2% real growth level depending upon new systems and technology insertion needs.

In planning our 6.1, 6.2, and 6.3A S&T investments, a critical balance must be maintained between preserving the core of broad, sustaining programs, and taking specific initiatives to lay the foundation for acquiring new, militarily significant warfighting capabilities. Within this latter portion of the program, we are taking action to focus a significant portion of the DoD S&T investment on a limited number of key thrust areas that contribute directly to broadly applicable, high priority defense needs. A seventh task of equal importance is the application of advanced technology to improving design and

manufacturing processes to reduce the costs and production time of our major system acquisitions. These thrust areas are enumerated at Tab A. We will focus and sustain our S&T investments in support of these seven thrusts areas such that we will provide the technological foundations for fielding these capabilities in not more than 15 years. Military Department and Defense Agency S&T investment strategies will be evaluated to ensure that a balance has been achieved between the broad core program and these focused initiatives across the DoD.

Each of the Military Departments and Defense Agencies, therefore, will submit with its FY 94-95 budget its S&T investment strategy and action plan for investing in these seven thrust areas. This input will include summary data in the format at Tab B and, where applicable, will be coordinated through the appropriate Defense Project Reliance panels.

The DDR&E will periodically review the programmed S&T investments to ensure they are responsive to this guidance and identified needs of the operational forces.

Attachments

S&T THRUST AREAS

1. Global surveillance and communications, focused on a theater of operations with sufficient fusion and planning assets.
2. All-weather, day/night precision strike against 21st century critical mobile and fixed targets.
3. All-weather defense against very low observable cruise missiles, ballistic missiles and aircraft.
4. Undersea superiority against open ocean, coastal and regional threats posed by advanced, stealthy nuclear and non-nuclear submarines and by undersea mine warfare.
5. All-weather, day/night, survivable, mobile, and lethal ground combat vehicles.
6. Technology for Training and Readiness, including embedded training, distributed simulation, and virtual environment depiction.
7. Reduction of DoD acquisition time and cost while improving performance.

S&T THRUST AREA DISPLAY

PE

Thrust Area FY-92 FY-93 FY-XX

Total 6.1

Total 6.2

Total 6.3A

**National Security Council
The White House**

PCAST Themed 300

BS approval

before paper can be done.

PROOFED BY: W58

LOG # 6568

URGENT NOT PROOFED: _____

SYSTEM PBS NSC INT

BYPASSED WW DESK: _____

DOCLOG PA A/O _____

W58

Ken Hill

SEQUENCE TO

HAS SEEN

DISPOSITION

1

K

A

Bill Sittmann

Bob Gates

2

Brent Scowcroft

3

APNSA Has Sec

Bill Sittmann

Situation Room

West Wing Desk

4

QW 9/7

NSC Secretariat

Deal

5

FFA

91 AUG 6 P7: 21

A = Action I = Information D = Dispatch R = Retain N = No further Action

cc: VP Sununu Other _____

Should be seen by: _____
(Date/Time)

COMMENTS *Suggested Themed 300 mtg w/PCAST on 9/12. If BS agrees with these Themed, Tim Deal will do TP's / paper for BS.*

DISPATCH INSTRUCTIONS:

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02a. Presentation	Powerpoint presentation for PCAST Meeting (9 pp.)	9/12/91	(b)(1)	C

Collection:

Record Group: Bush Presidential Records

Office: National Security Council

Series: Barth, Richard, Files

Subseries: Subject Files

WHORM Cat.:

File Location: PCAST [President's Council of Advisors on Science Technology]

Date Closed:	1/19/2010	OA/ID Number:	CF00957-016
FOIA/SYS Case #:	2005-0336-F	Appeal Case #:	
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P-2/P-5 Review Case #:		Disposition Date:	
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Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02b. Memorandum	To: Solomon Buchsbaum From: Allan Bromley Re: Revised Terms of Reference for PCAST Panel on Science, Technology, and National Security (2 pp.)	7/19/91	(b)(1)	

Collection:

Record Group: Bush Presidential Records

Office: National Security Council

Series: Barth, Richard, Files

Subseries: Subject Files

WHORM Cat.:

File Location: PCAST [President's Council of Advisors on Science Technology]

Date Closed:	1/19/2010	OA/ID Number:	CF00957-016
FOIA/SYS Case #:	2005-0336-F	Appeal Case #:	
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**PRESIDENT'S COUNCIL OF ADVISORS
ON SCIENCE AND TECHNOLOGY**

**PANEL ON
SCIENCE, TECHNOLOGY AND NATIONAL SECURITY**

Chairman

Solomon J. Buchsbaum

**Senior Vice President
Technology Systems
AT&T Bell Laboratories
Member of PCAST**

Vice Chairman

John S. Foster

**Vice President
Science and Technology
TRW, Inc.**

**and
Chairman
Defense Science Board**

Panel Members

David Packard

**Chairman of the Board
Hewlett-Packard Company
1501 Page Mill Road
Palo Alto, CA 94304
Member of PCAST**

Ashton Carter

**Director
Center for Science and International Affairs
Harvard University
John F. Kennedy School of Government
79 JFK Street
Cambridge, MA 02138**

Lew Allen

**1040 South Arroyo Boulevard
Pasadena, CA 91105**

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Martin Marietta Corporation
6801 Rockledge Drive
Bethesda, MD 20817**

George Heilmeier

**President and Chief Executive Officer
BELLCORE
1E310
290 W. Mt. Pleasant Avenue
Livingstone, NJ 07039**

Edward A. Frieman

**Director
Scripps Institution of Oceanography
University of California, San Diego
9500 Gillman Drive, Mail Code 0210
La Jolla, CA 92093**

Thomas J. Murrin

**Dean
School of Business and Administration
Duquesne University
Rockwell Hall
Pittsburg, PA 15282**

Office of Science and Technology Policy Representatives

Michelle Van Cleave

**Assistant Director for National Security
(202) 395-7326**

Charles Herzfeld

**Senior Director of the Panel
(202) 395-1330**

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02c. Memorandum	To: Brent Scowcroft From: Richard Barth Re: Talking Points for PCAST Meeting (1 pp.)	9/11/91	(b)(1)	C

Collection:

Record Group: Bush Presidential Records

Office: National Security Council

Series: Barth, Richard, Files

Subseries: Subject Files

WHORM Cat.:

File Location: PCAST [President's Council of Advisors on Science Technology]

Date Closed:	1/19/2010	OA/ID Number:	CF00957-016
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Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02d. Comments	Comments for Meeting of President's Council of Advisors on Science and Technology (4 pp.)	9/11/91	(b)(1)	C

Collection:

Record Group: Bush Presidential Records

Office: National Security Council

Series: Barth, Richard, Files

Subseries: Subject Files

WHORM Cat.:

File Location: PCAST [President's Council of Advisors on Science Technology]

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Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02e. Memorandum	To: Brent Scowcroft From: Richard Barth Re: Meeting with PCAST (2 pp.)	9/6/91	(b)(1)	

Collection:

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Withdrawal/Redaction Sheet

(George Bush Library)

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(b)(9) Release would disclose geological or geophysical information

**THE PRESIDENT'S COUNCIL OF ADVISORS
ON
SCIENCE AND TECHNOLOGY
(PCAST)**

**D. ALLAN BROMLEY, Assistant to the President for Science and Technology, and
Director of the Office of Science and Technology Policy, Executive Office of the
President. (Chairman)**

**NORMAN BORLAUG, Distinguished Professor, Department of Soils and Crop
Sciences, Texas A&M University.**

**SOLOMON BUCHSBAUM, Senior Vice President, Technology Systems, AT&T Bell
Laboratories.**

**CHARLES DRAKE, Albert Bradley Professor of Earth Sciences and Professor of
Geology, Dartmouth College.**

RALPH GOMORY, President, The Sloan Foundation.

PETER LIKINS, President, Lehigh University.

**THOMAS LOVEJOY, Assistant Secretary for External Affairs, The Smithsonian
Institution.**

JOHN McTAGUE, Vice President, Technical Affairs, Ford Motor Company.

**DANIEL NATHANS, Professor of Molecular Biology and Genetics, Johns Hopkins
University School of Medicine.**

DAVID PACKARD, Chairman of the Board, Hewlett-Packard Company.

HAROLD SHAPIRO, President, Princeton University.

