

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

FOIA Number:
2005-0336-F

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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: Organization Files - PCAST

OA/ID Number: 62076
Folder ID Number: 62076-003

Folder Title:
Council - PCAST: 1990 [2 of 2]

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Hollings: David Rudd 224-6656
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Danforth: McConnell

THE WHITE HOUSE

Office of the Press Secretary
(Knoxville, Tennessee)

For Immediate Release

February 2, 1990

The President today announced the appointment of the President's Council of Advisers on Science and Technology (PCAST), comprised of 12 distinguished scientists and engineers. This panel will provide high-level advice directly to the President on a wide range of important issues concerning science and technology.

PCAST will be the first Presidential scientific advisory group in many years to report directly to the President. Its establishment is a measure of the Bush Administration's high esteem for science and a recognition that advances in science and technology contribute in a major way to increased economic competitiveness. It also reflects the President's desire to strengthen Federal science and technology policy, enhance Federal research and development activities, and encourage private sector involvement in research and development.

The United States scientific community leads the world in creating new knowledge. Through PCAST, the President is seeking to provide the best obtainable private sector advice to Executive Branch decision-making in science and technology.

PCAST will be chaired by Dr. D. Allan Bromley, Assistant to the President for Science and Technology. A list of the members and their affiliations is attached, along with a fact sheet on science and technology accomplishments in the Bush Administration.

PCAST was established January 19, 1990, by Executive Order 12700. Its members will be sworn in later today by the Vice President at the White House.

For Immediate Release

January 19, 1990

EXECUTIVE ORDER

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PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY

By the authority vested in me as President by the Constitution and laws of the United States of America, and in order to establish, in accordance with the provisions of the Federal Advisory Committee Act, as amended (5 U.S.C. App. 2), an advisory committee on science and technology, it is hereby ordered as follows:

Section 1. Establishment. There is established the President's Council of Advisors on Science and Technology ("Council"). The Council shall be composed of not more than 15 members, one of whom shall be the Director of the Office of Science and Technology Policy, and 14 of whom shall be distinguished individuals from the private sector to be appointed by the President. The Director of the Office of Science and Technology Policy shall serve as Chairman of the Council. The Vice Chairman shall be appointed by the President from among the 14 private sector members. The Chairman shall report directly to the President.

Sec. 2. Functions. (a) The Council shall advise the President on matters involving all areas of science and technology.

(b) In the performance of its advisory duties the Council shall conduct a continuing review and assessment of developments in science and technology, and shall, through the Chairman, report thereon to the President whenever requested.

(c) The Chairman may, from time to time, invite experts to investigate and report to the Council on specific issues of national consequence.

Sec. 3. Administration. (a) The heads of Executive agencies shall, to the extent permitted by law, provide the Council and its panels such information with respect to scientific and technological matters as required for the purpose of carrying out its functions.

(b) Members of the Council shall serve without any compensation for their work on the Council. However, members appointed from among private citizens of the United States may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons serving intermittently in the Government service (5 U.S.C. 5701-5707).

(c) Any expenses of the Council shall be paid from the funds available for the expenses of the Office of Science and Technology Policy.

(d) The Office of Administration shall, on a reimbursable basis, provide such administrative services as may be required.

Sec. 4. General. (a) Notwithstanding any other Executive order, the functions of the President under the Federal Advisory Committee Act, as amended, except that of reporting to the Congress, which are applicable to the Council, shall be performed by the Office of Administration in accord with the guidelines and procedures established by the Administrator of General Services.

(b) The Council shall terminate on June 30, 1991, unless sooner extended.

GEORGE BUSH

THE WHITE HOUSE,
January 19, 1990.

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April 4, 1990

MEMORANDUM FOR RICHARD G. DARMAN, DIRECTOR OF THE OFFICE OF
MANAGEMENT AND BUDGET

SUBJECT: PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND
TECHNOLOGY (PCAST)

As you know from your participation in both meetings, our efforts to get the PCAST underway have been far more successful than anyone expected. The Council is gearing up to pursue a number of issues responsive to the priorities established by the President.

Our progress has exceeded not only our expectations, but also our budget projections. The budget amendment that addressed PCAST was developed on the assumption that the PCAST would be slow to get underway and would therefore not require the level of support necessary for a full year of operations. It was further assumed that federal agencies would support the staffing and other costs associated with PCAST panels in their areas of responsibility. The wording of the executive order now casts doubt on this assumption. However, the President's personal involvement has generated an atmosphere supportive of an active program even at this early stage.

We find ourselves soon exhausting the \$45K in FY90 Council funding. PCAST needs at least \$255K additional to continue minimal operations through the remainder of the year. Similarly, the programmed funding for FY91 falls short of that required to carry out PCAST objectives, specifically the support of the various panels.

I would very much appreciate your guidance as to how we may resolve this problem. Because PCAST is such an important and highly visible element of the President's support for science and technology, we can't afford an interruption in its work. The attached options paper summarizes my current thinking as to how we might approach the problem. Detailed budget estimates can be made available, should you desire.

