Science-Engineering-Technology
Congressional Visits Day
March 5-6, 2002

Participant Briefing Materials

Contents

***** For participants only – not for Hill use *****

About Science-Engineering-Technology Congressional Visits Day

Objective

To underscore the importance of science, engineering, and technology through meetings with congressional decision makers.

Core Message

Federally funded research promotes security, prosperity and innovation.

Other Messages

All participants will advance the "Core Message." To provide flexibility and to acknowledge the fact that many diverse groups will be participating in this effort, each team will decide which additional specific issues it would like to advance. Briefing materials are provided on a variety of federal agencies and partnership programs.

Participants

Members of the Coalition for Technology Partnerships and the Science-Engineering-Technology Work Group and their colleagues in the science, engineering, and technology enterprise.

Schedule

Tuesday, March 5, 2002

1:00 – 5:00 pm

Participant Briefing
Administration Briefing (1:00 pm)
Congressional Briefing (3:30 pm)
National Academy of Sciences
2100 C St. NW
Metro Stop: Foggy Bottom

5:30- 7:30 pm

Reception and Awards Ceremony
B339, Rayburn House Office Building
Metro Stop: Capitol South

Wednesday, March 6, 2002

8:00 - 9:30 am

CVD Breakfast Briefing
Hyatt Regency on Capitol Hill
In rooms Columbia A&B
Metro Stop: Union Station

9:00 a.m. - 5:00 p.m.
Congressional Visits

The **Coalition for Technology Partnerships** is a group of small, medium, and large businesses and trade associations. These groups have joined forces to demonstrate that partnerships between government and industry reflect the realities of today's budget climate and technology development mechanisms. Contact: Kathleen N. Kingscott - Phone 202-515-5193 - Fax 202-515-4943.

The **Science-Engineering-Technology Work Group** is an information network comprising professional, scientific, and engineering societies, higher education associations, institutions of higher learning, and trade associations. The Work Group is concerned about the future vitality of the U.S. science, mathematics, and engineering enterprise. Contacts: Debbie Rudolph (Phone 202-785-0017, Fax 202-785-0835, E-Mail d.rudolph@ieee.org) and Kevin Marvel (Phone 202-328-2010, E-Mail marvel@aas.org).

Briefings Schedule (tentative)

Tuesday, March 5, 2001

National Academy of Sciences, 2100 C St., NW ***Metro Stop: Foggy Bottom***

1:00 pm - 3:00 pm

Administration Briefing

- Dr. Rita Colwell, Director, National Science Foundation
- Dr. William Berry, Director for Basic Research, Department of Defense
- Mr. Phil Bond, Under Secretary for Technology, Department of Commerce (invited)

Federal Agency R&D Budgets — Kei Koizumi, AAAS

The Protocol of Congressional Visits — Kathi Ream, SPIE

The View from the Hill

- Bill Bonvillian, Legislative Director and Chief Counsel, Sen. Joe Lieberman (D-CT)
- Sharon Hays, Staff Director, House Subcommittee on Research
- Joel Widder, Senate VA, HUD Appropriations Subcommittee
- Jonathan Adelstein, Sen. Daschle (invited)
- Greg Lankler, House Defense Appropriations Subcommittee (invited)
- Drew Willison, Senate Energy & Water Appropriations Subcommittee (invited)

B339, House Rayburn Office Building ***Metro Stop: Capitol South***

5:30 pm - 7:30 pm

Congressional Visits Day Reception and Award Ceremony

Hosted by CTP and SETWG Member Organizations

Presentation of George E. Brown Jr. Science-Engineering-Technology Leadership Award to:

The Honorable Sherwood L. Boehlert

Wednesday, March 6, 2001

Hyatt Regency, Capitol Hill, Rooms Columbia A&B ***Metro Stop: Union Station***

8:00 am - 9:30 am

CVD Breakfast Briefing

Continental Breakfast

- Remarks by Senator Ron Wyden (D-OR), Chairman, Senate Subcommittee on Science, Space & Transportation

Team Logistics

9:30am - 5:00 pm

Congressional Visits -- House and Senate

The Coalition for Technology Partnerships

CTP is a group of small, medium, and large businesses, trade associations, and technical societies that have joined forces to advocate science and technology partnerships -- a vital part of our innovation engine. For further information on the Coalition's activities, contact Kathleen N. Kingscott (CTP Chair) at 202-515-5193 or email: tking@us.ibm.com.

Agere Systems	Breinigsville, PA
Agilent Technologies	San Jose, CA
Corning	Corning, NY
Dow Chemical Company	Midland, MI
Eastman Kodak Corporation	Rochester, NY
General Electric Corporation	Niskayuna, NY
IAP Research, Inc.	Dayton, OH
IBM Corporation	Armonk, NY
LumiLeds Lighting	San Jose, CA
National Association of Manufacturers	Washington, DC
Nortel Networks	McLean, VA
Ohio Aerospace Institute	Cleveland, OH
Optoelectronics Industry Development Association	Washington, DC
Physical Optics Corporation	Torrance, CA
PlugPower Corporation	Albany, NY
Semiconductor Industry Association	San Jose, CA
Rockwell Collins	Cedar Rapids, IA
Texas Instruments	Dallas, TX

The Science-Engineering-Technology Work Group

SETWG is an information network comprising professional, scientific, and engineering societies, higher education associations, institutions of higher learning, and trade associations. The Work Group is concerned about the future vitality of the U.S. science, mathematics, and engineering enterprise. The **Science-Engineering-Technology Work Group** contacts are Debbie Rudolph (Phone 202-785-0017, Fax 202-785-0835, email d.rudolph@ieee.org) and Kevin Marvel (Phone 202-328-2010, email marvel@aas.org).

American Association for the Advancement of Science
American Astronomical Society
American Chemical Society
American Geological Institute
American Geophysical Union
American Institute of Biological Sciences
American Institute of Chemical Engineers
American Mathematical Society
American Meteorological Society
American Physical Society
American Society of Agronomy
American Society for Biochemistry and Molecular Biology
American Society for Engineering Education
American Society for Microbiology
American Society of Civil Engineers
American Society of Mechanical Engineers
American Society of Plant Biologists
Association for Women in Mathematics
Association of Environmental Engineering and Science Professors
Coalition for Funding Agricultural Research Missions
Consortium of Social Science Associations
Council for Chemical Research
Council for Undergraduate Research
Council on Agricultural Science & Technology
Council of Graduate Schools
Council of Scientific Society Presidents
Crop Science Society of America
Ecological Society of America
Federation of American Societies for Experimental Biology
Federation of Animal Science Societies
Federation of Materials Societies
Institute of Food Technologists
Industrial Research Institute
Institute of Electrical & Electronics Engineers - United States of America
Massachusetts Institute of Technology
Materials Research Society
National Academy of Engineering
National Academy of Sciences
National Technology Transfer Center
North Carolina State University
Optical Society of America
Society of Manufacturing Engineers
Soil Science Society of America
SPIE - The International Society for Optical Engineering
The Science Coalition
University of California Riverside
University of Central Florida

Organizing your Visit

Before going into a Congressional Office, choose a leader who will be the focal point of the group. It is best to choose someone from the Member's state or district.

Use the "3" Rule:

Structure your visit into 3 main parts

1. Who*

- Thank the ***congress/staff person*** for taking the time to meet with your group
- Introduce ***the meeting participants*** – Both name and organization
- Mention the broader scientific community, making note of the more than 250 scientists participating in the ***SET Congressional Visits Day*** effort, who represent more than 2 million US scientists.

2. What

- **Science, engineering, and technology** are crucial to the nation, as well as the Member's state/district.
- Give examples of ***national SET importance*** (e.g., use CVD leave-behind materials)
- Give examples of ***state/district importance*** (e.g., use information about your own work/organization).

3. How

- ***Ask*** your senator/representative/staffer to maintain a commitment to science, engineering, and technology funding in the FY 2001 budget
- ***Offer*** to serve as a resource on SET-related issues.
- Follow-up: ***invite*** the legislator/staff to visit your facility. Seeing is believing!

✳ Be sure to acknowledge the legislator's past support for SET, and be specific. If the legislator is already a champion – ask how you can help him or her advance SET among their congressional colleagues.

Rules "of the Game" for your Meeting

1. Be on time and be prepared to wait. Changes in the legislative calendar and office activity often mean Members and staff must deal with other things.

2. You must be prepared and succinct. *If you do not know the answer, be honest! Always commit to finding out the answer and follow up*

3. Explain how what you are talking about affects the Senator's or Representative's state or district with a **short anecdote** or facts about the district. (e.g., how many people work for your company/university and their economic impact)

4. Limit the presentation; not everyone needs to speak to get the point across.

5. Never be negative about politicians; do not whine or lecture to Members or staffers; do not imply that R&D funding is or should be an entitlement.

After the meeting, follow up! Send a letter of thanks to the Member and staffer offering to be a source of information in the future.

How Congress Works

Members and staff are very busy and deal with many other issues in addition to your main issue of concern. They are "jacks of all trades, masters of few or none." Acknowledging the limitations on their time and resources and offering to be a source of information is vital and helps to build a strong working relationship.

1. The legislative process is designed to be complex and deliberative, ensuring that all parties have an opportunity to comment on legislation. Legislation is considered in subcommittees, committees, and on the floor of both the Senate and House, and must be signed by the President. Most proposed laws are never acted upon and few ever become law.

2. Members look to their colleagues for guidance; influencing one may, in fact, influence many.

3. Staffers are often very influential in advising Members on votes.

4. All government is political and, in the immortal words of former House Speaker Thomas P. "Tip" O'Neill, "all politics is local."

5. Legislative proposals are weighed subjectively. Members of Congress not only consider proposals on their merits but also on these basic political questions:

    - How will the bill affect the legislator's re-election prospects?
    - Is this issue consistent with the legislator's previous votes/positions on related matters, and with his/her political and economic philosophies?
    - What would be the impact on the Member's local economy and jobs?
    - What are the constituents saying, the news media and local interest groups recommending?
    - What are the legislative staff and advisors recommending?

The Legislative Process

There are essentially two types of legislation, both of which follow the same route into law:

1) ***Authorization bills*** -- establish programs and policies, also set recommended budget levels.
2) ***Appropriations bills*** -- provide the actual funding for government programs and agencies on an annual basis

Step 1 - Committees

Most legislative activity occurs in Committee, thus giving Committee members greater influence on specific legislation. Most legislation is given public hearings by subcommittees and full committees of both the House and Senate. Amendments to legislation can be made to the bill in subcommittee and/or full committee during special Committee meetings called "mark ups."