PCAST PANELS

Panels

High Performance Computing and Communications

International Economic Competitiveness

Bioscience and Biotechnology

Education and Human Resources

Technology and National Security

Global Environment and Natural Resources

Megaprojects in the Sciences

Chairmen

**Solomon Buchsbaum
Ralph Gomory**

**Ralph Gomory
Harold Shapiro**

Dan Nathans

**Peter Likins
Charles Drake**

**Solomon Buchsbaum
John S. Foster ***

**Thomas Lovejoy
David Packard
Norman Borlaug**

**John McTague
Harold Shapiro**

* Chairman, Defense Science Board

DRAFT

September 3, 1991

PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY

SEPTEMBER 12-13, 1991
AGENDA

THURSDAY, SEPTEMBER 12, 1991

OPEN SESSION 9:00 AM - 10:30 AM
CONFERENCE ROOM
COUNCIL ON ENVIRONMENTAL QUALITY
722 JACKSON PLACE, NW

8:30 - 9:00	ARRIVAL AND COFFEE	
9:00 - 9:15	OPENING REMARKS	DR. BROMLEY
9:15 - 10:00	THE OSTP BIENNIAL REPORT	DR. WELLS
10:00 - 10:15	DISCUSSION	DR. BROMLEY
10:15 - 11:00	THE PRESIDENT'S COUNCIL ON COMPETITIVENESS	MR. HUBBARD
11:00 - 11:15	CLOSING REMARKS AND MOVE TO ROOM 476, OLD EXECUTIVE OFFICE BUILDING	DR. BROMLEY

DRAFT

THURSDAY, SEPTEMBER 12, 1991 Continued...

CLOSED SESSION 11:30 - 5:00 PM

ROOM 476

OLD EXECUTIVE OFFICE BUILDING

11:30 - 12:00	DISCUSSION OF PCAST PANEL DRAFT PAPERS AND REPORTS - Science, Technology and National Security	DR. BUCHSBUAM DR. FOSTER
12:00 - 1:00	LUNCH (In Indian Treaty Room)	
1:00 - 2:45	DISCUSSION OF PCAST PANEL DRAFT PAPERS AND REPORTS - High Performance Computing and Communications - Bioscience and Biotechnology - Education and Human Resources - Megaprojects in the Sciences - International Economic Competitiveness - Global Environment and Natural Resources	DR. BUCHSBAUM DR. NATHANS DR. LIKINS DR. MCTAGUE DR. GOMORY DR. LOVEJOY DR. BORLAUG MR. PACKARD
2:45 - 3:00	BREAK	
3:00 - 3:45	S&T STATISTICS AND DATA COLLECTION	DR. NORWOOD
3:45 - 4:00	DISCUSSION	DR. BROMLEY
4:00 - 4:45	THE PRESIDENT'S NATIONAL SECURITY STRATEGY	GENERAL SCOWCROFT
4:45 - 5:00	OTHER BUSINESS AND CLOSING REMARKS	DR. BROMLEY

DRAFT

FRIDAY, SEPTEMBER 13, 1991

**CLOSED SESSION 9:00 AM - 12:00 NOON
CEA CONFERENCE ROOM
ROOM 324
OLD EXECUTIVE OFFICE BUILDING**

8:30 - 8:50	ARRIVAL AND COFFEE <u>(DR. BROMLEY'S OFFICE, ROOM 358, OEOB)</u>	
8:50 - 9:00	MOVE TO ROOM 324	
9:00 - 9:15	OPENING REMARKS	DR. BROMLEY
9:15 - 10:00	S&T AND COMPETITIVENESS, AND THE ECONOMIC POLICY COUNCIL	SECRETARY BRADY
10:00 - 11:00	DISCUSSION	DR. BROMLEY
11:00 - 11:30	DISCUSSION OF OCTOBER AGENDA AND FUTURE MEETING FORMAT	DR. BROMLEY
11:30 - 12:00	OTHER BUSINESS AND CLOSING REMARKS	DR. BROMLEY

**CLOSED SESSIONS 12:00 PM - 3:00 PM
OLD EXECUTIVE OFFICE BUILDING**

12:00 - 3:00	PANEL DISCUSSIONS - OEOB ROOM 476 - Education and Human Resources	DR. LIKINS
12:00 - 2:00	PANEL DISCUSSIONS - ROOM TO BE DETERMINED - Megaprojects in the Sciences	DR. MCTAGUE

THE WHITE HOUSE
WASHINGTON

July 9, 1991

File
PCAST

**MEETING WITH THE PRESIDENT'S COUNCIL OF ADVISORS ON
SCIENCE AND TECHNOLOGY**

DATE: Wednesday, July 10, 1991
LOCATION: Roosevelt Room
TIME: 3:45 P.M.

FROM: D. ALLAN BROMLEY



I. PURPOSE

To meet with your Council of Advisors on Science and Technology to review their progress on a number of issues.

II. BACKGROUND

The President's Council of Advisors on Science and Technology (PCAST) was established by Executive Order 12700 on January 19, 1991. The PCAST was extended through June 30, 1993 by an Executive Order dated June 28, 1991.

The PCAST consists of ten eminent American scientists, industry leaders, and distinguished members of the academic and research communities appointed by you to give advice on issues involving science and technology.

The PCAST will present a status report on the various panels established to review a variety of science and technology issues. As the attached memorandum of July 2, 1991 indicates, a number of issues have been given to the panels for further discussion. The issue areas include mathematics and science education, global environment and natural resources, international economic competitiveness, technology and national security, bioscience and biotechnology, "megaprojects" in the sciences, and high performance computing and communications.

III. PARTICIPANTS

See attached list.

IV. PRESS PLAN

White House Photographer Only.

V. SEQUENCE OF EVENTS

- You enter the Roosevelt Room and greet the Council members.
- You open the meeting.
- Overview of the PCAST Panels - D. Allan Bromley
- Discussion

VI. REMARKS

None required. 31

Attachments

PARTICIPANTS

The President

John Sununu

Richard Darman

Michael Boskin

D. Allan Bromley

Roger Porter

Brent Scowcroft

Michael Deland

Norman Borlaug

Solomon ("Sol") Buchsbaum

Charles Drake

Bernadine Healy

Peter Likins

Thomas Lovejoy

Walter Massey

Daniel Nathans

John McTague

D. A. Henderson

William Phillips

J. Thomas Ratchford

Eugene Wong

Maryanne Bach

Karl Erb

Charles Herzfeld

Rachel Levinson

Nancy Maynard

William Snyder

Pierre Perrolle

Michelle Van Cleave

Thomas Welch

Kenneth Yale

THE WHITE HOUSE

WASHINGTON

July 2, 1991

MEMORANDUM FOR THE PRESIDENT

FROM:

D. ALLAN BROMLEY *DB*

SUBJECT:

Your Council of Advisors on Science and Technology

Mr. President, I would like to summarize the current activities of your Council of Advisors on Science and Technology.

Since February 1990, the President's Council of Advisors on Science and Technology (PCAST) has met 12 times and held 5 discussions with you. During our meetings, you indicated a number of topics you would like PCAST to consider. Also, the Council has had extensive discussions with various senior officials within the Executive Office of the President, including the Vice President, Michael Boskin, Robert Gates, Michael Deland, and Roger Porter, to help better understand the Administration's goals and how the PCAST could be most helpful. Further, the Council talked in detail with many agency and department heads including James Watkins, Richard Truly, Donald Atwood and others to get their views on how the PCAST could be responsive to you and the Administration.

Mr. President, as Chairman I can report that the PCAST has been listening and is working intently on addressing many issues raised during these discussions. Seven of the most important are briefly described below. Each has been given to separate, ad hoc, discussion groups within PCAST for further discussion and at an appropriate time we would look forward to reporting to you on these deliberations.

The first issue is mathematics and science education. The importance of this issue was touched upon in nearly every PCAST discussion. Council member Peter Likins, President of Lehigh University, has taken the lead in this area with the goal of (1) providing an extragovernmental perspective on the work of governmental groups, including the Committee on Education and Human Resources of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET); and (2) undertaking specific studies to address such relevant questions such as: how best to approach the very serious problems in US precollege education, are undergraduate and graduate enrollments in engineering and the sciences appropriate society's needs and the talents of our population? Are Ph.D. recipients likely to be available to meet demands for faculty in engineering and the sciences in the coming decade? How can enrollments in these areas best be altered?

A second issue involves the global environment and natural resources. Council members Thomas Lovejoy of the Smithsonian, David Packard, and Nobel laureate Norman Borlaug, are taking the initiative to: identify areas of potential interaction and collaboration with the private sector in global change research; provide private sector input on societal needs that can be served by further scientific research in the areas of natural resources, and earth and environmental sciences; and identify areas in need of further study in order to protect biological diversity and minimize the impact of human populations upon it.