Sincerely yours,

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

*Separate
folder*

**PCAST FUNDING
OPTIONS PAPER**

*Will give to
Downman*

Fiscal Year 1990

- Option 1:** Fund the Council's requirements from contingency resources within the EOP. This gives PCAST the easiest and most flexible way of executing its mission. Such funds, however, may not be available.
- Option 2:** Obtain White House Counsel approval to assess Departments' using as authority the existing Executive Order (attached).
- Option 3:** Amend the PCAST Executive Order permitting the Departments to provide funding. Another technical amendment to the Executive Order that needs to be made has already been identified relating to assignment of Federal Advisory Committee Act responsibilities. However, obtaining funding from Departments does complicate life for PCAST, and the appearance of PCAST independence may suffer.

Fiscal Year 1991

In addition to those options listed for FY90, there is the possibility of amending the budget submission to reflect those requirements that were not adequately stated in the original submission.

PCAST FUNDING TALKING POINTS
FY 90

PROBLEM

- PCAST must drastically curtail its FY90 activities because allocated funds will be expended.
- This is not acceptable to me and certainly not to the President.

BACKGROUND

- The PCAST budget based on OMB assumption that PCAST would not be organized and fully underway in FY90. Although I argued PCAST would, I did not prevail.
- Accelerated PCAST start also resulted from the President's insistence, before and during his visit with PCAST at Camp David, to get underway.

FACTS (Use Attachment)

- PCAST up and running; 2 meetings complete and 1/month scheduled. Panels forming at average of 1/month.
- \$45K allocated for PCAST travel.
- \$3K for printing and reproduction.
- \$540K additional needed to be fully responsive to PCAST activities, or
- \$250K additional to be minimally responsive

OPTIONS

- Use White House contingency/emergency funds, or
- Get White House counsel approval on assessing Departments and agencies,
IF NOT,
- Amend the Executive Order for PCAST allowing assessing.

ATTACHMENTS:

1. FY90 request and funds remaining after 2 full PCAST meetings.
2. Funding needed for remainder of FY90.

**FY90 REQUEST AND
FUNDS REMAINING AFTER 2 FULL
PCAST MEETINGS**

FY90 Request	\$45K	PCAST Travel
	<u>3K</u>	Printing & Reproduction
	\$47K	
Estimated cost of first 2 PCAST meetings:	<u>\$20K</u>	(Estimated because not all travel and other vouchers unaccounted for)
Estimated Remainder	\$27K	

Conclusion: It appears we can host 2 more full PCAST meetings and no PCAST panels between now and October 1, 1990. Alternatively, we can permit 2 PCAST panel meetings and no full PCAST meetings, or 1 of each.

**PCAST FUNDS
Needed for Remainder of FY90**

1. Full PCAST meetings in Washington, DC

5 meetings @ \$10K/meeting = \$50K

2. PCAST Panel Meetings

Assume one panel start-up/month; an average of 10 members/panel (including one OSTP staffer); and one meeting of 1½ days duration/month.

<u>Panel #</u>	<u>FY90 Months Operating</u>	<u>Cost/Meeting (\$K)</u>	<u>Cost (\$K)</u>
1	6	10	60
2	5	10	50
3	4	10	40
4	3	10	30
5	2	10	<u>20</u>
			200

3. PCAST One-Week Summer Session

- Purpose:**
- Close out panels
 - Full PCAST approval of panel positions
 - Final review and critique of program and budget prior to submission to OMB.

When/Where: Late July - early August at a Government facility such as Air Force Academy, Colorado Springs or Navy, San Diego.

10 OSTP staff	\$ 50K
10 PCAST	50K
About 3 panels (30 people)	150K
Govt. secretarial, other support	<u>50K</u>
	\$300K

4. Representational Funds

Coffee and lunch at PCAST, other meetings

\$5K

Note: None of the above considers cost of literature searches, reports, contractor support for meetings, cost of OSTP staff and detailees.

COST SUMMARY

<u>Option</u>	<u>Option Cost (\$K)</u>	<u>Cumulative Cost (\$K)</u>
1. PCAST Meetings	50	50
2. Panel Meetings	200	250
3. Summer Session	300	550
4. Representational Funds	5	555

PCAST FUNDING TALKING POINTS
FY91

PROBLEM

- PCAST funding insufficient; only about 20% of what's needed.
 - \$365k requested and \$1.77M needed.

BACKGROUND

- PCAST funding request assumed Departments and agencies would fund PCAST panels. This assumption no longer appears valid.
- Funding request formulated during the last minute flurry to get PCAST empaneled and meet President's deadline to get underway.

OPTIONS

- Depending on White House Counsel ruling (see FY90 discussion above), either:
 - assess Departments and Agencies, or
 - amend Executive Order to permit assessing

ATTACHMENT

- PCAST funds needed for FY91.

FACTS (Use Attachments)

FY91

- \$365K requested.
- \$803K additional needed.