Step 2 - The Floor

Once a bill passes through the committee process, it may be amended further on the floor of either the House or Senate.

Step 3 - Conference Committee

When both the House and Senate have passed versions of the same legislation that are different, a "Conference Committee" of both Representatives and Senators meets to work out the differences -- often additional changes are made during Conference. Both chambers must approve the new version of the legislation.

Step 4 - The President

The President can sign or veto any piece of legislation. The Congress can attempt to override a veto with a 2/3 vote. Congress can also try to amend the legislation in a manner to the President's liking or send it back through the entire committee process. Only if the President signs a bill or a veto is overridden does the legislation become law.

Members of Congress and staff often note how little people know about the legislative process. Showing that you have some knowledge will impress them, leaving a positive impact.

Building Relationships with Legislators

Before academe and industry address legislators and their staff about a particular issue, it is helpful if a professional relationship has already been established. Strong personal relationships are the best means of influencing legislative decision-making. Personal visits, letters, phone calls, and other forms of communication also are important, especially when they come from constituents who are well-known, highly regarded, and have gone out of their way to be helpful in a variety of ways in the past. Building relationships takes time and careful effort, but it is the most effective way to shape the thinking of those who decide public policy.

How do you go about building such relationships? In much the same way as you cultivate friendships: by being friendly and personally helpful, by being a useful and trustworthy source of sound information and insight, and contributing your personal time to professional and political needs and interests. Your own party affiliation should not restrict you. Every elected officeholder represents an entire state, legislative district, or local government--Republicans, Democrats, and independents alike. You do not have to be a member of the legislator's political party to work together and even to become friends.

You will need to do some homework about the key issues, economic facts, employment, industry, etc. that are important to the interests and viewpoint you represent. At the same time, familiarize yourself about the legislators with whom you want to build relationships.

Become a fountain of facts. Know the number of employees you represent in the official's state or district, the annual payroll and taxes paid, expenditures for local supplies, materials and services, investments, and philanthropic contributions and corporate sponsorships. Also, be aware of the community improvement projects that your company/university or employees support, environmental investments, contributions and activities, and facts about local safety and health standards and performance.

Some relationship-building activities are:

1. Write and/or call legislators on current issues.
2. Make personal visits either in Washington, D.C. or in the home district offices to discuss current issues or broad problems.
3. Organize group visits on issues of mutual importance.
4. Invite legislators to tour local plants and facilities, research and teaching laboratories, and meet with management and employees for discussion of problems and issues.
5. Get personally involved in legislators' campaigns and the activities of your political party.

Here are some ways you can work with your organization's government relations staff to build relationships at the federal level:

1. Develop resource relationships which officeholders can call upon at will for reliable and authoritative economic/technical information.
2. Leverage legislative influence through effective coalitions and third-party activities.
3. Provide financial support for legislators' campaigns, through individual contributions or through your organization's political action committee.

These steps will progressively build your credibility with the officeholder. Establishing a reputation as an objective data source, for example, builds credibility for subsequent communications expressing opinions on issues. Political activity establishes you as a friend whose views are likely to receive more weight than someone who writes from time to time.

Using Economic Data

Economic data and technical information are often essential to support your case on key issues. Use the data you have about operating in your area or state to illustrate how much your organization contributes in terms of wages and benefits, local purchases, taxes, and other concerns. The data can be presented as a sentence or two in a letter to a legislator, as a brief paragraph in position papers, press releases and personal visits, or in a brochure for the public or government audiences.

If scientific data are necessary to address specific issues, they must be used with sophistication. Technical experts on the staffs of policymakers may comprehend and delight in complex charts and tables, but the decision makers themselves have very low tolerance for such detail. When using charts to convey information, avoid using scientific jargon. If such terms are required, you should explain them so that a non-technical audience can understand.

When using economic and technical data, use exactly the information you need to build credibility and make the case, and then stop. Stretching data to fit the need would strain your credibility. Test the presentation by showing it to a few friends or neighbors beforehand. If they find it tiresome or confusing, there is a good chance that your target audience would, too.

Personal Visits

There is no better way to effectively make your case on issues with legislators and staff than personal visits. Such visits also are a good way to introduce yourself as a constituent. Personal meeting can be difficult to accomplish with the policymaker's busy schedule, but remember that you are offering an important business contact. You can arrange the meeting with the policymaker directly or through staff aides.

The following suggestions will help make the best use of your time and the legislator's:

1. Always make an appointment. Arranging the first meeting may require patience on your part, but be persistent. Later, as you become known as a resource, gaining appointments will be less difficult. This will occur especially if you also become known as a campaign contributor, political activist, or civic leader who can muster support on the issues from a wide variety of groups through your coalition activities.

2. Be prepared to meet with key legislative personnel or committee staff members if the legislator is unavailable at the last moment. Briefing these people before your visit also may be useful so that they can prepare the legislator. Staff aides are often more knowledgeable about details of a specific issue than lawmakers themselves.

3. If several individuals join you in the visit, decide in advance who will be the principal spokesperson. That individual, of course, should encourage others to participate in the discussion to share particular expertise or experiences.

4. If you want to discuss a specific issue, make sure you are thoroughly familiar with all aspects of it before going into the meeting.

5. When talking to legislators, try to be concise, well organized, and mindful of the other person's time. State your view firmly, but be attentive to the policy-maker's position also.

6. Open the discussion by reminding the legislators who you are, whom you represent (i.e., the Coalition for Technology Partnerships or the SET Work Group), and why you are there. Know the issue and the bill number. State your concern about the issue, how it will affect you and your organization, and the community.

7. Always be truthful and never mislead. Your personal credibility and that of the organization you represent is at stake. If you do not have the answer to a question, do not improvise. Promise to get back to the questioner with the necessary information, and be sure to do so promptly.

8. Come prepared with a brief (one-page) position paper that summarizes your points with facts, and leave it behind with the legislators or staff aides. If a lengthier document or answers to questions is relevant, send it later with a "thank-you" note.

9. To gain a favorable vote, follow up with letter(s) and calls to legislators and their key staff advisors at appropriate points as the issue progresses.

10. Maintain the relationship. Get your name on legislative mailing lists. Find occasions to see the legislators again in appropriate circumstances, and write to them on the issues from time to time. If you obtain reports or data that will be useful to legislators and their aides and that you can share with them, send those documents with a brief personal cover note. Eventually, you may even find policymakers coming to you for information, help, or your point of view on new issues.

R&D Is an Investment

Federally funded research promotes security, prosperity and innovation.

Our core message packs a big idea into a small number of words, but it sums up the common denominator between all of the organizations participating in Congressional Visits Day. *Research should be viewed as an investment, not an expense.*

Our groups recognize that federal support for basic research in a wide variety of scientific and technological disciplines has led to the economic success our Nation enjoys today. Federal expenditure in this area is not an expense, but an investment in the future. Research takes time and only the Federal government can maintain the levels necessary to perform the very basic R&D efforts that lead to long-term national benefits.

Although some legislators and their staff are aware of the long-term nature of federally funded R&D efforts, many are not. This is the single most important message for all CVD participants to convey, that long term, steady investment is required for the Nation's research enterprise.

The federal government supports a unique research and education enterprise that fuels the American economy. This enterprise provides the underpinning of high-technology industries, expands the frontiers of knowledge, and trains future generations of scientists, engineers, and mathematicians.

Despite these facts, funding cuts loom on the horizon. It is up to the scientific and R&D community to carry the investment message to Congress. Be sure to highlight this important message in your visit with our Nation's legislators.

The Return on Federal R&D Investment

More than 50 percent of all industrial innovation and growth in the United States since World War II can be attributed to advances pioneered through scientific research.

The list of achievements is long and increases every day. Results happen -- sometimes through serendipity and sometimes by design, sometimes in a few years and sometimes not for decades. We do not know *when* they will occur, but we do know that they will.

Whether the applications are broad and enabling, or part of a new product or process, publicly funded science is at the core of our society's progress to date.

Achievements such as computer modeling of chemical structures to design drugs, the Internet, lasers, magnetic resonance imaging, and global environmental monitoring and management are well known.

> A 1997 study prepared for the National Science Foundation by CHI Research found that 73% of scientific articles cited in patent applications are based on research funded by government or foundations, showing industry's dependence on public science in developing the next generation of products and processes.[1]
>
> A five-year study released in 1997 showed that technology transfer from academic research added more than $21 billion – supporting 180,000 jobs – to the American economy each year.[2]

Although some in Congress are aware of these important facts, many are not. It is up to CVD participants to help carry this concept to policy makers. Remember our Core Message:

Federally funded research promotes security, prosperity and innovation.

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[1] The Increasing Linkage between US Technology and Public Science, by Francis Narin, et al., CHI Research (March 1997).

[2] Association of University Technology Managers Licensing Survey, FY 1991– FY 1995 (February 1997).

The Cycle of Innovation

Basic research, applied research, and development constitute a cycle which gives rise to new products and processes, new ideas and understanding, and new researchers and teachers. Each part of this cycle depends on every other. Basic research produces fundamental discoveries which underpin applied research and the development process. The resulting innovations drive economic growth, leading to new jobs and a higher quality of life. These latter stages of the cycle, in turn, stimulate questions and provide advances in instrumentation which produce new avenues for basic research. In addition, research performed at universities and colleges serves to educate the scientific and technical workforce, on which every stage of the cycle depends. This cycle of innovation is a positive-feedback loop, constantly expanding the frontiers of knowledge. Examples of innovations that followed this pattern abound:

Fiber Optics • Electronic mail, the World Wide Web, and better international telephone communications all depend on the use of tightly focused laser beams channeled through tiny strands of glass – optical fibers thinner than a human hair yet stronger than steel. These world-shrinking developments came from fundamental discoveries into the nature of light nearly a century ago.

GPS • Basic research into atomic clocks combined with satellite navigation technology led to development of the global positioning system (GPS). The ability to locate an object with pinpoint accuracy gives GPS a wide range of civilian and military uses, including aircraft navigation and collision-avoidance systems, rescue of ships lost at sea, and monitoring forest fires. This new technology has also become an important tool for basic research into earthquakes and volcanoes.

Human Genome • The sequencing and analysis of the human genome, which promises major advances in human health, has involved huge amounts of data-processing made possible only by recent advances in information technology (IT). The dramatic release of a draft sequence of the human genome earlier this year thus could not have occurred without the revolution in IT that has at its roots discoveries in basic physics.