International economic competitiveness is a third issue for PCAST focus. As with mathematics and science education, maintaining our science and technology base was pointed to by Administration officials as crucial to increased U.S. economic competitiveness. Council member Ralph Gomory, President of the Sloan Foundation, was asked to lead a group considering the areas of new technology, product improvement, and the technical workforce. Ralph will then work to identify ways to enhance the partnership between the government and the private sector with the goal of improving our competitive position internationally.

The war in the Gulf, among other things, demonstrated and confirmed the vital link between technology and national security. In your statement, **National Security Strategy of the United States**, you acknowledge that the economic and military strength of the United States rests on technological superiority. I have asked Council member Sol Buchsbaum, Senior Vice President for Technology System at AT&T Bell Laboratories, and Johnny Foster, Chairman of the Defense Science Board, together with David Packard and others to define and discuss the role science and technology are expected to play vis-a-vis national security during the decade of the 1990's and beyond in a vastly changed world environment. They will examine how effectively science and technology frontiers are being integrated into our national security activities; identify gaps or deficiencies, and where appropriate, propose alternative mechanisms and approaches.

Because of its promise for improved health care and American quality of life, and because the global market holds many promises for American industry, the area of bioscience and corresponding biotechnology is a fifth PCAST topic. Council member and Nobel laureate Daniel Nathans, Professor of Molecular Biology and Genetics at Johns Hopkins University School of Medicine will chair this effort. Daniel and his group will provide information to PCAST on: ways to enhance the transfer of biotechnology from Federally supported laboratories and University groups to American industry and how to encourage private sector leadership; ways to provide private sector input on current and possible future governmental policies that will enhance basic research in the life sciences and long term research and development by the biotechnology industries.

A sixth area of PCAST focus is on research megaprojects in the sciences. Council member John McTague, Vice President for Technical Affairs at Ford Motor Company, is taking the lead with Harold Shapiro, President of Princeton University. They are examining the relative roles of megaprojects, both of the large-scale, single facility type such as the Superconducting Super Collider and the multi-investigator, multi-facility type such as the Human Genome Project, with the smaller individual

investigator-initiated science projects. They will examine the potential for greater international cooperation in the megaprojects, and suggest the most appropriate fora - governmental and scientific, national and international - in which such cooperation could be further discussed and coordinated.

A seventh topic being addressed by the PCAST is high performance computing and communications. Your Presidential Initiative in the 1992 budget in this very important area laid the groundwork for maintaining and extending U.S. leadership in both the research and education communities. Here, Sol Buchsbaum is taking the lead to build upon current Federal activities and to explore ways to encourage the private sector participation and leadership that will maintain and ensure future U.S. competitiveness in this field.

The Council is pleased to respond to the challenge you have given it in examining these issues, and values the opportunities it has had thus far to provide advice. We look forward to providing you with additional private input on each of these seven areas and on others of importance to you and your Administration.

UNCLASSIFIED
NSC/S PROFILE

RECORD ID: 9009726
RECEIVED: 12 DEC 90 16

TO: BROMLEY, D

FROM: SITTMANN

DOC DATE: 13 DEC 90
SOURCE REF:

KEYWORDS: SCIENTIFIC

WH REFERRAL

*file
PCAST*

PERSONS:

SUBJECT: BRIEFING BY PRES COUN OF ADVISORS ON SCIENCE & TECHNOLOGY / PCAST

ACTION: SITTMANN SGD WH REFERRAL

DUE DATE: 13 DEC 90

STATUS: C

STAFF OFFICER: BARTH

LOGREF:

FILES: WH

NSCP:

CODES:

DOCUMENT DISTRIBUTION

FOR ACTION

FOR CONCURRENCE

FOR INFO
BARTH

COMMENTS: _____

DISPATCHED BY ✓ DATE _____ BY HAND W/ATTCH

OPENED BY: NSMEM

CLOSED BY: NSMJT

DOC 2 OF 2

UNCLASSIFIED

NATIONAL SECURITY COUNCIL EXECUTIVE SECRETARIAT STAFFING DOCUMENT

TIME STAMP

SYSTEM LOG NUMBER:

9726

ACTION OFFICER:

BARTH *RB*

DUE: 10:AM

13 DEC 90

☐ Prepare Memo For Scowcroft/Gates

☐ Appropriate Action

☐ Prepare Memo For Cicconi

☐ Prepare Memo for Sittmann

☒ Prepare Memo Sittmann

to Bromley wife Cicconi

CONCURRENCES/COMMENTS*

PHONE* to action officer at ext. 3550

Concur FYI

☐ ☐ Barth
☒ ☐ Basora *concur*
☐ ☐ Beers
☐ ☐ Broome
☐ ☐ Burns
☐ ☐ Canas
☐ ☐ Charles
☐ ☐ Coulson
☐ ☐ Davis
☒ ☐ Deal *No cmt*
☐ ☐ Dorminey
☐ ☐ Dyke
☐ ☐ Frasure
☐ ☐ Fry
☐ ☐ Gordon
☐ ☒ Gompert
☐ ☐ Haass
☐ ☐ Hayden

Concur FYI

☐ ☐ Hutchings
☐ ☐ Jackson
☐ ☐ Johnson
☐ ☐ Kanter
☐ ☐ Kitchen
☐ ☐ Kuehne
☐ ☐ Lampley
☐ ☐ Lundsager
☐ ☒ Melby
☐ ☐ Menan
☐ ☐ Merchant
☐ ☐ Miller
☐ ☐ Needles
☐ ☐ O'Leary
☐ ☐ Paal
☐ ☐ Pacelli
☐ ☐ Pavitt
☐ ☐ Pilling

Concur FYI

☐ ☐ Poneman
☐ ☐ Popadiuk
☐ ☐ Pryce
☐ ☐ Rademaker
☐ ☐ Rice
☒ ☐ Rostow *Rademaker concurs for*
☐ ☐ Tilley
☐ ☐ Tobey
☐ ☐ Van Eron
☐ ☐ Watson
☐ ☐ Welch
☐ ☐ Whitley
☐ ☐ Wilson
☐ ☐ Working
☐ ☐ Zelikow
☐ ☐ _____
☐ ☐ _____
☐ ☐ _____

INFORMATION

☒ Sittmann
☐ Scowcroft (advance)

☒ Hill
☐ Gates (advance)

☒ Exec Sec Desk
☒ Secretariat

COMMENTS

Logged By

GLM

Return to Secretariat
379 OEGB

WHITE HOUSE STAFFING MEMORANDUM

DATE: 12/12/90

ACTION/CONCURRENCE/COMMENT DUE BY: 12/13/90 NOON

SUBJECT: PCAST BRIEFING MATERIAL

	ACTION FYI			ACTION FYI	
VICE PRESIDENT	☐	☒	MCCLURE	☐	☐
SUNUNU	☐	☒	NEWMAN	☐	☐
SCOWCROFT	☒	☐	PORTER	☒	☐
DARMAN	☒	☐	ROGICH	☐	☐
CARD	☐	☒	UNTERMAYER	☐	☐
CICCONI	☐	☒	BOSKIN	☒	☐
DEMAREST	☐	☐	BROMLEY	☐	☒
FITZWATER	☐	☐		☐	☐
GRAY	☐	☐		☐	☐
HAGIN	☐	☐		☐	☐
HOLIDAY	☒	☐		☐	☐

REMARKS:

Please forward any comments directly to D. Allen Bromley, Rm. 358, x7116, no later than NOON, Thursday, December 13, with a copy to my office. Thank you.

RESPONSE:

To: D. ALLEN BROMLEY

December 13, 1990

The NSC concurs with the attached.

William F. Sittmann
 William F. Sittmann
 Executive Secretary

cc: James W. Cicconi

James W. Cicconi
 James W. Cicconi
 Assistant to the President
 and Deputy to the Chief of Staff
 Ext. 2702

THE WHITE HOUSE
WASHINGTON

December 11, 1990

MEMORANDUM FOR THE PRESIDENT

FROM: D. ALLAN BROMLEY

SUBJECT: Briefing by the President's Council
of Advisors on Science and Technology

Attached are two papers prepared by your Council of Advisors on Science and Technology (PCAST), and one paper prepared through an interagency process, that will be used in discussions at their next meeting with you. The first is entitled "Education in Science and Mathematics: Meeting the National Education Goals"; the second is entitled "Technology and the American Standard of Living." The two PCAST papers are summarized below. The third paper, "U.S. Technology Policy," is a compilation of current Federal government policies that affect technology.