OPTIONS

FY91

- If assessing permitted, no problem.
- If not permitted,
 - contingency funds
 - supplemental request to Congress

ATTACHMENTS:

1. FY91 request
2. Funding needed for FY 91

**PCAST FUNDS
Needed for FY91**

1. Full PCAST meetings in Washington, D.C.

11 meetings @ \$10K/meeting = \$110K

Assumes: Average cost/member: \$550 roundtrip airfare
300 per diem
50 taxis, incidentals
\$900 TOTAL

2. PCAST Panel Meetings

Assume average of 6 panels/year; an average of 10 members/panel (including one OSTP staffer); and one meeting of 1½ days duration/month. Assume \$100K for contractor support per panel.

6 panels x \$10k/meeting x 11 months = \$660K = 600K = \$1.2M

3. PCAST One-Week Summer Session

Purpose: -- Close out panels
-- Full PCAST approval of panel positions
-- Final review and critique of program and budget prior to submission to OMB.

When/Where: Late July - Early August at a Government facility such as Air Force Academy, Colorado Springs or Navy, San Diego.

10 OSTP staff	\$ 50K
10 PCAST	50K
About 3 panels (30 people)	150K
Govt. secretarial, other support	<u>50K</u>
	\$300K TOTAL

PCAST FUNDS

Page two

4. Representational Funds

Full PCAST Meetings

<u>Function</u>	<u>\$Cost/Person</u>	<u>Persons</u>	<u>Total \$</u>
Meeting Dinner (1 month for 11 months)	60	17 (x11)	11,220
Meeting: Coffee & Pastries (2 days)	5	15 (x2) (x11)	1,650
Lunch (1 day)	10	15 (x11)	1,650
			<u>\$14,520</u>

PCAST Panel Meetings

<u>Function</u>	<u>\$Cost/Person</u>	<u>Persons</u>	<u>Total (\$)</u>
Coffee & Pastries (2 days)	5	20 (x2) (x11)	2,200
			<u>2,200</u>

PCAST One-Week Summer Session

<u>Function</u>	<u>\$Cost/Person</u>	<u>Persons</u>	<u>Total (\$)</u>
Pre-Meeting Reception	25	60	1,500
Coffee & Pastries (6 days)	5	50 (x6)	1,500
Closing Banquet	50	60	3,000
			<u>\$6,000</u>

REPRESENTATIONAL FUNDS TOTAL \$22,720

COST OF PCAST SECRETARIAT

SPACE

<u>Amount (square foot)</u>	<u>\$Cost/square foot</u>	<u>Total (\$K)</u>
355	31	11

EXECUTIVE DIRECTOR AND SECRETARY

<u>Grade</u>	<u>Salary (\$K)</u>	<u>Overhead & Benefits (%)</u>	<u>Total (\$K)</u>
GM-15	80	20	96
GS-8	30	20	<u>36</u>
			132

SECRETARIAT COST TOTAL \$143K

COST SUMMARY

<u>Option</u>	<u>Option Cost (\$K)</u>	<u>Cumulative Costs (\$K)</u>
1. PCAST Meetings	110	110
2. Panel Meetings	660	770
3. Summer Session	300	1,000
4. Representational Funds	12	1,012

**FY91
ASSESSMENT OPTION**

PORTION OF EVERY FCCSET CHARTER

The committee's integrated, coordinated plan, program, and budget, will have the benefit of private sector advice, counsel, and suggestions. This will be accomplished by the President's Council of Advisors on Science and Technology [PCAST].

Accordingly, Dr. John Smith has been requested to establish a PCAST panel on _____. Dr. Smith estimates that \$__K in FY90 and \$__K in FY91 will be required to conduct the required PCAST work. The committee will make these funds available to the PCAST chairman for this purpose.

1. Hugh —
2. Charles —

Fyi

Tom W.

THE WHITE HOUSE
WASHINGTON

April 24, 1990

To: Joe Hegu, OMB

Joe,
Thank you for the suggestions yesterday on PCAST funding.

Attached is the new FY90 breakdown of funds needed.

Tom Welch

encl

COST SUMMARY

<u>Option</u>	<u>Option Cost (\$K)</u>	<u>Cumulative Cost (\$K)</u>
1. PCAST Meetings	25	25
2. Panel Meetings	150	175
3. Summer Session	30	205

THE WHITE HOUSE
WASHINGTON

May 31, 1990

MEMORANDUM FOR JAMES W. CICCONI

from:

D. ALLAN BROMLEY

Duan

SUBJECT:

MEMORANDA

I am enclosing herewith, on behalf of the President's Council of Advisers on Science and Technology--and with the members' unanimous support--two memoranda that the Council has requested that I forward to the President and one that they requested I send to Dick Cheney, with a copy going to the President.

I recognize, of course, that the President will be more than fully committed for the next few days and do not want to bother him but I am sending these to you for whatever you consider to be the necessary staffing.

I would, of course, welcome your comments. I would also pass on the information that I received last evening from George Edwards to the effect that Seabrook went onto the grid at 8:15 p.m. this past Tuesday evening. It has been a long haul.