Federal Investment in R&D

Federal funding of research and development comes in many forms. Most federal R&D funding is mission-oriented. That is, it serves to advance the goals and objectives of the agency that provides the funds. NASA, for example, funds basic research, applied research, and development as part of its broad goal of exploring space. The only federal agency that funds R&D that is not mission-oriented is the National Science Foundation, whose mission is to support basic and applied research, research facilities, and education across a wide range of science and engineering disciplines.

The federal investment of public funds in the early stages of the innovation cycle stands out as a vitally important element of the nation's scientific enterprise. While federal funding accounts for only about a quarter of total R&D in the U.S., it pays for nearly half of basic research. Similarly, just nine percent of industry R&D funding goes to basic research, while nearly a quarter of federal R&D does.[3]

[3] *AAAS Report XXVI: Research & Development FY 2002*, pp. 31, 58 (http://www.aaas.org/spp/dspp/rd/xxvi/rd02main.htm).

R&D in the FY 2003 Federal Budget

For a detailed analysis of R&D in the FY 2003 budget request, please refer to the Appendix.

Federal R&D funding increased significantly across the board last year, rising $12.3 billion to $103.7 billion in fiscal year (FY) 2002, far more than President Bush proposed last spring. This year, however, with the political climate dominated by terrorism, recession, and midterm elections, the outlook is uncertain. On February 4, President Bush released a FY 2003 budget request which, like last year's request, contains overall increases for R&D, but cuts in some of the major R&D funding agencies.

Citing the war on terrorism and a shrinking economy as justification for a return to a budget deficit, President Bush has proposed large increases in discretionary spending, which is the one-third of the budget subject to annual appropriations decisions by Congress and the President, and is the part of the budget out of which nearly all federal R&D is funded. The President's budget calls for overall discretionary spending to rise 6.8 percent or $49 billion in FY 2003 to $767 billion. However, most of the increase would go just to the President's top priorities: the Department of Defense (DOD) and the National Institutes of Health (NIH).

Because DOD and NIH are the two largest funding sources of federal R&D, the special treatment given to them in the budget would allow overall federal R&D to increase in FY 2003, however other R&D funding agencies would share in flat funding. Total R&D would increase $8.6 billion (8.3 percent) to $111.8 billion, while defense and NIH R&D together would rise by $8.7 billion. Nondefense R&D excluding NIH, therefore, declines by about $100 million (0.4 percent). As indicated in the chart below, this includes a mix of increases and decreases in major R&D programs, reflecting in part the Bush Administration's campaign to eliminate congressional earmarks and FY 2002 funding levels inflated by post-Sept. 11 emergency counterterrorism spending.

The Bush Administration has placed new emphasis on performance-based budgeting, which uses predetermined, objective criteria to set priorities. While such a system was not in place in time to be used extensively in formulating this year's budget, the Administration has begun developing criteria for evaluating R&D programs to be used in next year's budget process.

The R&D funding numbers presented here will likely go through many changes as Congress works its will on the budget. It is crucial to make a strong case for broad, long-term investment in R&D, not just funding to target the specific priorities of the moment.

Please take a look at the Highlights table on the next page for details of the President's FY 2003 budget request.

Highlights of R&D Funding in the FY 2003 Budget Request
(billions of dollars)

Key Federal R&D Agencies	FY 2002	FY 2003 Request	Change, FY 02-03
Department of Defense	49.1	54.5	10.9%
Defense S&T (6.1-6.3)	*9.9*	*9.7*	*-2.0%*
National Institutes of Health	22.5	26.5	17.4%
NASA	9.6	10.1	5.3%
Department of Energy	9.3	8.5	-8.0%
Energy and Science Programs	*4.6*	*4.5*	*-2.5%*
National Science Foundation	3.6	3.7	3.6%
Total R&D	**103.2**	**111.8**	**8.3%**
Defense R&D	*53.8*	*58.6*	*8.8%*
Nondefense R&D	*49.4*	*53.2*	*7.8%*
Nondefense R&D excluding NIH	*26.8*	*26.7*	*-0.4%*

Source: *AAAS Preliminary Analysis of R&D in the FY 2003 Budget* (Reproduced in full in the appendix to this briefing packet).

Our Core Message

Federally funded research promotes security, prosperity and innovation.

R&D Linkages to Education

The United States has a strong educational system in support of science, engineering, and technology. The keys to our system's strength include DIVERSITY in the kinds of institutions (public and private) that deliver education; DIVERSITY in the approaches to science education in our 50 states; DEDICATION of many fine scientists and educators; and INTEGRATION of research and education at the college level. In recent years, federal programs have been initiated that seek to reinvigorate K-12 education, including the President's Math-Science Partnerships and National Science Foundation programs that use the talents and enthusiasm of university scientists and graduate students in the classroom and in teaching training. NSF plans to increase the size of graduate fellowships in its 2003 budget, and efforts are underway to improve the teaching skills of the next generation of college professors through Preparing Future Faculty, funded by a combination of federal and private dollars.

Now that programs are underway for K-12 and graduate students, **the Congressional agenda for 2002-2003 focuses on the undergraduate level of science and technology education.** This is often the choke point in the science pipeline. Many students drop out of science courses because education at the undergraduate level too often treats science only as something to be memorized rather than something alive, personal, and full of creative potential. Too many students never see science education as relevant to them, and they leave school without the tools to understand much of the modern world.

Senate Bill 1549, the "Technology Talent Act", and its House Counterpart, HR 3130, seek to increase the number of U.S. students studying science, technology, engineering, and mathematics. The legislation authorizes the National Science Foundation to establish a demonstration program that supports grants to undergraduate programs. Support is promised to projects that emphasize mentored undergraduate research and experiential learning of all kinds, including industrial and governmental internships. Thus the legislation encourages science and technology partnerships between government, colleges and universities, and local industries to provide opportunities for young people to enter science and technology fields. Such incentives will help industries and scientific/technological corporations to work with the educational system that will produce their workforce for this new century.

R&D Linkages to Education (cont.)

Other undergraduate initiatives worthy of support in Congress are:

---- efforts to provide funds for mentored undergraduate research at the national laboratories and experiment stations, such as **NASA's Undergraduate Student Research Program (USRP) and the NASA Centers.** We need to be sure that this program remains funded. We can use it as a model for federally funded programs at the other national laboratories.

---- efforts to help **two-year colleges and technical schools** to provide strong environments for science education, both to feed the professional science pipeline and to provide job opportunities within the modern economy for those who will not continue their education. S 1549 does provide for "bridge" programs to help graduates of two-year schools continue in science, but more support is needed for science curricula at the schools themselves.

---- efforts to develop **programs that recognize excellent science and technology educational opportunities at our comprehensive universities, especially those that successfully integrate scientific research and education.** These are the schools, often within our state university systems, that train the majority of our K-12 science teachers and most of our students from underrepresented groups. The House Science Committee is looking at ways to encourage and support these schools, whose sheer size, limited budgets, and diversity of students require creative means to reach them with investigative science learning tools.

---- efforts to support **public understanding of science** through education of non-science majors and informal education opportunities.

Our Core Message

Federally funded research promotes security, prosperity and innovation.

The Importance of Partnerships

Research conducted in government, industrial and academic laboratories varies in style and objective. Each sector's efforts complement the others' and reinforce the excellent R&D enterprise of the United States. With recent changes in commercial and financial markets, however, industry is forced to reshape its R&D goals. Not only are foreign competitors challenging U.S. industry's stature in world markets, the pressure for short-term returns from U.S. capital markets forces the Nation's industry to focus its investment on development, which is closer to the marketplace.

> "The United States has unparalleled resources of science and technology. Its industrial research capability, universities, nonprofit research institutions, and federal laboratories are great national treasures. But in a time of severe financial constraints and heightened international competition, the Nation must maximize its returns on those assets...The time is ripe for bold steps to capitalize on the promise of partnership."
>
> **State-Federal Technology Partnership Task Force Report, co-chaired by former Governors Dick Thornburgh (R-PA) and Richard Celeste (D-OH)**

The federal government plays a crucial role in R&D partnerships. It can create an environment conducive to collaborations among federal, industrial, and academic researchers. For example, **Cooperative Research and Development Agreements** give companies access to the expertise and facilities of federal labs for specified R&D. The Department of Energy's Stockpile Stewardship Program creates partnerships with industry and universities to manage our nation's nuclear weapons and develop the most advanced supercomputing capability.

Under the National Institute of Standards and Technology's **Advanced Technology Program**, the federal government shares the costs of research on high-risk technologies that underlie a broad spectrum of potential new applications, commercial products, and services. The **Manufacturing Extension Program** aims to accelerate the transfer of advanced manufacturing technology to small and medium-sized, U.S.-based manufacturing firms.

The newly introduced **National Nanotechnology Initiative** largely is directed toward university-based research across a variety of disciplines. Many advances will come at the interfaces between areas and will require multidisciplinary partnerships involving federal-university-industry teams.

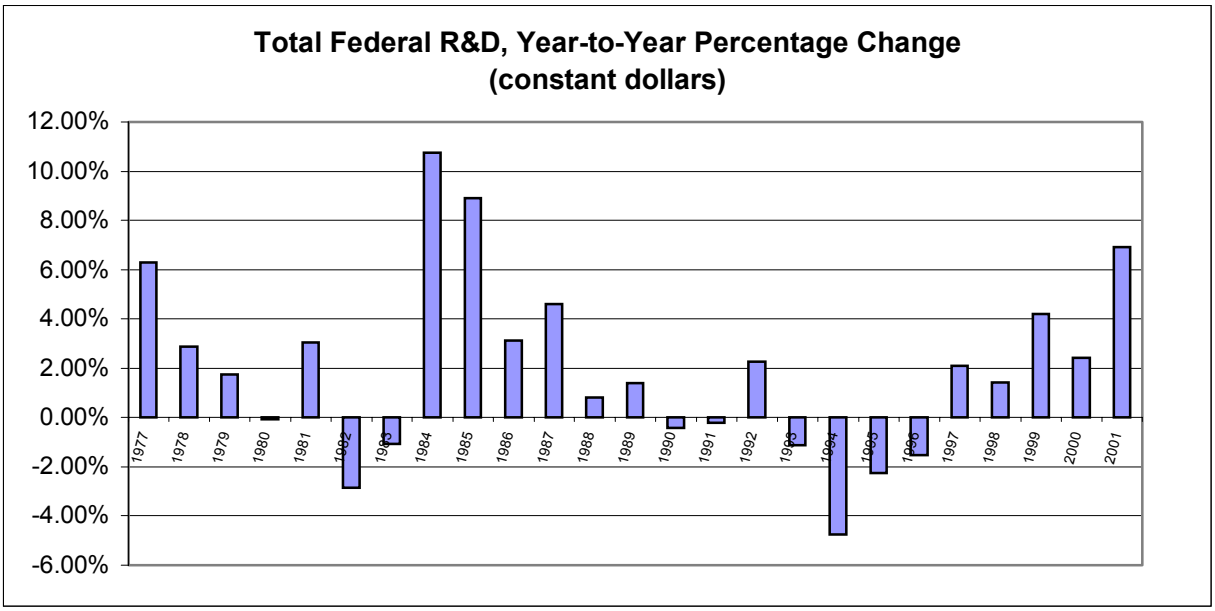
Seven federal agencies support the **Experimental Program to Stimulate Competitive Research** (EPSCoR), a federal-state partnership that provides funds for research activities at universities and non-profit organizations in those states that historically have not received significant federal R&D funding.