The two PCAST papers have been circulated to a number of offices within the Executive Office of the President for review and comment. Because PCAST is chartered as an independent advisory body it is appropriate for them to provide you with independent advice. We believe, however, that it is important for your White House staff to have an opportunity to respond to the thoughts of this group, which would also allow the PCAST to obtain a better understanding of Administration interests and policies. As a result, we have summarized here the major issues that were raised in the review process. In addition, comments received on the papers will be shared with PCAST members in preparation for their next meeting.

"MEETING THE NATIONAL EDUCATION GOALS"

The first paper applauds your leadership, and that of the nation's Governors, in moving education toward the top of the nation's agenda. It points out, however, that achieving the goals will require a fundamental restructuring of elementary and secondary education in America. The goals themselves are an important element of this restructuring, in that they focus on performance or levels of achievement rather than processes or inputs such as the amount of time a student spends in a particular class. Past reforms have most often involved changes in inputs, and the results of these reforms have been generally disappointing.

A number of other fundamental changes will also be required to meet the national goals. Promising approaches include the introduction of parental choice in education, rewarding exceptional teachers, reducing impediments to change through school-based management, and a shift in focus in education from institutions to the children those institutions serve (particularly for students at risk of dropping out).

The members of PCAST believe that an evaluation of the proposed changes will depend on the availability of reliable performance based assessment mechanisms for both students and teachers. They indicate that considerable work needs to be done in this area to create greater confidence in assessments and more understanding of how assessments relate to actual learning.

PCAST points out that the federal government cannot mandate reform in the decentralized system of basic education in America. However, the federal government can facilitate the reform initiatives mentioned in the paper. A number of actions are presented for further consideration:

- o Provide incentives to states or regions pursuing reforms
- o Foster greatly intensified research on academic assessments
- o Facilitate and coordinate state and local programs to deal with the dropout problem
- o Encourage both private companies and government agencies to work cooperatively with local schools
- o Encourage talented females and minority students to study science and mathematics
- o Invest in teacher training programs in science and mathematics and use forgivable loans and other incentives to attract young people with degrees in science, mathematics, and engineering to teach in schools

COMMENTS ON "MEETING THE NATIONAL EDUCATION GOALS"

Some of the comments were favorable, pointing out that the papers are generally consistent with existing Administration policy and the decisions emerging from the FY 1992 budget process. However, some specific points have been raised.

Some staff objected to the emphasis on assessment, indicating that we do not need better tests to tell us how our schools are failing. To meet the goals we must take action now and not wait for more studies on assessment. Furthermore, a focus on assessment tends to emphasize central planning, whereas choice programs and other reform strategies call for greater local autonomy and flexibility.

The scientific and engineering communities were also urged to focus on specific actions that those communities might take to promote educational reform. For example, scientists and engineers could work with local communities to promote choice, magnet schools, and particularly alternate certification programs.

Finally, it was pointed out that the Federal government needs a solid rationale before embarking on major efforts to retain talented females and minorities in science and mathematics and to invest in teacher training programs. In addition, forgivable loans for teacher education is not current Administration policy; similar legislative provisions prompted veto recommendations from the Administration last year.

"TECHNOLOGY AND THE AMERICAN STANDARD OF LIVING"

The second paper states that new technologies and basic research have contributed to dramatic increases in economic growth and improvements in the quality of life. The United States has led the world in science and technology for much of this century, resulting in a standard of living to which the rest of the world aspires. But, the paper continues, we need to take other steps to continue to lead the world and provide a standard of living that will allow our children and grandchildren to live better than we do.

The paper points to three things that PCAST believes are required for America to continue to benefit from the dividends of science and technology: (1) a continuing flow of new ideas and new understanding; (2) the translation of new ideas and new technologies into significant new products and into steady improvements of existing products; and (3) a revival of quality manufacturing and production of goods.

According to the PCAST, the federal government has a role, though not the exclusive role, in each of these three areas. Regarding the flow of new ideas, the Federal government must continue to make a strong investment in basic research and must continue to support the principle of scientific diversity. To address concerns about the future support of scientific research, especially among young scientists, the federal government should develop a well-articulated position that the generation of scientific and technological talent is essential to America's future and will be given high priority. Finally, the Federal government should join with the private sector to revitalize the instrumentation and facilities that are crucial to forefront research.

The paper also discusses the importance of product development and the role of the Federal government in assisting private industry. Compared with other countries, the United States is seen as relatively weak at translating basic knowledge into significant new products and in improving those products that are already an important part of our lives. The Federal government can help to speed product development by creating an economic climate that stimulates the development of new products and processes. It can also support the development of generic, pre-competitive technologies that have widespread applications in the public and private sectors.

The federal laboratories are a major resource. PCAST believes that they could contribute more effectively to technology transfer, particularly if some of the laboratories are given new missions focusing on generic, pre-competitive technologies, on manufacturing, and on technology transfer. In addition, legislative and regulatory actions by the federal government can support and encourage appropriate technology transfer at the level of individual scientists and institutions.

Finally, even though manufacturing technology is predominantly the responsibility of industry, PCAST believes the Federal government could take several actions to make manufacturing a high priority for this country. Programs can be established to recognize the importance of manufacturing to the American standard of living, as is done through the Malcolm Baldrige National Quality Award. The Federal government could also support engineering education and fellowships targeted for research and manufacturing technology.

COMMENTS ON "TECHNOLOGY AND THE AMERICAN STANDARD OF LIVING"

The majority of comments on the PCAST's technology paper focused on their call for a renewed emphasis on manufacturing. One staff person noted that some economists disagree on this emphasis, particularly since manufacturing accounts for just 22 percent of our GNP (down from 29 percent in 1950). In addition, it was felt that this recommendation went beyond the charter of PCAST because it addresses economic rather than R&D issues.

A concern was also raised about radically redirecting the missions of the federal laboratories in support of civilian applications. If these laboratories no longer serve a useful federal purpose, they should be phased down or closed. According to this view, it would be very inefficient and unproductive to try to use the federal laboratories to support the private sector.

Attachments

EDUCATION IN SCIENCE AND MATHEMATICS: MEETING THE NATIONAL EDUCATION GOALS

The National Education Goals developed by the President and the nation's Governors have helped to move education toward the top of the nation's agenda. Following the lead of the President and the Governors, Americans in growing numbers are committing their energies to efforts designed to improve basic education.

Achieving the national goals will require significant improvement in science and mathematics education. However, revitalizing science and mathematics education will not be possible without much broader reforms in American basic education. This paper therefore examines some of the general reform strategies that will be needed to meet the national goals. It then suggests several ways in which the President and the federal government can anticipate and facilitate those reforms, with a particular emphasis on science and mathematics education.

THE NATURE OF THE GOALS

The National Education Goals have revolutionary implications for basic education. They are performance goals stated in terms of outcomes or levels of achievement. In the areas of science and mathematics, they require "demonstrated competency . . . in mathematics [and] science," sufficient to place U.S. students "first in the world in science and mathematics achievement" by the year 2000, when "every adult American will be literate and possess the knowledge and skills required in a global economy." Moreover, the call for 90 percent of our young people to graduate from high school requires that the goals extend to virtually all school-aged children, even those for whom alternate educational strategies are required.

Previous efforts to improve education have often used input or process goals, which prescribe the experiences that all students and teachers should undergo -- for example, the amount and kinds of courses required of all students. Many of the new approaches adopted in the 1980s were process reforms, and although there is some evidence that these changes have contributed to modest progress in recent years, their results have been generally disappointing.

REQUIREMENTS FOR EDUCATIONAL REFORM

Since the announcement of the National Education Goals, a consensus has emerged that achieving them will require fundamental restructuring of basic education in America. Incremental improvements may be achieved by further incremental changes, but the magnitude of improvement needed to meet the goals calls for massive change in the educational system.

The emphasis on performance implicit in the goals is one of the most important educational reforms needed to meet those goals. This focus on results rather than inputs must be accelerated and become pervasive throughout American elementary and secondary education.

However, performance can be emphasized only if achievement can be reliably measured. Today, we need greater confidence in assessment mechanisms and more understanding of how assessments relate to actual learning. Without such improvements, many in the education community feel it will be difficult to reorder the educational system on the basis of performance.

As assessment mechanisms are being improved, a complementary effort is needed in the area of curricular reform. Much good work is being done in this area, but implementation of the results in schools will not be easy. Moreover, testing standards should be coordinated with curriculum development, which is a major challenge.