I expect that PCAST will request that I forward a memorandum on alternative energy sources--specifically including nuclear--to the President in the near future.

Many thanks for your help.

Enclosures

THE WHITE HOUSE

WASHINGTON

May 31, 1990

MEMORANDUM FOR THE PRESIDENT

FROM: D. Allan Bromley, On Behalf of the President's Council of
Advisors on Science and Technology

Allan

SUBJECT: Your Fiscal Year 1991 S&T Budget

The Council wishes to register its strong support of your overall S&T budget for Fiscal Year 1991. Within the fiscal constraints you face, your budget proposal provides appropriate balance between investing in the future and meeting our current national needs. The Administration proposals provide a strong start in revitalizing our education system and maintaining our nation's strong S&T base.

Your S&T budget proposals are so important to the future of this country that they deserve strong and aggressive White House support in the Congress. We hope that you, personally, as well as Fred McClure and his staff and the agency heads will get this message to the House and Senate leadership promptly and with vigor. The PCAST members pledge to convey the sense of urgency your budget deserves to leaders in the academic and industrial communities, as well as with political leaders at the grass roots.

Should the Congress not heed your leadership in supporting the Administration's S&T budget, we face a threatened erosion of our S&T base in this country. Of particular concern are the many individual and small-group researchers. The success and vitality of our science base rests primarily on these individual scientists, working in laboratories across the country, driven by independent insight, perspective, inspiration, puzzlement, drive and toil. In the aggregate these researchers produce the stream of new knowledge that is science and becomes technology. We recommend, therefore, that in the event Congress fails to respond appropriately to your S&T budget request for Fiscal Year 1991, you direct the agencies to protect those programs that provide support for small investigator-initiated research programs.

THE WHITE HOUSE

WASHINGTON

May 31, 1990

MEMORANDUM FOR THE PRESIDENT

FROM: D. ALLAN BROMLEY *Alan*
ON BEHALF OF THE PRESIDENT'S COUNCIL OF
ADVISERS ON SCIENCE AND TECHNOLOGY

SUBJECT: THE NATIONAL INSTITUTES OF HEALTH

The National Institutes of Health represent one of the great success stories of federal research investment; a recent independent poll of leading Japanese scientists designated NIH as the world's foremost scientific research institution. We live in a golden age of biology in which complex processes of living organisms and their abnormalities are being deciphered in molecular detail. This knowledge is driving the contemporary revolution in biotechnology and medicine and is the underpinning of our world leadership in medical technology and pharmaceuticals. Continued progress in this critical human endeavor is dependent on NIH, and specifically the strength of its leadership and its budgetary policies. The Council perceives serious problems in both areas.

Strong and effective leadership of NIH is impaired by the position of NIH in the administrative structure of the government. NIH is buried in the Department of Health and Human Services as part of the Public Health Service, which reports to the Assistant Secretary for Health. NIH accounts for about 50% of the total PHS budget, yet the NIH Director has no direct access to the HHS Secretary. In spite of having responsibility for the largest research budget in the life sciences in the Federal Government and many times that of NSF, the Director of NIH has little or no input into federal policy decisions related to science and technology. Accordingly, your Council recommends two actions:

1) The status of NIH should be elevated. NIH should be elevated within the Department of HHS to an office of Undersecretary; the NIH director should serve as Undersecretary, reporting directly to the Secretary. NIH, as an independent agency, would thereby retain ties to other health-related HHS agencies and to health-related committees of the Congress. The dual role of the Director of NIH and Undersecretary of HHS would make it easier to attract an outstanding NIH Director and enhance the ability of that individual to function in a health science policy role. It should be noted that many other Departments of the Executive Branch have the science arm at the level of Undersecretary; in the Department of Commerce, for example, the Director of NOAA serves as Undersecretary.

2) The Administration should take a more active role in setting budgetary policy for the NIH, rather than turning those authorities over to the Congress. In part because of the structure, there has been a long-standing tradition within the Executive Branch of government to abdicate policy making and related budgetary decisions that involve the NIH and its relationship to the Congress. Past Administrations intentionally requested minimal annual funding increases for NIH with the knowledge that the Congress regularly appropriated substantially greater support than was requested. This policy, however, has had the effect of allowing Congress to exercise almost exclusive control over budget, detailed distribution of incremental dollars, and de facto priority setting for the NIH. The Council is convinced that this mechanism is not in the best interests of the life and medical sciences in the U.S. and recommends that your Administration act to reestablish its policy role concerning life sciences. A strengthened Office of the Director will provide a closer link between the NIH and the Executive Office of the President, which is essential to the achievement of this goal.

THE WHITE HOUSE

WASHINGTON

November 13, 1990

file

MEMORANDUM FOR JOSEPH HAGIN II

FROM: D. ALLAN BROMLEY *D. Allan Bromley*
SUBJECT: DECEMBER PCAST MEETING

Recognizing the pressure on the President's schedule in recent months because of the budget summit, the Middle East situation and the election, I have not requested any meeting with the President's Council of Advisors on Science and Technology since May.