The Coalition for Technology Partnerships and the Science-Engineering-Technology Work Group encourage legislators to sustain and enhance the federal government's role in R&D partnerships.

The Nation Needs a Sustained Federal Investment in Research

Over the last several years, a call has gone out from the research community for a doubling of federal science agency budgets. The National Research Investment Act of 1999, passed in the 106th Senate, called for doubling, over eleven years, of all agency budgets that support non-defense science. Lately, there have been calls for doubling, over five years, the budgets of specific science agencies: NIH, NSF, and the Office of Science of DOE.

Rhetoric for doubling science budgets is an outgrowth of the frustration of the scientific community and others, because of the **lack of a comprehensive, consistent federal plan to support science, mathematics and engineering research.** One easily discerns this from considering the chart below.



Simply doubling agency science budgets is only a short-term fix. Yes, many agencies' science budgets have dropped precipitously over the last ten years. These drops in funding should be remedied by quick enhancements.

However, once the enhancements are completed **a long-term, comprehensive and consistent plan is needed**. Arguments for such a plan are all around us: the maintenance of the U.S. leadership in science, medicine, and technology, the security of a constantly enhanced quality of life, the overall economic well being of our Nation, and, of course, national security.

Federally funded research promotes security, prosperity and innovation.

Department of Agriculture R&D

Budgetary Issues

The President's fiscal year 2003 budget proposes $ 105.6 billion for U.S. Department of Agriculture (USDA). The Research, Education, and Economics (REE) mission area of USDA is assigned federal leadership for the discovery, application, and dissemination of information and technologies spanning the biological, physical, and social sciences through agricultural research, education, and extension activities as well as economic and statistical analysis. The three REE agencies with research responsibilities and the respective requests are:

- Agricultural Research Service (ARS): **$1,066 million**
- Cooperative State Research, Education & Extension Service (CSREES): **$1,032 million**
- Economic Research Service (ERS): **$82 million**

CSREES has two competitive grant programs—the National Research Initiative (NRI) and the Initiative for Future Agriculture and Food Systems (IFAFS). The FY03 budget proposal would double funding of the NRI from $120 million to $240 million. However, given the Administration's recommendation to block the $120 million mandatory budget expenditure of the IFAFS program, there is no overall change. Furthermore, the budget terminates funding of congressionally earmarked add-ons. **As proposed, USDA research funding will see an overall decrease of 9.4%, down to $2,180 million from $2,407 million.**

Background

ARS is the principal intramural biological and natural sciences research agency within USDA. ARS conducts research to develop new scientific knowledge, provides access to scientific data, and transfers technology to the private sector to solve technical agricultural problems of broad scope and high national priority. The 2003 budget priority research areas are: emerging, reemerging, and exotic animal diseases, including "mad cow" and food and mouth diseases; emerging and exotic plant diseases; new uses for agricultural products, including as energy sources; global climate change; agricultural genomes; and biosecurity.

CSREES has primary responsibility for linking the federal and state components of the U.S. agricultural research, extension, and higher education system. CSREES provides funding for projects conducted in partnership with the State Agricultural Experiment Stations, State Cooperative Extension Systems, land grant universities and colleges, and other research and education institutions. Federal funds are distributed to universities and institutions by statutory formula funding, competitive awards, and special grants. CSREES has two competitive grant programs, the NRI and the IFAFS.

ERS is the principal intramural economic and social science research agency within USDA.

Champions and Players

Senate Agriculture, Nutrition and Forest Committee	
Richard Lugar (R-IN), Ranking Member	Tom Harkin (D-IA), Chair
Senate Appropriations Subcommittee on Agriculture, Rural Development and Related Agencies	
Thad Cochran (R-MS), Ranking Member	Herbert Kohl (D-WI), Chair
House Agriculture Committee	
Larry Combest (R-TX), Chair	Charles Stenholm (D-TX), Ranking Member
House Appropriations Subcommittee on Agriculture, Rural Development, FDA, and Related Agencies	
Henry Bonilla (R-TX), Chair	Marcy Kaptur (D-OH), Ranking Member

Our Core Message

Federally funded research promotes security, prosperity and innovation.

Department of Commerce R&D

National Institute for Standards and Technology

Not yet available.

National Oceanic and Atmospheric Administration (NOAA)

Budgetary Issues

The president has requested $3.33 billion, a $45.4 million (1.3%) decrease from the fiscal year (FY) 2002 level, for the National Oceanic and Atmospheric Administration (NOAA), an agency within the Department of Commerce. Increases in the NOAA budget are focused on climate research, severe weather prediction, and fisheries management and research.

NOAA's Office of Oceanic and Atmospheric Research (OAR) would receive $297.0 million, a decrease of $59.1 (16.6%) million from last year. The OAR request includes a $20.8 million increase to $171.0 million for climate research, of which $41.5 million, an increase of $18.0 million (43.3%), is aimed at the Climate Observations and Services. At a budget briefing, this increase was described by NOAA Administrator Conrad Lautenbacher as a "down payment" towards supporting the President's Climate Change Research Initiative (CCRI), announced in June 2001. NOAA's role in the CCRI will include the establishment of a Climate Modeling Center, improved ocean and atmosphere observations, increasing understanding of climate forcings, and improved understanding of climate impacts and risk assessment. Efforts to improve severe weather forecasting are reflected in $59.0 million of the OAR request for Weather and Air Quality Research, up $3.58 million, for the replacement and upgrading of instruments and laboratories; $10.0 million for the U.S. Weather Research Program to improve forecasts of heavy precipitation associated with tropical storms; and $1 million to establish a new tornado storm research program.

In addition to supporting research for the assessment and prediction of environmental change through the use of weather and climate forecasting, NOAA is involved in mapping and exploration of the oceans, protection of coastal ecosystems, and education of students and teachers. These initiatives are supported under the Ocean, Coastal, and Great Lakes Research programs, which received $54.2 million within the OAR request, a drop of $83.5 million, or 60.7%. A large portion of this decrease comes from the transfer of the National Sea Grant College Program, which received $62.4 million in FY2002, to the National Science Foundation (NSF). At a budget briefing, Lautenbacher stated that the Sea Grant Program was transferred to NSF in light of the strong R&D elements of the program. Started in 1966 as a program at NSF, the Sea Grant was transferred to NOAA so that the agency could build partnerships with universities. Lautenbacher stated that it was a goal of NOAA to ensure that the program will continue to operate at NSF as it did under NOAA.

Part of NOAA's mission is to conserve and wisely manage the nation's marine and coastal resources, promoting environmental stewardship through building sustainable fisheries, recovering protected species,

and sustaining healthy coastal ecosystems. The NOAA budget included a $90.9 million increase for the modernization of agency fisheries, including $74.8 million in science. Also included in the science increase is $45.5 million for the replacement of a fisheries research vessel.

Players and Champions

House Appropriations Subcommittee on Commerce, Justice, State and Judiciary	
Frank Wolf (R-VA), Chair	José Serrano (D-NY), Ranking Member
Senate Appropriations Subcommittee on Commerce, Justice, State and Judiciary	
Judd Gregg (R-NH), Ranking Member	Ernest Hollings (D-SC), Chairr
House Environment, Technology, and Standards Subcommittee	
Vernon Ehlers (R-MI), Chair	James Barcia (D-MI), Ranking Member
House Fisheries Conservation, Wildlife and Oceans Subcommittee	
Wayne Gilchrest (R-MD), Chair	Robert Underwood (D-GU), Ranking Member
Senate Commerce, Science and Transportation Committee	
John McCain (R-AZ), Ranking Member	Ernest Hollings (D-SC), Chair

A House Oceans Caucus aimed at increasing House of Representative awareness about ocean policy is co-chaired by Rep. Curt Weldon (R-PA), Rep. Sam Farr (D-CA), Rep. Jim Greenwood (R-PA), and Rep. Tom Allen (D-ME).

Department of Defense R&D

Budgetary Issues

Last year, in the aftermath of September 11 and with strong bipartisan support, Congress passed increases for both basic research (6.1) and applied research (6.2) allocations. In the end, 6.1 allocations received a 5.5% or $72 million increase to total $1.4 billion, and 6.2 allocations received a 12.5% or $ 459 million increase to total $4.1 billion.

While the President's FY 2003 budget proposal emphasized national security and highlighted large increases in DOD R&D programs, the increases went to the development and procurement accounts, and not to the more fundamental research portion of the defense R&D program. The President's FY 2003 budget request would actually decrease basic research (6.1) funding by .7% from last year's congressionally appropriated levels. Applied research (6.2) would decrease 7.5% under the President's proposal.

In 2001, the DOD released an extensive evaluation of its programs and priorities called the Quadrennial Defense Review (QDR). The QDR included a review of the DOD science and technology (S&T) program, which is made up of the basic (6.1), applied (6.2), and the advanced development (6.3) research accounts. The QDR stated: "A robust research and development effort is imperative to achieving the Department's transformation objectives. DOD must maintain a strong S&T program that supports evolving military needs and ensures technological superiority over potential adversaries. … To provide the basic research for these capabilities, the QDR calls for a significant increase in funding for S&T programs to a level of three percent of DOD spending per year." This level in the FY 2003 president's budget would equal $11 billion. The president's actual FY 2003 request for the S&T program is $9.7 billion, approximately $200 million below the amount appropriated by Congress last year.