A second fundamental change that will be required for the restructuring of basic education is the introduction of parental choice in the selection of schools appropriate for each child. Choice has many dimensions, ranging from permitting some children to choose "magnet" schools within the public system to distributing government vouchers for children to pay for educational expenses at any school, public or private. Whatever system is adopted, it is important to provide some measure of academic quality to act as a basis for choice. Requiring nationally standardized tests and publishing their results would provide one of the indexes that parents could use as consumers in the educational marketplace. Involving parents in education has great value, and giving parents some element of choice is often the beginning of a deeper parental involvement.

A third promising strategy in the reform of basic education is rewarding exceptional teachers. Implementation often founders on the difficulty of assessing the quality of a teacher, but improved assessments of teacher performance, along with other means of evaluation, including peer review, provide important opportunities for improving the quality of the teaching force.

Such efforts are especially important in science and technology. Unless teachers at both the elementary and secondary levels understand and appreciate science and technology, significant improvement will be difficult. Teacher training programs to improve the quality of science and mathematics teaching will be an

essential element in meeting the national goals.

A fourth requirement for effective reform is reducing bureaucracies by relying on school-based management that empowers principals and their teachers. However, bureaucracies will relinquish control to teams of teachers and principals at individual schools only if equity and accountability can be assured, which again raises the question of educational assessment.

Finally, underlying the needed reforms of basic education is the recognition that school is only one of many critical influences in a child's development. Only by shifting our focus from our institutions to our children can we truly address the challenges to our society. This strategy is particularly relevant for the retention of students at risk of dropping out, who may require strategies beginning with prenatal and child care even before formal school begins. If we are to strengthen our nation's workforce and build better citizens, we must shape society's institutions to our children and not vice versa.

THE ROLE OF THE FEDERAL GOVERNMENT

The federal government cannot mandate reform in the decentralized system of basic education in America. It can, however, facilitate, and where appropriate finance, the reform initiatives cited above, using incentives and appropriate leveraging to accelerate the reform process. In particular, we believe that the following federal actions warrant serious consideration:

- o The federal government can provide incentives to states or regions pursuing any of the reforms described in the previous section, subject to constraints designed to ensure equity and equal opportunity. For example, federal funds might be used to facilitate choice for needy students, thereby providing an inducement to states or districts offering choice programs. Similarly, a national competition might be established to recognize and reward exemplary programs for restructuring education (just as the Malcolm Baldrige National Quality Award has recognized quality improvements in industry).

- o The federal government can foster greatly intensified research on academic assessment and the development of measurement instruments so that performance standards can be set and the academic marketplace can function more rationally. For example, federal funds could be used to leverage voluntary participation in appropriate achievement evaluation programs.

- o The federal government can make a concerted, national effort to facilitate and coordinate state and local programs, both public and private, to deal with the school dropout problem. Successful drop-out prevention programs could be recognized by the President and rewarded for their achievement.

- o The federal government can encourage private corporations, universities, and

national laboratories to work cooperatively with local schools, building on the many excellent initiatives already under way.

- o In the areas of mathematics and science, the federal government can encourage effective programs to engage talented girls and minority students in science and mathematics, where they are now underrepresented.

- o The federal government can invest in teacher education programs in science and mathematics and use forgivable loans and other inducements to attract to teaching young people with degrees in science, mathematics, and engineering.

- o The federal government can support programs using modern communications technologies, including satellite technologies, to expand access of both students and teachers to the most highly qualified teachers of science and mathematics.

THE PRESIDENT'S ROLE

Responsibility for our system of basic education in America rests fundamentally on the general population, who shape the learning environments of their children, elect their school boards and other influential politicians, and demonstrate their priorities by their behavior toward teachers and schools.

However, our nation's leaders influence the attitudes and values of the electorate. The President, in particular, has a personal role that reaches beyond his authority as our nation's chief executive officer. In choosing his own priorities as a leader, he sets a standard for all to heed.

The President, in partnership with the Governors, has placed a great challenge squarely on the national agenda. Now all of the resources of leadership must be applied to meeting that challenge. Federal budget priorities must be set, the activities of the federal agencies must be guided, and the President's personal commitment to education must continue to be demonstrated. With timely actions, and with a continuing and unrelenting campaign of words, the President can secure his place in the history of American education.

TECHNOLOGY AND THE AMERICAN STANDARD OF LIVING

Today most Americans take for granted a standard of warmth, cleanliness, food, medical care, music and entertainment, and transportation that was undreamt of 150 years ago. This great surge forward in the standard of living can and will continue. Furthermore, this progress can encompass all Americans and the citizens of other countries as well.

The foundation for dramatic increases in economic growth and improvement in the standard of living has been technology. Basic research built a fundamental understanding of the physical world, including the laws of mechanics and gravity, the atomic and molecular bases of chemistry, and the basic principles of electricity and energy. Building on this knowledge, individuals brought forth one striking invention after another, from the steam engine, railroads, and the telegraph to electric lighting, the telephone, and radio. Over the years, the rate of technological progress accelerated. Advances in agriculture liberated the vast farm population for other pursuits; automobiles and airplanes provided unprecedented speed and accessibility over vast distances; and the television and computerized communications linked the world together. This remarkable surge in invention, which contributed to an equally remarkable ability to produce goods and services in volume, did much to create the modern world.

America has led the world in science and technology for much of this century -- resulting in a standard of living to which the rest of the world aspired. This paper explores what will be necessary to continue to lead the world and thereby provide a standard of living that will allow our children and grandchildren to live far better than we do today.

REQUIREMENTS FOR TECHNOLOGICAL LEADERSHIP

Since World War II, basic scientific research has provided a new foundation on which to build for the future. The molecules in a material can now be seen and studied at the atomic level. The discovery of the structure of DNA and of the immense complexity of the cell has opened up whole new areas of opportunity. New materials are being developed that are lighter, stronger, and more durable than anything known today. Advanced computers and new modes of communication, such as optical fibers, are resulting in new ways to learn, new ways to work, new kinds of

intelligent machinery with virtually unlimited new capabilities. Furthermore, a better understanding of the environment is making it possible for these advances to have far fewer negative environmental impacts than did earlier technological advances.

Three basic things will be required if the United States is to continue to benefit from the dividends of science and technology.

1. A continuing flow of new ideas and new understanding, which are the basis of new materials, better health care, new information technologies, a cleaner environment, and other technological advances.

2. The translation of new ideas and new technologies into significant new products and into the steady improvement of those that are already an important part of our lives.

3. A revival of manufacturing and the production of goods, which in the past has provided both the material wealth and the jobs that built the American standard of living.

THE ROLE OF THE FEDERAL GOVERNMENT

The federal government has a role, although not the exclusive role, in the development of technology. In particular, it has been a major catalyst for technology development through its direct investment in research and through legislative and regulatory actions that have facilitated the development and commercialization of new insights.

New Ideas and New Understanding

Our diverse science and technology base can generate new ideas anywhere -- on the production line, in industrial or government laboratories, and in the individual laboratories of universities and research institutes. Many new ideas have come from basic research, which has been supported largely by the federal government. The federal government supports this research through diverse mechanisms in government laboratories and in hundreds of universities and private research institutes throughout the United States.

Continued strong investment in basic research, the recognition that basic research is a high national priority, and the continued support of the principle of diversity without federal control of research are all essential. The federal government must also ensure that the large sums of money it is investing are invested well. Thus, oversight must be balanced with control in ensuring that this broad and diverse research base thrives.

Through its support of research and training programs, the federal government

has also played a major role in training the next generation of scientists. However, many scientists, particularly young scientists, are discouraged about their future prospects in science. Some of these problems may be based more on perceptions than realities. Nevertheless, there needs to be a well-articulated federal position across science and technology that the generation of scientific and technological talent is essential to America's future and will be given high priority.

Finally, in partnership with the private sector, the federal government has a role in revitalizing the research infrastructure. A modern infrastructure is essential if we are to create environments for talented people to generate new ideas.

Translation of New Ideas into Technologies

One of the greatest threats to continued improvements in our standard of living is our relative weakness at translating basic knowledge into significant new products and in generating steady improvement of those products that are already an important part of our lives. Other countries now succeed at this process this much more effectively than we do here in the United States.

The federal government has both a direct and an indirect role in translating new ideas and new understanding into useable technologies. First, it can help create an economic climate that stimulates the development of new products and encourages the formation of new entrepreneurial companies. The federal government can also support the development of generic, precompetitive technologies that have widespread applications in the public and private sectors (examples include high performance computing, biotechnologies, and materials science and engineering). The federal government has often taken this role in the past, as in the cases of computer technologies, aeronautical developments, and agricultural advances. It is important, however, that such support not pull the federal government into an inappropriate development role.