Rather, I have encouraged the PCAST group to think through a number of important science and technology related issues -- some raised as questions by the President in earlier meetings and some reflecting identification of issues by members of PCAST -- to the point where we have developed briefing materials that merit discussion with the President.

To that end, I am enclosing herewith a formal request for a two-hour meeting with the President at a time selected for his convenience on Thursday, December 13, or Friday, December 14 -- preferably in the morning on Friday, but anytime on Thursday.

I would propose to provide the President and the West Wing with issue papers concerning the discussion topics well in advance of this meeting and at a later date will request a brief meeting with the President to repond to any specific questions that he may wish to raise prior to his discussion with the PCAST group.

These issue papers will also be circulated to senior, West Wing and EOP staff for comment well in advance of this meeting.

I shall much appreciate your help in making this possible.

Enclosure

THE WHITE HOUSE
WASHINGTON

John

SCHEDULE PROPOSAL

November 13, 1990

TO: JOSEPH W. HAGIN II
Deputy Assistant to the President
for Appointments and Scheduling

FROM: D. ALLAN BROMLEY *D. Allan Bromley*
Assistant to the President for Science and Technology
and Chairman, The President's Council of Advisors on
Science and Technology (PCAST)

REQUEST: The President to meet with the PCAST.

PURPOSE: To advise the President on various science and
technology issues. To provide information requested
at the Camp David meeting earlier in the year.

BACKGROUND: The PCAST was established by Executive Order 12700 on
January 19, 1990. It consists of twelve eminent American
scientists, industry leaders, and distinguished members
of the academic and research communities appointed by
the President to advise him directly on national issues
related to science and technology.

PREVIOUS PARTICIPATION: Saturday, February 3, for three hours, at Camp David;
Friday, March 23 and Friday, May 25.

DATE AND TIME: Friday, December 14, 10:00 a.m. - 12:00 noon
Alternate: Any 2-hour period, December 13-14
DURATION: Two hours

LOCATION: The Roosevelt Room

PARTICIPANTS: Dr. Bromley, the PCAST Members, White House Senior
Staff, and OSTP Staff Members (see attached list)

OUTLINE OF EVENT: The President joins the PCAST meeting in the Roosevelt
Room, greets the group, and is briefed by the PCAST.

REMARKS REQUIRED: Talking points will be provided.

MEDIA COVERAGE: None

RECOMMENDED BY: D. Allan Bromley

PARTICIPANTS

D. Allan Bromley, Chairman, PCAST

PCAST Members

Bernadine Healy, Vice-Chairman
Norman Borlaug
Solomon Buchsbaum
Charles Drake
Ralph Gomory
Peter Likins
Thomas Lovejoy
Walter Massey
John McTague
Daniel Nathans
David Packard
Harold Shapiro

White House Senior Staff

Richard Darman
Governor Sununu
Lt. General Brent Scowcroft
Roger Porter
Michael Boskin
Michael Deland

OSTP Staff Members

Kenneth P. Yale
Thomas J. Welch
Thomas J. Ratchford
William Phillips
Eugene Wong
Maryanne Bach

For Immediate Release

January 19, 1990

EXECUTIVE ORDER

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PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY

By the authority vested in me as President by the Constitution and laws of the United States of America, and in order to establish, in accordance with the provisions of the Federal Advisory Committee Act, as amended (5 U.S.C. App. 2), an advisory committee on science and technology, it is hereby ordered as follows:

Section 1. Establishment. There is established the President's Council of Advisors on Science and Technology ("Council"). The Council shall be composed of not more than 15 members, one of whom shall be the Director of the Office of Science and Technology Policy, and 14 of whom shall be distinguished individuals from the private sector to be appointed by the President. The Director of the Office of Science and Technology Policy shall serve as Chairman of the Council. The Vice Chairman shall be appointed by the President from among the 14 private sector members. The Chairman shall report directly to the President.

Sec. 2. Functions. (a) The Council shall advise the President on matters involving all areas of science and technology.

(b) In the performance of its advisory duties the Council shall conduct a continuing review and assessment of developments in science and technology, and shall, through the Chairman, report thereon to the President whenever requested.

(c) The Chairman may, from time to time, invite experts to investigate and report to the Council on specific issues of national consequence.

Sec. 3. Administration. (a) The heads of Executive agencies shall, to the extent permitted by law, provide the Council and its panels such information with respect to scientific and technological matters as required for the purpose of carrying out its functions.

(b) Members of the Council shall serve without any compensation for their work on the Council. However, members appointed from among private citizens of the United States may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons serving intermittently in the Government service (5 U.S.C. 5701-5707).

(c) Any expenses of the Council shall be paid from the funds available for the expenses of the Office of Science and Technology Policy.

(d) The Office of Administration shall, on a reimbursable basis, provide such administrative services as may be required.

Sec. 4. General. (a) Notwithstanding any other Executive order, the functions of the President under the Federal Advisory Committee Act, as amended, except that of reporting to the Congress, which are applicable to the Council, shall be performed by the Office of Administration in accord with the guidelines and procedures established by the Administrator of General Services.