The QDR follows up on several other reports that recommend higher defense S&T funding. In 1998, the Defense Science Board used the amounts invested in R&D by successful advanced technology industries as its yardstick, and recommended that DOD should invest 3% of its budget in the S&T program. And in 1999, Congress mandated in the 1999 Defense Authorization bill that the Pentagon increase defense S&T programs by 2% above inflation annually.

Supporting Arguments and Background Information

The DOD basic research budget is approximately 0.5% of the total DOD budget. The primary objective of 6.1 and 6.2 programs is to provide the means to develop new technologies and capabilities that can be used by the military in order to maintain a technologically superior military force.

By making an investment in scientific research, DOD is able to better understand the fundamentals of the areas of science relevant to the military and help cultivate the scientific and engineering human resources needed by the Nation.

Most DOD basic research is performed in academia thus providing a major federal investment in the university research infrastructure and in future US scientists and engineers. Over 250 US universities received research funding from DOD.

The Department invests in many fields and is a significant source of funding for engineering (39% of all federal funding, according to NSF Science & Engineering Indicators - 2000), electrical engineering (65%), computer science (48%), mathematics (18%), environmental sciences (15%), physical sciences (9%), cognitive sciences (7%), and the life sciences (2%).

Champions and Players

House Appropriations Subcommittee on Defense	
Jerry Lewis (R-CA), Chair	John Murtha (D-PA), Ranking Member
House Armed Services Subcommittee on Military Research and Development	
Duncan Hunter (R-CA), Chair	Marty Meehan (D-MA), Ranking Member
Senate Appropriations Subcommittee on Defense	
Ted Stevens (R-AK), Ranking Member	Daniel Inouye (D-HI), Chair
Senate Armed Services Subcommittee on Emerging Threats and Capabilities	
Pat Roberts (R-KS), Ranking Member	Mary Landrieu (D-LA), Chair

This January, Rep. Tony Hall (D-OH) organized a letter to President Bush urging the administration to fund defense S&T at 3% level of the total DOD budget as recommended by the Quadrennial Defense Review. Twenty-nine members of Congress signed the letter. They included: Hall; Sherwood Boehlert (R-NY); John Boehner (R-OH); Allen Boyd (D-FL); Dave Camp (R-MI); John Dingell (D-MI); Martin Frost (D-TX); James Hansen (R-UT); Van Hilleary (R-TN); David Hobson (R-OH); Rush Holt (D-NJ); Rick Larsen (D-WA); John Larson (D-CT); Dale Kildee (R-MI); Sander Levin (D-MI); James McGovern (D-MA); George Nethercutt (R-WA); William Pascrell (D-NJ); Donald Payne (D-NJ); Lynn Rivers (D-MI); Steven Rothman (D-NJ); Christopher Smith (R-NJ); Ted Strickland (D-OH); John Tierney (D-MA); Robert Underwood (D-GU); and Heather Wilson (R-NM);

Last year, Senator Rick Santorum (R-PA) led a bipartisan letter urging Senate appropriators to invest at least $10 billion in the defense S&T program (which ultimately was the amount Congress appropriated for the program.) Santorum, Trent Lott (R-MS), Edward Kennedy (D-MA), Jeff Bingaman (D-NM), George Voinovich (R-OH), John Kerry (D-MA), and Joseph Lieberman (D-CT) signed the letter.

Department of Energy R&D

Budgetary Issues

The Administration proposes to increase the Department of Energy's (DOE) Defense Programs by 2.8 percent. For the balance of the DOE's R&D budget, however, the Administration proposes a cut of 3.2 percent. The presidential request would extend the decade-long decline in DOE's research programs. These programs account for more than half of all federal spending on the physical sciences.

To achieve the Department's bottom line, the Administration would all but freeze the Office of Science budget at the FY 2002 level. The presidential request does propose to give increases to a number of Science subprograms. High-Energy Physics would rise 1.7 percent, Nuclear Physics by 6.5 percent (mostly to increase the utilization efficiency of two major accelerators), Fusion Energy Sciences by 4.0 percent and Advanced Scientific Computing by 7.9 percent. The Basic Energy Sciences budget would climb by only 2.0 percent, but planned reductions in construction expenditures for the Spallation Neutron Source would actually allow Materials Science to rise by 6.9 percent and Chemical and Geosciences by 5.9 percent.

Most of these proposed increases might seem quite reasonable, but the presidential budget achieves them by eliminating all congressional earmarks, which historically have appeared in the appropriation for Biological and Environmental Research (BER). This is reflected in a proposed 11.6 percent cut in the BER activity. If Congress restores the earmarks, as it likely to do, and Science's bottom line is not augmented, various subprograms will have to take a hit. These hits would result in cutbacks at DOE user facilities and in university research programs, both of which are key elements in the education and training of the next generation of scientists.

The Administration would trim Energy Conservation R&D by 10.9 percent and Fossil Energy programs by 17.3 percent. Although the President's request would raise R&D spending on Renewable Energy Resources by 2.8 percent, it would cut Nuclear Energy R&D by almost 35 percent. And within the weapons programs, the 30.8 percent increase in Stockpile Stewardship R&D would come at the expense of cuts of ten percent in a number of key activities, including nonproliferation and verification.

Supporting Arguments and Background Information

The DOE is the third largest federal sponsor of basic research and the largest supporter of research in the physical sciences. In addition to its extramural programs, DOE maintains major research facilities – widely considered jewels in the federal science enterprise – that are used by researchers from universities, industries and other government agencies, including the National Institutes of Health.

The Department is also charged with studying and developing reliable and affordable fuel sources that are essential for safeguarding national security, supporting a high quality of life, increasing productivity, improving economic competitiveness and protecting the environment. These goals require a balanced portfolio of energy technologies, including advanced fossil fuels, nuclear fission and fusion, solar energy, renewable energy, conservation and efficiency. And they require strong support of the underlying sciences.

Last year, a task force chaired by Vice President Cheney submitted its report on "National Energy Policy" to President Bush. It drew just that conclusion, stating, "Our challenge is clear – we must use technology to reduce demand for energy, repair and maintain our energy infrastructure and increase our energy supply." Two years earlier, the President's Council of Advisors on Science & Technology (PCAST) presented a report to Bill Clinton that similarly concluded, "For reasons of economy, environment, security, and stature as a world power alike, the United States must maintain its leadership in the science and technology of energy supply and use."

Champions and Players

Senate Appropriations Subcommittee on Energy & Water Development	
Pete Domenici (R-NM), Ranking Member	Harry Reid (D-NV), Chair
House Appropriations Subcommittee on Energy & Water Development	
Sonny Callahan (R-AL), Chair	Peter Visclosky (D-IN), Ranking Member

Senate Appropriations Subcommittee on Energy & Water Development: Harry Reid (D-NV) Chair; Pete Domenici (R-NM), Ranking Member. House Appropriations Subcommittee on Energy & Water Development: Sonny Callahan (R-AL), Chair; Peter Visclosky (D-IN), Ranking Member.

Reid has expressed support for DOE's science programs, but, like all Nevada politicians, has vociferously opposed the Department's decision to open Yucca Mountain for long- term storage of high-level radioactive wastes. Domenici, a founding member of the bipartisan Senate Science and Technology Caucus, is regarded by his colleagues as one of the most forceful advocates of scientific research throughout government. His state is home to two DOE weapons laboratories, Los Alamos and Sandia, but his support for the Department goes much deeper than its defense programs. Rodney Frelinghuysen (R-NJ), who serves on the House Subcommittee, has proved to be more of a science advocate than either Callahan, who has focused more on water projects, or Visclosky.

Department of the Interior R&D

Budgetary Issues

The U.S. Geological Survey (USGS) conducts the vast majority of research within the Department of the Interior (DOI). For the second year in a row, USGS faces substantial cuts in the president's request. For fiscal year (FY) 2003, the Bush Administration is seeking a $47 million, or 5.1%, cut to $867.3 million.* Biological programs are down $5.9 million (-3.5%) to $160.5 million; geologic programs would be cut $8.2 million (-3.5%) to $224.7 million; water programs take the biggest hit, down $28 million (-13.6%) to $177.8 million; and mapping programs are down $4 million (-3.0%) to $129.3 million. Taking into account the need to cover cost-of-living increases, actual program funds would fall by $55.2 million. All four disciplines within the Survey have made and continue to make significant contributions to support of homeland security and the war on terrorism overseas, but neither the emergency supplementals nor the FY 2003 request provide any direct funding. Instead, those costs must be absorbed in addition to the proposed cuts.

As was the case a year ago, USGS water programs take the brunt of the cuts in the president's request. Several programs are targeted for elimination and, in one case, transfer out of Interior. Funding for the National Water Quality Assessment (NAWQA) program is to be cut by 9.2% to total $63.1 million for collecting data from 42 large river basins and aquifers. Two other water programs would be eliminated by the budget request: the Water Resources Research Institutes and the Toxic Substances Hydrology Program (Toxics). The Water Resources Research Institutes were established by the Water Resources Research Act of 1984, to train the next generation of water scientists and engineers. They are located in all 50 states, the District of Columbia, and federal territories. The Toxics program is a collaborative effort of scientists from USGS, universities, private-sector, and state, local, and federal agencies. Research from the program helps to understand the transport of various contaminants, such as MTBE and radioactive waste, in ground water. The administration proposal would downsize the program from the $13.9 million allocated in FY 2002 to only $10 million, all of which would be transferred to the National Science Foundation and absorbed into other programs within the Geoscience Directorate.

For the past two years, several USGS cooperative programs have received funding through a separate account in the Interior and Related Agencies appropriations bill known as the Title VIII Conservation Funding category. Originally added in the FY 2001 bill, Title VIII was a slimmed-down version of a much broader plan to use funds collected from oil and gas royalties to be used for environmental activities at the state and local level. Title VIII funding was planned as a six-year initiative, but funding is not mandatory and thus not guaranteed from year to year. Last year, the USGS received an additional $25 million from Title VIII. As was the case in the president's FY2002 request, Title VIII funds are zeroed out in the president's request. The National Cooperative Geologic Mapping program is marked for a nearly $6 million decrease of which almost $5 million is from the Title VIII account. The National Streamflow Information Program (NSIP), a network of nearly 7,200 streamgages, would receive a $2 million cut (14.6%), which would eliminate funding for 130 streamgages. Several other programs are in a similar situation with a decrease in funding because of the removal of Title VIII funds in the request.