The federal laboratories are a major government resource that could, in some cases, be marshalled to participate more effectively in technology transfer. In particular, some federal laboratories could be given new missions focusing on generic, precompetitive technologies, on manufacturing, and on technology transfer.

In general, the federal government needs to promote legislative and regulatory actions that support and encourage appropriate technology transfer at the level of individual scientists and institutions in both the private and public sectors. Concerns about conflict of interest must be resolved so that they do not inappropriately retard the entrepreneurial spirit.

Manufacturing

If America is to benefit from its own new ideas, this country must once again become preeminent in manufacturing. This is largely the responsibility of industry, but there are certain things that the federal government can do to make manufacturing a high priority for this country. The President can recognize the importance of manufacturing to the American standard of living. The Malcolm Baldrige National Quality Award is an example that has been extremely successful. Other programs that give manufacturing this kind of recognition need to be established. The federal government can also support engineering education and fellowships targeted for research and manufacturing technology.

SETTING PRIORITIES IN SCIENCE AND TECHNOLOGY

In times of limited financial resources, choices must be made. Investments to support technology, and thereby increase the American standard of living, will not necessarily be free. The federal government's priorities in science and technology may have to shift to more explicitly recognize economic growth and a higher standard of living as national goals. In any such evaluation, we feel that the three areas discussed above -- basic research, the translation of new ideas into products, and manufacturing technologies -- must have priority if this country is to continue to increase its standard of living.

U.S. TECHNOLOGY POLICY



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

SEPTEMBER 26, 1990

U.S. TECHNOLOGY POLICY

A nation's technology policy is based on the broad principles that govern the allocation of its technological resources. Competitive market forces determine, for the most part, an optimal allocation of U.S. technological resources. Government can nonetheless play an important role by supplementing and complementing those forces. Technology policy is not something that, once set in place, remains immutable. Broad principles exist, but effective technology policy requires sufficient flexibility to permit response to changing national and international situations. We are in an era marked by increased international economic interdependency and increasingly stronger technological capabilities in other industrial nations. These factors pose competitive challenges for U.S. firms as well as opportunities. In formulating a national technology policy, consideration must be given to a nation's traditions, its strengths and weaknesses, and the international environment in which it exists.

In almost all respects the U.S. science and technology base remains the world's strongest. The Nation's research universities and the ability of its people to innovate remain the envy of the world. Nonetheless, industrial competitiveness depends on many factors besides technology. Our strengths in technology and innovation have not prevented an erosion in market shares of U.S. companies in many industries. As new products mature, the advantage quickly shifts from the innovator to the efficient producer. We have also seen the importance of high rates of capital investment for the industrial competitiveness of Japan, Europe, and the Pacific Rim countries.

The competitive challenges American firms face are multifaceted and complex. There will be no facile, short-term solutions. We, in this Administration, believe it is essential that we recognize and use the strengths of our economic system more effectively to help U.S. firms remain competitive. In order to do so, all elements of our society must recognize that while we possess many strengths and assets, problems do exist, and that we can mobilize our resources and solve them. At the same time, we need to refrain from actions that might distort our basic system of free enterprise -- the Nation's ultimate strength.

In order to build on its strengths, U.S. society needs to focus on ensuring:

- o a **quality** workforce that is educated, trained, and flexible in adapting to technological and competitive change;
- o a financial environment that is conducive to longer-term investment in technology;
- o the translation of technology into timely, cost competitive, high quality manufactured products;
- o an efficient technological infrastructure, especially in the transfer of information; and

Federal laboratories, and industry all contribute to the science and technology base. Industry makes the investments necessary to turn this knowledge base into commercial products and processes. Federal, state, and local governments support research both directly when they fund specific R&D projects, and indirectly through tax and other incentives for private sector R&D investment. The Federal Government also sets the overall macroeconomic and legal environment in which industry's decisions about product and process development and commercialization take place.

In that context, the Administration's strategy to implement U.S. technology policy includes the following major elements:

Role of the Private Sector

While the government plays a critical role in establishing an economic environment to encourage innovation, the private sector has the principal role in identifying and utilizing technologies for commercial products and processes. In particular, the private sector has the responsibility to:

- conduct research and development to advance industry-related knowledge and technology;
- identify and aggressively pursue potential commercial applications for technologies developed by its own laboratories as well as by universities, Federal laboratories, and foreign sources;
- increase quality, output, and productivity by undertaking necessary investments in physical capital;
- improve the skills and abilities of its workforce to meet its specific needs; and
- participate cooperatively in improving the quality of U.S. education.

Government policies can help establish a favorable environment for private industry to conduct these activities but cannot substitute for aggressive private sector action.

Government Incentives for the Private Sector

- o Create an environment conducive to technological competitiveness by ensuring that technology policy concerns are factored into the formulation of related policies (e.g. fiscal, monetary, trade, environmental, etc.) with the overall objective of enhancing U.S. economic growth.
- o Encourage private technology-related investment through Federal monetary and fiscal policies. For example, reducing the capital gains tax differential and making permanent as well as enhancing the tax credit for research and experimentation will provide incentives for added investment. Incentives can also be provided through appropriate tax policies.

- o Provide an appropriate legal environment at the Federal level that removes unnecessary obstacles to innovation. Reducing the uncertainties about antitrust enforcement related to inter-firm cooperation in research and technology development encourages the pooling of limited resources and a rapid diffusion of results while still protecting against anticompetitive practices. Reducing the antitrust uncertainties about joint production ventures will also enable firms to cooperate in the development and introduction of new products.
- o Revise Federal procurement regulations and practices to permit greater integration of government and commercial production at the factory level, as well as encourage greater innovation and efficiency in development and production. Also encourage the use of commercial products, to the extent feasible, for defense, space, and other government applications.
- o Improve opportunities for companies to commercialize technologies and computer software developed during the performance of government contracts by allowing the contractors to retain rights in technical data and by protecting their trade secrets.
- o Provide a stable regulatory environment in order to decrease risk for private investment.
- o Seek greater harmonization of regulations and standards for products and processes with our major trading partners.
- o Encourage increased U.S. participation in multi-lateral international standardization efforts through the standards activities of the National Institute of Standards and Technology.
- o Seek better international protection of intellectual property to allow more benefits to be recovered from R&D investments.

Education and Training

- o Revitalize education at all levels including not only the training of scientists, engineers, and the technical workforce, but also educating our population to be sufficiently literate in science and technology to deal with the social issues arising from rapid scientific and technical change. Achieving such a goal will require a broad-based approach involving business, academia, and educational organizations, as well as Federal, state, and local governments.
- o Develop a framework for Federal interagency coordination and collaboration in mathematics, science, engineering, and technology education. The goal is to define an effective and appropriate role for the Federal government in support of the states, localities, and universities as they improve science and technology education to build human capital in the U.S.

- o Encourage continuing education and training, recognizing that, particularly in scientific and technological fields, education must be a lifelong activity.

Federal R&D Responsibilities

- o Increase Federal investment in support of basic research. Private industry does not invest heavily in basic research because the payoffs are so unpredictable and diffuse that individual firms cannot be confident of fully recovering their investments. However, the long-term potential benefits of this research are so large that society cannot afford not to make the investment, especially in university research which, in addition to new knowledge, also produces trained scientists and engineers of the future.
- o Participate with the private sector in precompetitive research on generic, enabling technologies that have the potential to contribute to a broad range of government and commercial applications. In many cases these technologies have evolved from government-funded basic research, but technical uncertainties are not sufficiently reduced to permit assessment of full commercial potential. In pre-competitive research, which occurs prior to the development of application-specific commercial prototypes, research results can be shared among potential competitors without reducing the financial incentives for individual firms to develop and market commercial products and processes based upon the results.
- o Continue the Federal government's development of products and processes for which it is the sole or major consumer, such as national defense, provided that no commercially available products can be substituted. The government, in such cases, must rely principally on the private sector to undertake the development process. Revise current Federal procurement regulations to strengthen the abilities of companies involved in developing and demonstrating these products to use the same research results and technologies for commercial purposes.
- o Maintain a strong Defense technology base to provide options for future weapons systems development and to help avoid technological surprises by potential adversaries. Special emphasis needs to be placed on shortening the time required for transferring R&D results to production and on using commercial products.
- o Streamline Federal decision-making structures and mechanisms to eliminate unnecessary and cumbersome regulations and practices that inhibit industrial competitiveness.
- o Encourage international cooperation in science and technology, where mutually beneficial, and inform U.S. researchers of opportunities to participate in R&D initiatives outside the U.S.