(b) The Council shall terminate on June 30, 1991, unless sooner extended.

GEORGE BUSH

THE WHITE HOUSE,
January 19, 1990.

THE WHITE HOUSE
Office of the Press Secretary

For Immediate Release

June 28, 1991

EXECUTIVE ORDER

- - - - -

EXTENSION OF THE PRESIDENT'S COUNCIL OF
ADVISORS ON SCIENCE AND TECHNOLOGY

By the authority vested in me as President by the Constitution and the laws of the United States of America, and in order to extend the President's Council of Advisors on Science and Technology, it is hereby ordered that Section 4(b) of Executive Order No. 12700 is amended by deleting "June 30, 1991" and inserting "June 30, 1993" in lieu thereof.

GEORGE BUSH

THE WHITE HOUSE,
June 28, 1991.

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THE WHITE HOUSE

WASHINGTON

July 18, 1990

SCHEDULE PROPOSAL

TO: JOSEPH W. HAGIN, II
Deputy Assistant to the President
for Appointments and Scheduling

FROM: D. ALLAN BROMLEY *Alan*
Assistant to the President for Science and Technology

REQUEST: To meet with the President's Council of Advisers on Science and Technology (PCAST)

PURPOSE: To report to and apprise the President on issues discussed at the February, March, April and May PCAST meetings

BACKGROUND: The PCAST was established by Executive Order 12700 on January 19, 1990, and it meets with the President monthly or at other intervals. The President appointed twelve eminent American scientists, industry leaders, and distinguished members of the academic and research communities to advise him directly on critical challenges facing the nation in science and technology.

PREVIOUS PARTICIPATION: Saturday, February 3, for three hours, at Camp David; Friday, March 23; and Friday, May 25

DATE AND TIME: Friday, July 27, 9:00 a.m.-12:00 Noon
Thursday, July 26, 1:00-5:00 p.m.

DURATION: One-half hour

LOCATION: July 27, Roosevelt Room; July 26, Room 208 OEOB

PARTICIPANTS: Dr. Bromley, the PCAST Members, White House Senior Staff, and OSTP Staff Members (see attached list)

OUTLINE OF EVENT: The President joins the PCAST meeting in the Roosevelt Room or in the OEOB, greets the group, and an informal exchange ensues, following up on discussions at prior meetings

REMARKS REQUIRED: Talking points will be provided

MEDIA COVERAGE: None

RECOMMENDED BY: D. Allan Bromley

OPPOSED BY:

PARTICIPANTS

D. Allan Bromley, Chairman, PCAST

PCAST Members

Bernadine Healy, Vice-Chairman
Solomon Buchsbaum
Norman Borlaug
Charles Drake
Ralph Gomory
Peter Likins
Thomas Lovejoy
Walter Massey
John McTague
Daniel Nathans
David Packard
Harold Shapiro

White House Senior Staff

Richard Darman
Governor Sununu
Lt. General Brent Scowcroft
Roger Porter
Michael Boskin
Michael Deland

OSTP Staff Members

William G. Wells
J. Thomas Ratchford
Eugene Wong
William D. Phillips
Thomas J. Welch
Maryanne Bach
Charles Dickens
Hugh Stringer

THE WHITE HOUSE
WASHINGTON

File

December 13, 1990

MEMORANDUM FOR THE PRESIDENT

FROM: D. ALLAN BROMLEY *AW*

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, where states and localities control most of the resources devoted to education. 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 paper is generally consistent with existing Administration policy and the decisions emerging from the FY 1992 budget process. However, some specific points have been raised.

There were objections 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.

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

THE WHITE HOUSE
WASHINGTON

January 4, 1990

Dear Dick,

I am most pleased that you can meet with the President's Council of Advisors on Science and Technology on Thursday, January 10, 1991.

At its inception a year ago, the President asked the PCAST to study and later advise him on specific issues of National importance. We have done this and will continue to offer advice on these issues. Now we believe it appropriate to revisit the needs of the President and the Presidency and identify those issues which the PCAST can offer helpful and substantive advice in 1991.

Your participation on January 10 will greatly assist us in meeting this goal and setting our priorities for this coming year.

Sincerely,



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

The Honorable Richard Darman
Director
Office of Management and Budget
Executive Office of the President
Room 252
Old Executive Office Building

Enclosures: Draft Agenda for PCAST Meeting
 PCAST Membership
 PCAST Executive Order

THE WHITE HOUSE
WASHINGTON

January 4, 1990

Dear Mike,

I am most pleased that you can meet with the President's Council of Advisors on Science and Technology on Friday, January 11, 1991.

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Sincerely,



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

The Honorable Michael Boskin
Chairman
Council of Economic Advisors
Room 314
Old Executive Office Building

Enclosures: Draft Agenda for PCAST Meeting
 PCAST Membership
 PCAST Executive Order

THE WHITE HOUSE
WASHINGTON

January 4, 1990

Dear Fred,

I am most pleased that you can meet with the President's Council of Advisors on Science and Technology on Thursday, January 10, 1991.