In all, the budget request cuts 35 separate programs in USGS. More than half of these programs are considered by OMB to be congressional earmarks, and most of those are projects in specific locations. Nearly all the cuts proposed in the biological research division (BRD) fall under this OMB category. The largest single decrease in BRD is a $2.8 million cut to fire ecology research. Amphibian research would be cut by $0.5 million along with a $0.75 million cut in biological research and monitoring related to a mining study in the Mark Twain National Forest and a $0.5 million cut to research on ballast water and invasive species.

Six programs would receive additional funding in areas that are administration priorities: supporting the president's National Energy Policy plan, researching environmental and human health connections, and implementing the Comprehensive Everglades Restoration Plan. Focused primarily on the Mexico/U.S. border, the environmental health project is marked to receive $1 million. USGS would receive $4 million from the National Park Service to support multi-agency science activities related to the Everglades project. In the energy arena, USGS would receive $1.2 million to build upon activities from the current fiscal year to conduct estimates of undiscovered oil and natural gas resources on onshore federal lands. Also included was $1 million to produce digital base maps in areas of Alaska with future leasing potential. Geothermal energy would receive a small boost of $0.5 million.

Although USGS is the sole science-oriented agency within DOI, other Interior agencies, such as the Minerals Management Service and the National Park Service do fund small amounts of R&D. Resource Stewardship at the National Park Service supports a few R&D projects related to the Natural Resources Challenge, a five-year action plan for improving resource management at parks. That plan is slated for a $35 million increase.

Supporting Arguments

With no regulatory or management functions, the USGS is the principal source of independent scientific data on the nation's fresh water, natural hazards, and natural resources. Research conducted by USGS helps find solutions to challenging environmental problems ranging from drinking water quality to invasive species. USGS research is critical to proper management of the 650 million acres of land managed by the U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, and Bureau of Land Management, and is increasingly used by state and local planners across the country.

* The official budget request number for USGS is $904 million, which includes a one-time transfer of $35.9 million for the pension system and health benefit program for current employees -- excluding this transfer the request come to $867.3 million, which is directly comparable to previous years.

Champions and Players

House Appropriations Subcommittee on Interior & Related Agencies	
Joe Skeen (R-NM), Chair	Norm Dicks (D-WA), Ranking Member
Senate Appropriations Subcommittee on Interior & Related Agencies	
Conrad Burns (R-MT), Ranking Member	Robert Byrd (D-WV), Chair
House Resources Committee	
James Hansen (R-UT), Chair	Nick Rahall (D-WV), Ranking Member
Senate Energy and Natural Resources Committee	
Jeff Bingaman (D-NM), Chair	Frank Murkowski (R-AK), Ranking Member
Senate Environment and Public Works Committee	
James Jeffords (I-VT), Chair	Robert Smith (R- NH), Ranking Member

National Aeronautics and Space Administration

Budgetary Issues and Issues to Know About

The President has requested $15.1 billion for NASA in FY 2003, of which AAAS estimates $10.1 billion would go for R&D (up an amazing 5.3% from enacted FY2002 levels). Most of NASA's research is performed under the Science, Aeronautics and Technology budget line in four basic areas, Space Science, Earth Science, Biological and Physical Research and Aerospace Technology. Space Science would increase by 19.3% to $3.43 billion, but some of this increase is from a transfer of funds from Mission Support into each of the program areas. This accounting detail impacts all mission-oriented budget lines. Earth science would stay flat at a level of $1.6 billion. Biological and Physical Research would see a modest growth of 3% to a level of $851 million and Aerospace Technology would see an increase of about 13% to $2.86 billion.

The International Space Station (ISS or 'Station') receives a significant cut of roughly $230 million or 13.3% to a funding level of $1.5 billion. There are a significant number of details regarding the management and implementation of the ISS project in the President's budget. Significantly, the ISS research budget has been transferred to the Biological and Physical Research portion of NASA's budget as per Congressional directive. The President's budget includes funding to get the ISS to "US Core Complete", the minimal useable configuration recommended by an independent panel of experts last year.

In a House Science Committee Hearing in February, Chairman Boehlert and other committee members renewed their commitment to maintaining the science and technology research efforts taking place at NASA in light of Space Station cost overruns. This so-called "firewall" concept helps to guarantee the preservation of scientific research efforts at NASA, despite cost Station cost overruns.

Supporting Arguments

NASA's support for basic scientific research has stretched the vistas of imagination, expanding our knowledge of the solar system and the universe — answering questions and creating new ones. NASA has developed a strong strategic plan that continues to guide the agency in fulfilling its mission. This strategic plan has resonated with OMB and Congress and is heavily focused on science and technology research.

A well-balanced and vigorous civil aeronautics and space program is critical for advancing science and technology and for improving economic competitiveness. Investments in civil aerospace R&D help to maintain our leadership in the modern world. Support for Earth Science programs has allowed us to improve our understanding of our own planet, including its weather, atmospheric, oceanic and geophysical processes. NASA is one of the most liked Federal agencies by the American public.

Champions and Players

House Science Committee	
Sherwood Boehlert (R-NY), Chair	Ralph Hall (D-TX), Ranking Member
Dana Rohrabacher (R-CA), Space Subcommittee Chair	Bart Gordon (D-TN), Space Subcommittee. Ranking Member
House Appropriations Subcommittee on VA/HUD & Independent Agencies	
James Walsh (R-NY), Chair	Alan Mollahan (D-WV), Ranking Member
Senate Appropriations Subcommittee on VA/HUD & Independent Agencies	
Barbara Mikulski (D-MD), Chair	Christopher Bond (R-MO), Ranking Member*

* Sen. Mikulski remains one of the strongest voices for NASA and especially the Goddard Space Flight Center, which is the center for all earth-science programs, including ESE.

National Institutes of Health

Not yet available.

Champions and Players

Senate Appropriations Subcommittee on Labor, Health & Human Services, Education	
Arlen Specter (R-PA), Ranking Member	Tom Harkin (D-IA), Chair
House Appropriations Subcommittee on Labor, Health & Human Services, Education	
Ralph Regula (R-OH), Chair	David Obey (D-WI), Ranking Member

Other champions include Senator Barbara Mikulski (D-MD), in whose state NIH is located, Rep. Connie Morella (R-MD), in whose district NIH is located, and Sen. Connie Mack (R-FL), who co-chairs the Senate Cancer Coalition.

National Science Foundation

Budgetary Issues

For FY 2003, the President has requested $5.036 billion for NSF, a $240 million or 5 percent increase over the FY 2002 current plan. Closer scrutiny reveals that $76 million of the $240 million is a transfer of funds from the National Sea Grant program of the National Oceanic and Atmospheric Administration ($57 million), the United States Geological Survey ($10 million), and the Environmental Education Program of the Environmental Protection Agency ($9 million). These transfers likely will not make it through Congress, so the real dollar increase to the NSF budget is $164 million or a 3.4 percent increase. As in past years, the NSF has highlighted several priority areas: biocomplexity in the environment, information technology research, nanoscale science and engineering, learning for the 21st century workforce, the mathematical sciences, and the social, behavioral and economic sciences. The mathematics and science partnerships initiative, initiated in the FY2002 budget, will receive an additional $40 million dollars in FY 2003.

Supporting Arguments

Over the past half century the NSF has had monumental impact on our society. The NSF investment has paid dividends in building the infrastructure of the individual scientific disciplines, as well as laid the groundwork for innovative interdisciplinary research to meet modern-day scientific and technical challenges. Many new methods and products arise from the NSF investment in research, such as geographic information systems, World Wide Web search engines, automatic heart defibrillators, product bar codes, retinal implants, optical fibers, magnetic resonance imaging technology, and composite materials used in aircraft. NSF-sponsored research has triggered huge advances in understanding our planet's natural processes, which lead to providing a sound scientific framework for better decision-making about earth's natural environment. These methods, products, and advances in understanding accrue from basic research performed over many years, not always from planned research aimed at specific technological outcomes. In today's environment of conflict, many of the technologies used to protect and defend the U.S. can be traced to science supported by the NSF.

Background Information

The NSF is the sole federal agency tasked with maintaining the health of basic research and science, engineering, and mathematics education. The Foundation provides twenty-three percent of the federal funding for basic research done at academic institutions. Eighteen hundred colleges and universities, schools, nonprofit institutions, and small businesses receive NSF funds each year. Each year NSF competitively reviews 32,000 proposals, supports 20,000 grant awards (10,000 are new awards), and supports nearly 200,000 people. Approximately 50,000 scientists and engineers write over 250,000 reviews each year, for proposals received by the NSF. The NSF also invests in many large, multi-user, state-of-the-art research facilities that are vital to the progress of research in many areas of science.

Champions and Players

House Appropriations Subcommittee on VA/HUD & Independent Agencies	
James Walsh (R-NY), Chair	Alan Mollahan (D-WV), Ranking Member
Senate Appropriations Subcommittee on VA/HUD & Independent Agencies	
Christopher Bond (R-MO), Ranking Member	Barbara Mikulski (D-MD), Chair

Most members of Congress readily acknowledge that federal support for basic research and education is important, particularly for the programs supported through the NSF. Over the last several years, strong congressional advocates for NSF have stepped forward, Senators Christopher "Kit" Bond (R-MO) and Barbara Mikulski (D-MD) and Representatives James Walsh (R-NY) and Alan Mollohan (D-WV). Senators Bond and Mikulski publicly advocate for the doubling of the NSF budget, while Representatives Walsh and Mollohan have continuously worked behind the scenes on behalf of the NSF. Other Members of Congress who have made public statements in support of the NSF are Representatives David Wu (D-OR), Eddie Bernice Johnson (D-TX), Vernon Ehlers (R-MI) and Sherwood Boehlert (R-NY).

APPENDIX

Bush Proposes Large Increases for DOD, NIH R&D; Mix of Cuts and Increases for Other R&D Programs

AAAS Preliminary Analysis of R&D in the FY 2003 Budget

(All figures in this analysis are **preliminary** and will be revised in later AAAS releases. This analysis is a preview of the forthcoming *AAAS Report XXVII: Research and Development FY 2003*, a comprehensive look at the President's budget for R&D in FY 2003. More tables and continually updated supplemental materials on R&D in the FY 2003 budget can be found on the AAAS R&D Web site at http://www.aaas.org/spp/R&D.)

On February 4, President Bush released a FY 2003 budget request containing overall increases for the federal investment in R&D, especially for the high-priority areas of defense, health, and homeland security against terrorism. In sharp contrast to the financial optimism of last year's budget when budget projections forecast endless surpluses, the FY 2003 budget assumes a deficit in FY 2002 and proposes deficit spending for FY 2003.