Transfer of Federally Funded Technology

- o Improve the transfer of Federal laboratories' R&D results to the private sector. Where appropriate, these laboratories should give greater consideration to potential commercial applications in the planning and conduct of R&D, and these efforts should be guided by input from potential users. To achieve this goal, there must be a closer working relationship among these laboratories, industry, and universities. Defense-related laboratories can make major contributions while still providing adequate safeguards for classified information.
- o Promote increased industry-Federal laboratory-university collaboration, including personnel exchanges, to help convert Federally-supported R&D into new technologies that the private sector can then turn into commercial products and processes.
- o Promote and encourage access by U.S. industry to Federal laboratories within the guidelines established by the Federal Technology Transfer Act of 1986 (P.L. 99-502), other existing legislation, and Executive Order 12591.
- o Expedite the diffusion of the results of Federally-conducted R&D to industry, including licensing of inventions and removal of barriers to commercialization of Federally developed computer software.
- o Encourage direct laboratory-industry interaction within broad, flexible Federal guidelines, since effective technology transfer occurs at the operational level.

Federal-State Activities

Recognize the importance of decentralization, and encourage states to develop programs that take into account the individual characteristics of each state. Federal programs in such areas as education, training, the national infrastructure, and regional generic technology centers, should build upon state initiatives.

Programs To Implement U.S. Technology Policy

The Administration has undertaken a broad range of programs and initiatives aimed at translating the technology policy into action. These programs and their associated budget levels requested for Fiscal Year 1991, where applicable, are summarized here.

Incentives for the Private Sector

The Administration has proposed improvements in incentives for private sector innovation by:

- o Reducing the tax rate on capital gains permanently to spur entrepreneurial activity.

The Administration has proposed restoring a capital gains tax differential such as existed before the Tax Reform Act of 1986. A lower tax rate on capital gains will encourage investors and entrepreneurs to make the investments necessary to be competitive.

- o Making the research and experimentation (R&E) tax credit permanent to reduce uncertainty.

Under current law, the R&E tax credit is scheduled to expire on December 31, 1990. The Administration proposal to make the credit permanent would permit businesses to establish and expand research facilities without fearing that the tax laws will suddenly change.

- o Protecting intellectual property through international negotiations.

The Administration is aggressively pursuing improved international protection of intellectual property. The current negotiations in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) are an important forum for developing better international rules. Negotiations on intellectual property rights are also being conducted in the World Intellectual Property Organization and in trilateral talks with the European Community and Japan. In addition, the U.S. is pursuing bilateral negotiations on intellectual property rights under the provisions of the 1988 Omnibus Trade and Competitiveness Act.

- o Liberalizing export controls to enhance high technology product exports.

Dramatic changes in the Eastern European security environment have permitted an Administration re-evaluation of U.S. export controls, and paved the way for an expanded trade potential for U.S. high technology industries.

- o Reforming product liability laws to restore balance to the tort system.

The Administration supports the adoption of uniform product liability standards across the 50 states based on three principles of fairness: the right of an innocent person to fair compensation for actual damages; liability based on responsibility for harm and not ability to pay; and encouragement of alternatives to costly litigation. The proposed changes to product liability laws would

maintain incentives to produce safe products, but would restore balance to the tort system and reduce uncertainty – particularly for new products.

o **Reforming the Federal procurement process.**

The Administration supports continued efforts to streamline the procurement process, reduce its complexity and paperwork burden, and provide contractors with incentives to innovate and reduce costs. The Administration has proposed changes in legislation and regulations to foster commercial style competitive procedures for the acquisition of commercial products. A revision of the Federal Acquisition Regulations is being drafted that will allow contractors to retain commercial rights in technical data developed under Federal contracts. The Administration is also developing a policy mandating increased agency use of performance based contracting that gives contractors more freedom and incentive to innovate.

o **Removing barriers to research, innovation, and development.**

The Administration supports continued elimination of unwarranted regulation. Deregulation can spur innovation as well as lower prices. It also requires a continuous reexamination of existing regulatory policies to avoid unnecessary stifling of new products and processes. The Administration has proposed antitrust legislation that would reduce the legal uncertainties for companies to enter joint production ventures while still protecting against anticompetitive practices. Challengers would be required to prove that such ventures would harm competition. The legislation would also eliminate punitive treble-damage awards under certain circumstances.

Education and Training

In addition to the President's broad initiatives on education, there are a number of programs directed at improving education in mathematics and science and at training of the technical workforce. These include:

o **National Science Foundation: \$463 million plus research assistantships proposed in Fiscal Year 1991**

The National Science Foundation has a broad range of programs dealing with mathematics and science education and human resources at all levels. Major programs are:

- Research career development (graduate research fellowships and enrichment activities for talented high school students).
- Teaching materials development and informal science education (aimed primarily at the pre-college level).

- Teacher preparation and enhancement (upgrading quality of faculty, providing Presidential Awards for Excellence in Science and Mathematics Teaching, and developing model programs for women, minorities, and the handicapped).
- Undergraduate science, engineering, and mathematics education (includes instrumentation grants, curriculum development, faculty revitalization, comprehensive regional centers for minorities, and research experiences for undergraduates).

In addition, almost 16,000 graduate students are supported by research assistantships through regular research grants to universities.

o Department of Education: \$333 million proposed in Fiscal Year 1991

- Eisenhower mathematics and science program (provides funds to help State and local educational agencies carry out programs to train teachers and improve instruction in mathematics and science).
- Adult education program (aimed at skills needed to cope with new technologies and providing for workplace literacy).

o National Institutes of Health: \$292 million plus research assistantships proposed in Fiscal Year 1991

- Almost 12,000 graduate students receive training grants.
- Tens of thousands of graduate students are supported by research assistantships through the \$4.4 billion in extramural research grants.

o National Aeronautics and Space Administration: \$51 million proposed in Fiscal Year 1991

Program activities cover informal K-12 science education, mobile presentations on space to elementary and secondary schools, teacher workshops and internships at NASA research centers, grants for undergraduate and graduate students, and programs for minorities in science and engineering education.

o Department of Energy: \$25 million plus research assistantships proposed in Fiscal Year 1991

- Programs include science and mathematics exposure for middle and high school students, research training of undergraduates, and graduate fellowships in science and engineering.
- An estimated 4,000-4,500 graduate students are supported by research assistantships through research grants to universities.

- o **Department of Defense: \$364 million projected for Fiscal Year 1991 for non-military personnel**
 - Pre-college programs (summer programs for minorities).
 - Undergraduate programs (primarily ROTC scholarships in technical fields).
 - Graduate fellowships and research assistantships.
 - Post-doctoral and faculty research appointments.
- o **Department of Agriculture: \$125 million proposed in Fiscal Year 1991**
 - Challenge grants to strengthen undergraduate education.
 - Capacity building grants to strengthen teaching and research programs in the "1890 Land Grant" institutions.
 - National needs fellowships to recruit and train scientists in the most critically deficient areas.
 - Graduate assistantships associated with research grants projects. About 13,000 graduate students are supported for graduate studies.
 - Ag-In-The-Classroom to support science strengthening in K-12 programs.
 - Research apprenticeships to bring high school students into university and government laboratories to stimulate interest in science.
 - School enrichment program to function as a catalyst between schools and community to strengthen science programs.
 - Postdoctoral program in Agricultural Research Service and Animal and Plant Health Inspection Service laboratories.