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Sincerely,



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

The Honorable Fred Bernthal
Acting Director
National Science Foundation
1800 G Street, NW
Washington, DC 20550

Enclosures: Draft Agenda for PCAST Meeting
 PCAST Membership
 PCAST Executive Order

THE WHITE HOUSE
WASHINGTON

January 4, 1990


Dear Governor Sununu,

I am most pleased that you can meet with the President's Council of Advisors on Science and Technology on Friday, January 11, 1991.

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Sincerely,



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

The Honorable John Sununu
Chief of Staff
West Wing
The White House

Enclosures: Draft Agenda for PCAST Meeting
 PCAST Membership
 PCAST Executive Order

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

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

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

**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 Alfred P. Sloan Foundation

**BERNADINE HEALY, Chairman of the Research Institute, The Cleveland Clinic Foundation
(Vice-Chairman)**

PETER LIKINS, President, Lehigh University

THOMAS LOVEJOY, Assistant Secretary for External Affairs, Smithsonian Institution

**WALTER MASSEY, Vice President for Research and for Argonne National Laboratory,
University of Chicago**

JOHN McTAGUE, Vice President-Research, 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

For Immediate Release

January 19, 1990

EXECUTIVE ORDER

- - - - -

PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY

By the authority vested in me as President by the Constitution and laws of the United States of America, and in order to establish, in accordance with the provisions of the Federal Advisory Committee Act, as amended (5 U.S.C. App. 2), an advisory committee on science and technology, it is hereby ordered as follows:

Section 1. Establishment. There is established the President's Council of Advisors on Science and Technology ("Council"). The Council shall be composed of not more than 15 members, one of whom shall be the Director of the Office of Science and Technology Policy, and 14 of whom shall be distinguished individuals from the private sector to be appointed by the President. The Director of the Office of Science and Technology Policy shall serve as Chairman of the Council. The Vice Chairman shall be appointed by the President from among the 14 private sector members. The Chairman shall report directly to the President.

Sec. 2. Functions. (a) The Council shall advise the President on matters involving all areas of science and technology.

(b) In the performance of its advisory duties the Council shall conduct a continuing review and assessment of developments in science and technology, and shall, through the Chairman, report thereon to the President whenever requested.

(c) The Chairman may, from time to time, invite experts to investigate and report to the Council on specific issues of national consequence.

Sec. 3. Administration. (a) The heads of Executive agencies shall, to the extent permitted by law, provide the Council and its panels such information with respect to scientific and technological matters as required for the purpose of carrying out its functions.

(b) Members of the Council shall serve without any compensation for their work on the Council. However, members appointed from among private citizens of the United States may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons serving intermittently in the Government service (5 U.S.C. 5701-5707).

(c) Any expenses of the Council shall be paid from the funds available for the expenses of the Office of Science and Technology Policy.

(d) The Office of Administration shall, on a reimbursable basis, provide such administrative services as may be required.

Sec. 4. General. (a) Notwithstanding any other Executive order, the functions of the President under the Federal Advisory Committee Act, as amended, except that of reporting to the Congress, which are applicable to the Council, shall be performed by the Office of Administration in accord with the guidelines and procedures established by the Administrator of General Services.

(b) The Council shall terminate on June 30, 1991, unless sooner extended.

GEORGE BUSH

THE WHITE HOUSE,
January 19, 1990.

THE WHITE HOUSE

WASHINGTON

January 4, 1990

Dear Brent,

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Sincerely,



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

The Honorable Brent Scowcroft
Assistant to the President
for National Security Affairs
First Floor, West Wing
The White House

Enclosures: Draft Agenda for PCAST Meeting
 PCAST Membership
 PCAST Executive Order

THE WHITE HOUSE
WASHINGTON

January 4, 1990

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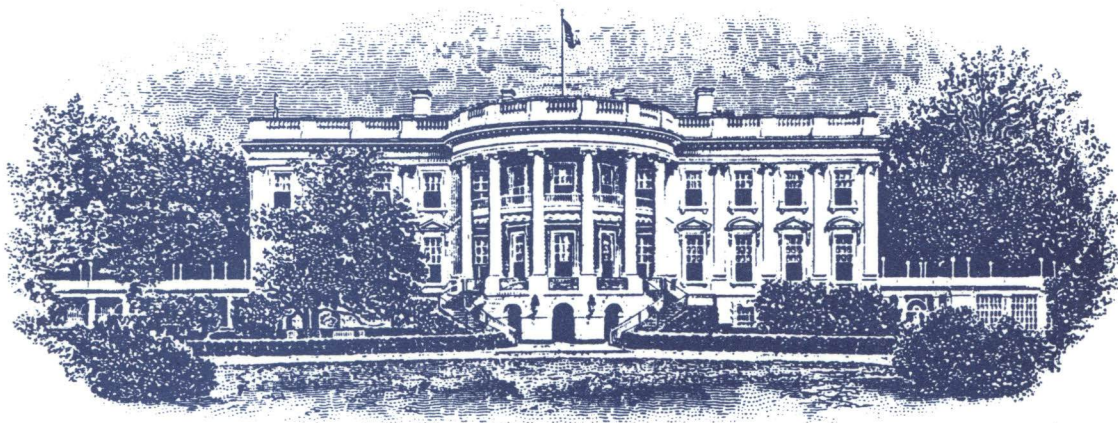