Citing the war on terrorism and a recessionary economy as justification for a return to deficit spending, President Bush's proposals for further tax cuts and large increases in discretionary spending follow on even larger increases in FY 2002. Discretionary spending, the one-third of the budget subject to annual appropriations decisions by Congress and the President, is the part of the budget out of which nearly all federal R&D is funded. The FY 2003 budget calls for overall discretionary spending to rise 6.8 percent or $49 billion in FY 2003 to $767 billion, on top of an FY 2002 total already inflated by emergency appropriations approved in the immediate aftermath of September 11. But in a repeat of last year's request, nearly the entire increase would go just to the Department of Defense (DOD) and the National Institutes of Health (NIH), leaving all other discretionary programs, including R&D programs outside NIH and DOD, with flat or declining funding overall.

R&D in the FY 2003 Budget: DOD and NIH Increases Lead to Record Totals

Because DOD and NIH are the two largest funding sources of federal R&D, the special treatment given to them in the budget would allow overall federal R&D to increase substantially in FY 2003. But the other R&D funding agencies would share in flat funding for nondefense discretionary spending. (All figures in this release are preliminary and will be revised in later AAAS releases with revised agency data.)

- The request for **total federal R&D** in FY 2003 is a record $111.8 billion, $8.6 billion or 8.3 percent more than FY 2002 (see Table 1). As was the case last year, the proposed increases for DOD ($5.4 billion) and NIH ($3.9 billion) account for more than the overall increase, leaving all other R&D funding agencies combined with less money than in FY 2002.

- There are no clear patterns in the mix of increases and decreases for the other R&D funding agencies (see Figure 1). Unlike last year, when most R&D funding agencies would have seen their R&D funding decline, FY 2003 would see increases and decreases scattered even within agency portfolios as agencies try to prioritize in an environment of scarce resources. Some cuts are due to the Bush Administration's campaign to eliminate congressional R&D earmarks, which reached $1.5 billion in FY 2002. Other cuts would be declines to more normal funding levels from FY 2002 totals inflated by post-September 11 counter-terrorism appropriations; while counter-terrorism R&D would see increases at some agencies such as NIH, other agencies with one-time laboratory security upgrades in FY 2002 would see their counter-terrorism R&D funds decline sharply in FY 2003.

- **Nondefense R&D** would increase by 7.8 percent or $3.8 billion to $53.2 billion. NIH would make up almost half of the entire nondefense R&D portfolio with another large increase, the fifth and final installment of a plan to double the NIH budget in the five years to FY 2003. **Excluding NIH, however, all other nondefense R&D would fall by 0.4 percent** to $26.7 billion.

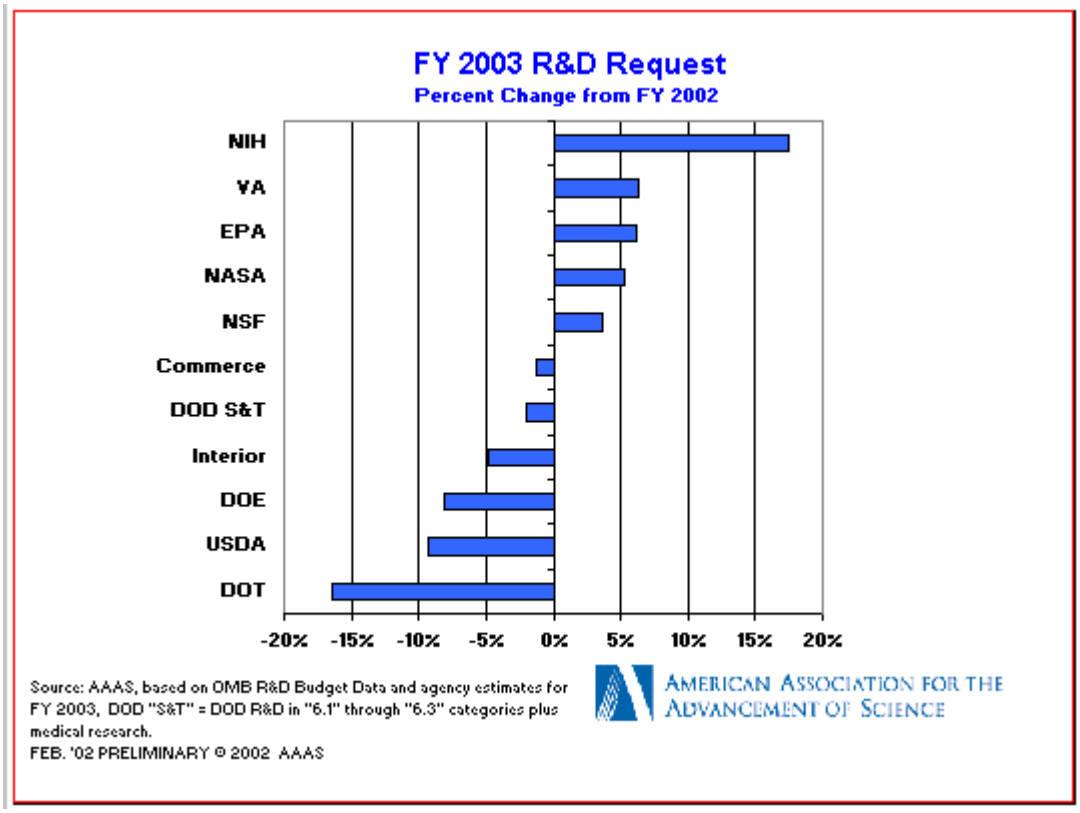


Figure 1.

- The federal investment in **basic research** would grow by 8.5 percent or $2.0 billion to another all-time high of $25.5 billion (see Table 2). NIH has supported the majority of federal basic research since FY 2000 and in FY 2003 would provide 57 percent of all federal support. NIH basic research would increase 9.7 percent, less than its overall R&D increase, because of a new emphasis in FY 2003 on applied research on cancer and bioterrorism. Most agencies would see their basic research funding increase in the FY 2003 budget request.

- The total federal investment in **research** (basic and applied research) would increase 8.8 percent to $51.8 billion in FY 2002 (see Table 2), with a large increase for NIH (up 16.1 percent to $25.7 billion) responsible for most of the increase. **Without NIH, total federal research would increase moderately by 2.5 percent** or $645 million to $26.1 billion.

- The high priority placed by the Bush Administration on defense and health is evident in Table 4, which shows federal **R&D by mission area**. Defense and health R&D together make up more than three-quarters of the federal R&D portfolio, and their share is increasing. Defense R&D (up 8.8 percent) and health R&D (up 15.2 percent) would increase substantially in the request because of large increases for DOD and NIH. Most other national missions would see their R&D decline in the FY 2003 request, except for general science and space. Space R&D would increase 7.0 percent to $9.2 billion because of substantial new investments in space science and space launch technologies in the NASA request, while general science R&D (up 2.6 percent) would benefit from the Bush Administration's favorable attitude toward NSF and its programs, including the transfer of three programs from other missions to the NSF portfolio.

- Three major multi-agency initiatives would receive increases in the FY 2003 budget. After jumping by more than $100 million in FY 2002, funding for the **Nanoscale Science, Engineering, and Technology Initiative** would climb another $100 million (or 17.3 percent) to $679 million in FY 2003. NSF's lead contribution to the initiative would rise by 11.1 percent to $221 million. NSF also continues its lead role in the **Networking and Information Technology R&D** initiative, which would see its budget edge up 2.5 percent to $1.9 billion. NSF's contribution would be $678 million, mostly in the Computer and Information Science and Engineering (CISE) directorate. The longstanding **U.S. Global Change Research Program** would climb 5.0 percent to $1.8 billion. While NASA's Earth Science program continues to provide the bulk of funding ($1.1 billion), the increases would go mostly to other agencies' contributions, including $40 million in new funds for the Climate Change Research Initiative (CCRI) aimed at funding fundamental research to answer key gaps in knowledge in climate science.

- The Office of Management and Budget (OMB) again presents a 'Federal Science and Technology' (FS&T) budget in the FY 2003 budget (see Table 3). The **FS&T budget** is successor to the Clinton Administration's "21st Century Research Fund" and contains most of the same programs. FS&T is a collection of selected R&D and non-R&D programs that emphasize basic and applied research and the creation of new knowledge or technologies. It also includes some

S&T education and training activities but excludes most development, and is designed to be an alternative measure for the federal investment in science and technology. FS&T would increase 8.9 percent to $57.0 billion in FY 2002, with a mixed bag of increases and decreases for programs skewed toward the positive by the large increase for NIH.

Highlights of the Major R&D Funding Agencies

- The **National Institutes of Health (NIH)** would receive $27.3 billion for its total budget in FY 2003, an unprecedented increase of $3.7 billion (15.7 percent) that would fulfill the commitment to double the NIH budget between FY 1998 and 2003. NIH R&D would rise 17.4 percent to $26.5 billion. The big winner would be the National Institute of Allergy and Infectious Diseases (NIAID) which would receive a boost of 57.3 percent to $4.0 billion as NIH's lead institute for bioterrorism R&D and a key part of the Administration's homeland security request. NIAID is also the lead NIH institute in AIDS research, which would increase 10 percent over FY 2002 to $2.8 billion. Cancer is another high priority for the Bush Administration; the FY 2003 cancer research budget would be $5.5 billion, of which $4.7 billion would go to the National Cancer Institute (NCI; up 12.2 percent). Another high priority would be Buildings and Facilities, which would nearly double to $633 million over an FY 2002 total already inflated by emergency counter-terrorism funds. The new funds would further improve NIH laboratory security, build new facilities for bioterrorism research, and finish construction of NIH's new Neuroscience Research Center. Most of the other institutes would receive increases between 8 and 9 percent. With the large increase, NIH hopes to offer a record 35,920 research project grants in FY 2003, with grants an average of 4.0 percent larger than FY 2002.