Federal R&D Responsibilities

The Fiscal Year 1991 budget proposes to allocate about \$71 billion for research and development. This is an increase of \$4.5 billion, or 7 percent, over 1990 enacted levels. Civilian R&D will increase by 12 percent, while defense-related R&D will increase by 4 percent. Within this total, \$12 billion will be allocated for basic research, an increase of \$1 billion or about 8 percent over 1990. The budget contains a number of new and expanded programs that will contribute to the Nation's R&D enterprise and competitive posture. These include:

- o A 13 percent increase in the National Science Foundation's budget request for research and facilities, which account for over 75 percent of the NSF budget. Support for basic science and engineering is the foundation on which U.S. technology is built. Within the overall increases there are emphases on Science and Technology Centers, networking and communications, Engineering Research Centers, and major research equipment for universities.
- o Developing advanced technologies to meet Defense and civilian agency needs. Based on the results of a special survey of the support for selected advanced technologies that are funded by more than one Federal agency, the budget proposals are:
 - Robotics - The budget provides \$192 million to six Federal agencies for support of robotics R&D. The focus of this R&D is on the development of systems that are more autonomous and capable of interacting with changing and uncertain environments.
 - High Performance Computing - The budget provides \$469 million for Federal support of R&D focused on high performance computing. This activity includes the full range of advanced computing technologies as well as systems and applications software, networking, and underlying research and human resource infrastructure.
 - Semiconductors - The budget provides \$537 million for research on semiconductor materials, development and application of semiconductor materials to meet agency mission needs, and support of R&D on semiconductor manufacturing processes. The largest single Federal program is DOD funding of \$100 million per year for SEMATECH, a semiconductor industry R&D consortium.
 - Superconductivity - The budget provides \$215 million for superconductivity R&D. Programs in five Federal agencies deal with both high temperature and low temperature superconducting phenomena and materials.
 - Advanced Imaging Technologies - The budget provides \$118 million for advanced imaging R&D. Advanced imaging systems include interactive graphics, high definition displays, advanced signal processing, and advanced digital switching technologies.
- o Improving productivity and the quality of life through biotechnology. The budget proposes \$3.6 billion for biotechnology R&D. In pharmaceuticals, foods, agriculture, waste management, and energy, biotechnical advances offer the possibility of improvements that will make a real difference in people's lives.
- o Developing technologies for improved transportation. The budget proposes funding for transportation R&D of \$1,527 million. This R&D is aimed at maintaining a modern, efficient transportation infrastructure, an essential factor

in being industrially competitive. Federal programs are focused on aeronautics, highways, mass transit, railroads, maritime, water, aviation, and other transportation areas.

- o Promoting alternate sources of energy. For conduct of energy R&D programs in the Department of Energy, the budget proposes total funding of \$2,450 million. The R&D is aimed at maintaining abundant, reliable, and economic sources of energy. Federal programs cover a broad spectrum of energy technologies including solar, renewable, conservation, nuclear fission, nuclear fusion, and fossil energy, and supporting energy sciences.
- o Enhancing industrial productivity and development of standards. The budget proposes \$198 million for the National Institute of Standards and Technology. R&D in fundamental measurements and standards provides the foundation for U.S. industry, commerce, and science to achieve levels of accuracy and compatibility required to support technological development, efficient processing, process control, and quality assurance. Special activities include R&D on advanced manufacturing technologies. In addition, the Advanced Technology Program provides grants to industry-led ventures to support research on pre-competitive generic technologies.

Transfer of Federally Funded Technology

Many important steps have been taken, pursuant to the Federal Technology Transfer Act and other legislation, to increase the degree to which Federal laboratories collaborate with private industry in commercializing the results of Federally-funded research and development. These activities include:

- o Establishment of over 200 active cooperative research and development agreements between Federal laboratories and private companies.
- o Creation of the Precision Manufacturing Technology Program by the Department of Energy to provide U.S. industry greater access to the extensive manufacturing technology, expertise, and facilities available within the Department's Defense Programs weapons complex.
- o Formation of the Biotechnology Research and Development Consortium, a joint research effort between the Department of Agriculture's Northern Regional Research Center, the University of Illinois, the State of Illinois, and six U.S. companies.
- o Formation of a joint venture in high temperature superconducting materials and applications by Du Pont, Hewlett-Packard, and Los Alamos National Laboratory.
- o Establishment of Regional Manufacturing Technology Centers. The budget provides \$5 million for this program. The approach is to reduce the barriers

faced by small- and medium-sized manufacturers in adopting new technology by creating awareness and providing up-to-date, practical information and expertise on manufacturing technologies and practices.

Federal-State Activities

Federal programs have already been initiated to build upon the advantages offered by decentralized programs operating at the state and local level. These programs include:

- o **Department of Commerce Clearinghouse for State and Local Initiatives on Productivity, Technology and Innovation:**

The Clearinghouse gathers and analyzes information on the many technology development centers at the state and local level. It will help to develop a network of contacts among state and local officials and staff.

- o **Small Business Development Centers:**

Each Small Business Development Center (SBDC) serves as a one-stop assistance center for businesses and provides services ranging from pre-business start-up counseling to technical advice for existing businesses. The centers have a legislative mandate to assist in technology transfer, make use of Federal laboratories and equipment, and coordinate and conduct research they deem worthwhile.

- o **University Centers Program:**

This program provides funds to involve the resources of universities in economic development within the community.

- o **NASA Industrial Applications Centers Program:**

The centers offer clients access to a national data bank that includes over 100 million documents of accumulated technical knowledge, along with their expertise in retrieving information and applying it in support of clients' needs. The centers are backed by state-sponsored business or technical centers that provide access to the technology transfer network.

- o **Trade Adjustment Assistance Centers Program:**

The centers provide trade-impacted small and medium-sized manufacturers with in-depth technical assistance.

THE WHITE HOUSE

WASHINGTON

May 21, 1990

Staff 4014

File
PCAST

**MEMORANDUM FOR GENERAL BRENT SCOWCROFT
ASSISTANT TO THE PRESIDENT
FOR NATIONAL SECURITY AFFAIRS**

FROM:

D. ALLAN BROMLEY 
**ASSISTANT TO THE PRESIDENT FOR SCIENCE
AND TECHNOLOGY**

SUBJECT:

MAY 24-25 PCAST MEETING

The President's Council of Advisers on Science and Technology will hold its fourth meeting on May 24-25, 1990. A preliminary agenda is attached.

I cordially invite you to attend any portion of the meeting in which you may have an interest. Please inform Tom Welch, PCAST Secretariat, at 395-5101 if you can join us.

Attachment

PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY

MAY 24-25, 1990

PRELIMINARY AGENDA

THURSDAY, MAY 24, 1990

**OPEN SESSION: 9:00 A.M. - 12:00 NOON
CONFERENCE ROOM, COUNCIL ON ENVIRONMENTAL QUALITY
722 JACKSON PLACE, N.W.**

8:30-9:00	ARRIVAL -- COFFEE AND PASTRIES	
9:00-9:30	OPENING REMARKS	DR. BROMLEY
9:30-10:30	INTERNATIONAL ECONOMIC COMPETITION -- INFORMATION BRIEFING AND DISCUSSION	DR. GOMORY DR. PHILLIPS
10:30-10:45	BREAK	
10:45-11:45	GLOBAL ENVIRONMENT AND NATURAL RESOURCES -- INFORMATION BRIEFING AND DISCUSSION	DR. LOVEJOY DR. MAYNARD
11:45-12:00	CLOSING REMARKS	DR. BROMLEY

THURSDAY, MAY 24, 1990 continued

**12:00-1:00 LUNCH - ROOM 208, CORDELL HULL CONFERENCE ROOM
OLD EXECUTIVE OFFICE BUILDING**

**CLOSED SESSION, 1:00 - 5:00 P.M.
ROOM 208, CORDELL HULL CONFERENCE ROOM
OLD EXECUTIVE OFFICE BUILDING**

**1:00-2:00 MATERIALS SCIENCE AND ENGINEERING
PANEL APPROVE TERMS OF REFERENCE,
MEMBERS AND MILESTONES DR. McTAGUE
DR. PHILLIPS**

2:00-2:15 BREAK

**2:15-3:15 BIOSCIENCE AND BIOTECHNOLOGY
PANEL - DISCUSSION OF DRAFT
TERMS OF REFERENCE, DR. NATHANS
RECOMMENDED MEMBERSHIP DR. WYNGAARDEN**

**3:15-4:15 EDUCATION AND HUMAN RESOURCES
PANEL -- DISCUSSION OF DRAFT
TERMS OF REFERENCE, RECOMMENDED
MEMBERSHIP DR. LIKINS
DR. RATCHFORD**

**4:15-5:00 FUNDING FOR INDIVIDUAL
INVESTIGATORS AND SMALL GROUPS DR. ERB**

5:00 CLOSING REMARKS DR. BROMLEY

**6:30 RECEPTION AND DINNER HOSTED BY AMERICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE (DINNER AT 7:00)
OCCIDENTAL RESTAURANT, 1475 PENNSYLVANIA AVENUE**

FRIDAY, MAY 25, 1990

**CLOSED SESSION, 9:00 A.M. - 12:00 NOON
ROOSEVELT ROOM, THE WHITE HOUSE**

9:00-10:00	THE BUDGET PROCESS AND TIMING AS IT RELATES TO PCAST AND FCCSET	MR. DARMAN
10:00-10:30	DISCUSSION	
10:30-10:45	BREAK	
11:15-11:45	OTHER PCAST ISSUES	
11:45-12:00	THE NEXT MEETING AND CLOSING REMARKS	DR. BROMLEY

REVISED 5/21/90