D. Allan Bromley
Assistant to the President
for
Science and Technology

The Honorable Richard H. Truly
Administrator
National Aeronautics and Space Administration
400 Maryland Avenue, SW Room 7137
Washington, DC 20546

Enclosures: Draft Agenda for PCAST Meeting
 PCAST Membership
 PCAST Executive Order

**PRESIDENT'S COUNCIL OF ADVISORS
ON
SCIENCE AND TECHNOLOGY**



**Camp David, Maryland
February 3, 1990**

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	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MCCLURE	<input type="checkbox"/>	<input type="checkbox"/>
SUNUNU	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NEWMAN	<input type="checkbox"/>	<input type="checkbox"/>
SCOWCROFT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PORTER	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DARMAN	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ROGICH	<input type="checkbox"/>	<input type="checkbox"/>
CARD	<input type="checkbox"/>	<input checked="" type="checkbox"/>	UNTERMAYER	<input type="checkbox"/>	<input type="checkbox"/>
CICCONI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>BOSKIN</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DEMAREST	<input type="checkbox"/>	<input type="checkbox"/>	<u>BROMLEY</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FITZWATER	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>
GRAY	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>
HAGIN	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>
HOLIDAY	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>

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:

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.

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"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
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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.

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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 unremitting 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

December 7, 1990

MEMORANDUM FOR BOB GRADY

FROM: D. ALLAN BROMLEY **DAB**

SUBJECT: PCAST BACKGROUND PAPERS

Attached are two background papers -- one on meeting the National Education Goals and the other on technology and the American standard of living. They were prepared by the President's Council of Advisors on Science and Technology and will be used to brief the President next Friday, December 14.

I would very much appreciate your comments on these papers by next Monday evening, so that the members of PCAST may consider your thoughts before briefing the President.

Thank you in advance for your assistance.

cc: Ken Yale
Tom Welch

THE WHITE HOUSE
WASHINGTON

December 7, 1990

MEMORANDUM FOR DICK SCHMALENSSEE

FROM:

D. ALLAN BROMLEY

DAB

SUBJECT:

PCAST BACKGROUND PAPERS

Attached are two background papers -- one on meeting the National Education Goals and the other on technology and the American standard of living. They were prepared by the President's Council of Advisors on Science and Technology and will be used to brief the President next Friday, December 14.

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Thank you in advance for your assistance.

cc: Ken Yale
Tom Welch

THE WHITE HOUSE

WASHINGTON

December 7, 1990

MEMORANDUM FOR MICHAEL BOSKIN

FROM: D. ALLAN BROMLEY

SUBJECT: PCAST BACKGROUND PAPERS

DAB

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cc: Ken Yale
Tom Welch

THE WHITE HOUSE

WASHINGTON

December 7, 1990

MEMORANDUM FOR TOM SCULLEY

FROM: D. ALLAN BROMLEY

DAB

SUBJECT: PCAST BACKGROUND PAPERS

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Thank you in advance for your assistance.

cc: Ken Yale
Tom Welch

THE WHITE HOUSE
WASHINGTON

December 7, 1990

MEMORANDUM FOR CHARLES KOLB

FROM: D. ALLAN BROMLEY **DAB.**

SUBJECT: PCAST BACKGROUND PAPERS

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Thank you in advance for your assistance.

cc: Ken Yale
Tom Welch

THE WHITE HOUSE

WASHINGTON

December 7, 1990

MEMORANDUM FOR DICK DARMAN

DAB

FROM: D. ALLAN BROMLEY

SUBJECT: PCAST BACKGROUND PAPERS

Attached are two background papers -- one on meeting the National Education Goals and the other on technology and the American standard of living. They were prepared by the President's Council of Advisors on Science and Technology and will be used to brief the President next Friday, December 14.

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Thank you in advance for your assistance.

cc: Ken Yale
Tom Welch

THE WHITE HOUSE
WASHINGTON

July 20, 1990

MEMORANDUM FOR GENERAL SCOWCROFT

FROM:

D. ALLAN BROMLEY

DAB

SUBJECT:

Background Information on the President's Council
of Advisors on Science and Technology (PCAST)

I am pleased to provide you, in advance of your meeting with the PCAST on Thursday afternoon, July 26th, at 2:15 p.m. in the Cordell Hull Conference Room, background information on the PCAST.

I am sending you the following: a draft agenda for PCAST's July 26-27 meetings, a listing of the members of the PCAST with biographical statements, the minutes of the February, March and May PCAST meetings, and the Executive Order establishing the PCAST.

Please call me if you have any questions prior to Thursday.

Attachments