- The **Department of Defense (DOD)** would receive its second-largest dollar boost in history for its R&D to $54.6 billion in FY 2003, an increase of $5.4 billion or 10.9 percent coming after a record increase of $7 billion last year. Most of the increase would go to the development of weapons systems in the services (the Air Force and Navy in particular) rather than research. Basic and applied research in DOD would remain flat despite the record increase in the overall DOD budget of 13.4 percent to $380 billion; DOD S&T, which includes research plus generic technology development, would fall 2.0 percent down to $9.7 billion (see Figures 1 and 2). After nearly doubling its budget in FY 2002, the Ballistic Missile Defense Organization (BMDO) would see its R&D budget decline slightly to $6.7 billion, which would still be more than 50 percent above the FY 2001 funding level. The Defense Advanced Research Projects Agency (DARPA) is a big winner in the FY 2003 budget with a proposed 19.2 percent increase to $2.7 billion across its broad portfolio of research programs aimed at expanding the frontiers of knowledge and military technology to provide future solutions to DOD's technology needs, including a 23 percent boost for Defense Research Sciences, DARPA's basic research portfolio.

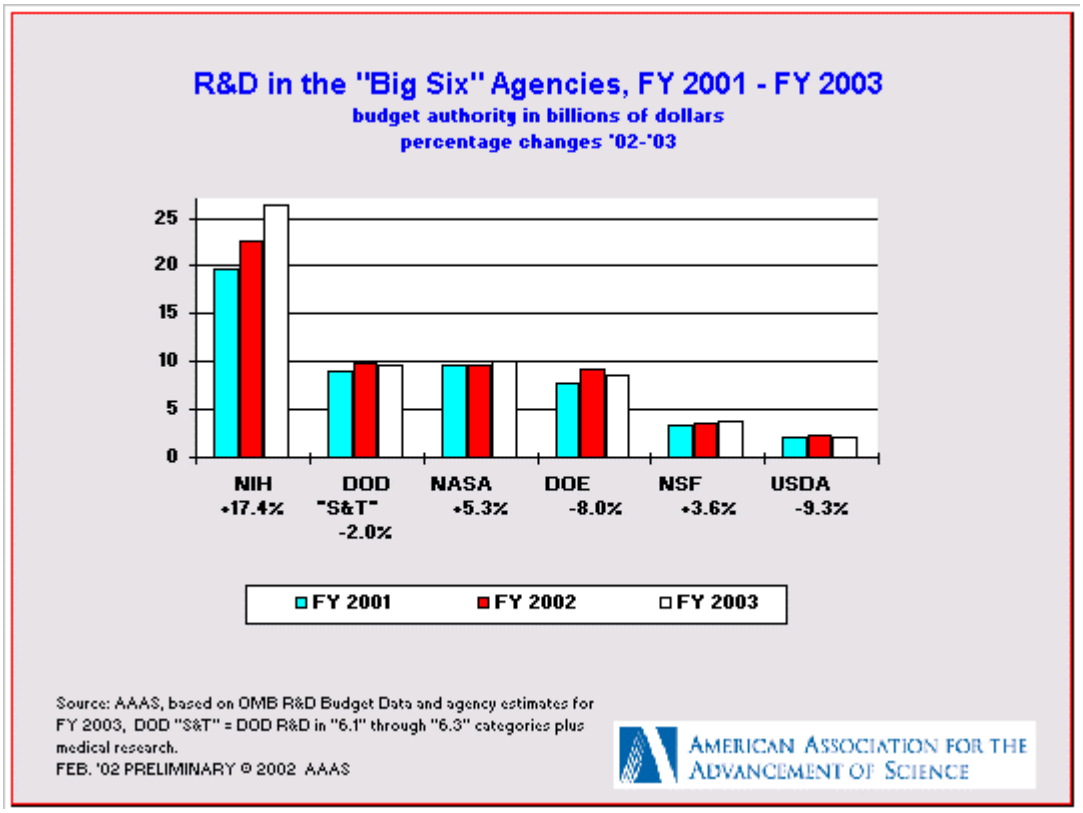


Figure 2.

- The **National Science Foundation (NSF)** wins praise from the Bush Administration for its management, and increases for its R&D programs. The NSF budget would total $5.0 billion in FY 2003, an increase of 5.0 percent. Excluding NSF's non-R&D education activities, NSF R&D would be $3.7 billion, a boost of 3.6 percent or $129 million. More than half of the increase is due to the NSF Geosciences directorate's acquisition of the National Sea Grant program from Commerce, hydrologic sciences from Interior, and environmental education from EPA. The three programs account for $76 million of the $129 million increase. Most disciplinary programs in the research directorates would receive small increases or cuts. While mathematical sciences would receive a substantial 20 percent increase to $182 million, other programs in Mathematical and Physical Sciences (MPS) such as chemistry, physics, and astronomy would all decline. Another big winner would be Information Technology Research (up 9.9 percent), though at the expense of other computer sciences research. Funding for the Major Research Equipment and Facility Construction account would fall $13 million to $126 million, with one new start (EarthScope) more than offset by proposals not to renew two FY 2002 congressionally earmarked projects. In the non-R&D education programs, NSF would boost funding for the Administration's high-priority Math and Science Partnerships from $160 million to $200 million, but would cut most other education and human resources programs.

- The **National Aeronautics and Space Administration (NASA)** would see its total budget increase by 1.4 percent to $15.1 billion in FY 2003, but NASA's R&D (two-thirds of the agency's budget) would climb 5.3 percent to $10.1 billion. Although spending on Human Space Flight,

which includes the International Space Station and the non-R&D Space Shuttle, would decline, R&D in Science, Aeronautics and Technology (SAT) would climb 10.3 percent to $8.9 billion. While the much-delayed International Space Station would receive $1.5 billion for construction, down from $1.7 billion, most science programs would receive increases. Space Science funding would climb 13 percent to $3.4 billion. While canceling the Outer Planets program (including Pluto and Europa missions), NASA proposes a New Frontiers program to select promising planetary missions through competitive proposals and would also make major new investments in new propulsion technology development to enable future missions. The Biological and Physical Research program expanded greatly last year to take on all Space Station research; BPR funding would rise 2.8 percent in FY 2003 to $851 million. Aero-Space Technology would climb 11.7 percent to $2.9 billion, including $759 million (up 63 percent) for the Space Launch Initiative to continue efforts to develop new technologies for space launch to replace the Space Shuttle. The NASA request would eliminate most R&D earmarks added on to the budget in FY 2002, resulting in a nearly 50 percent cut to Academic Programs, a perennial home to congressional earmarks.

- The **Department of Energy (DOE)** would see its R&D fall 8.0 percent to $8.5 billion from an FY 2002 total inflated with one-time emergency R&D funds. Funding for the Office of Science would remain flat at $3.3 billion, but most programs (including the physics programs, Basic Energy Sciences, and computing research) would receive increases, offset by cuts in R&D earmarks and a planned reduction in Spallation Neutron Source construction. While overall funding for Solar and Renewables R&D would remain level, there would be many program shifts toward hydrogen, hydropower, and wind research and away from other areas. In Fossil Energy R&D, there would be steep cuts of up to half in R&D on natural gas and petroleum technologies, with a continuing shift in emphasis toward coal R&D. In Energy Conservation, DOE would abandon the Partnership for a New Generation of Vehicles (PNGV) to develop high-mileage gas-powered vehicles and would replace it with FreedomCAR, a collaborative effort with U.S. auto companies to develop hydrogen-powered fuel cell vehicles. DOE's defense R&D programs would fall 13.5 percent to $4.0 billion because the FY 2002 total is inflated with one-time counter-terrorism emergency funds for the defense weapons labs and nonproliferation R&D, and because funding for construction of the National Ignition Facility would decline in FY 2003 to $214 million. Many ongoing defense R&D programs such as advanced scientific computing R&D and stockpile R&D would receive increases.

- R&D in the **U.S. Department of Agriculture (USDA)** would fall $218 million or 9.3 percent to $2.1 billion, mostly because of steep cuts to R&D earmarks and the loss of one-time FY 2002 emergency anti-terrorism funds. Funding for competitive research grants in the National Research Initiative (NRI) would double from $120 million to $240 million, offsetting steep cuts in earmarked Special Research Grants from $103 million down to $7 million. The large NRI increase would partially make up for the Administration's decision to block a $120 million mandatory competitive research grants program from spending any money in FY 2003, as in FY 2002. In the intramural Agricultural Research Service (ARS) programs, Buildings and Facilities funding would fall from $119 million down to $17 million because FY 2002 emergency anti-

terrorism security upgrades and congressionally earmarked construction projects would not be renewed; ARS research would fall $30 million to $1.0 billion, but selected priority research programs would receive increases, offset by the cancellation of R&D earmarks.

- **Department of Commerce** R&D programs would decline 1.3 percent in FY 2003 to $1.1 billion. While last year's budget would have eliminated the Advanced Technology Program (ATP) at the **National Institute of Standards and Technology (NIST),** the FY 2003 budget would keep it alive, though at a greatly reduced level. NIST would instead redirect funds to intramural R&D in the NIST laboratories, which would receive a $70 million increase to $402 million, including funding to make a new Advanced Measurement Laboratory operational. **National Oceanic and Atmospheric Administration (NOAA**) R&D would decline by 2.2 percent or $14 million because of a transfer of the $62 million (in FY 2002) National Sea Grant program from NOAA to NSF in FY 2003. Overall, NOAA R&D programs would see increases.

- R&D in the **Department of the Interior** would fall 4.8 percent to $628 million, but steeper cuts would fall on Interior's lead science agency, the **U.S. Geological Survey (USGS).** USGS R&D would fall 7.0 percent or $41 million to $542 million. Hardest hit would be programs in Water Resources as a result of reductions in the National Water Quality Assessment Program and the Toxic Substances Hydrology Program; these programs provide data and research-based information to state and federal regulatory agencies such as the EPA. Included in the Toxics Program is a $10 million transfer to NSF to initiate a competitive grants process to address water quality issues.

- The **Environmental Protection Agency (EPA)** R&D budget would rise 6.2 percent to $650 million in FY 2003. Much of this increase may be attributed to the $77.5 million set aside for research in homeland security, which could include developments in dealing with biological and chemical incidents. The total EPA budget would decline from $8.2 billion in FY 2002 to $7.7 billion in FY 2003, a 5.5 percent drop.

- **Department of Transportation (DOT)** R&D funding would fall 16.4 percent to $725 million. These numbers should be viewed with caution, however, as the transfer of some functions (including R&D) to the new **Transportation Security Administration** has yet to be fully reflected in agency budget documents.

The Budgetary Context for FY 2003: Big Increases for Defense, Flat Funding for Other Programs, and Deficits are Back

The FY 2002 Bush budget proposes **discretionary spending of $767 billion** in FY 2003, a large increase of $49 billion or 6.8 percent over FY 2002 (see Figure 3), following on an even larger increase in FY 2002, boosted in part by emergency funds to respond to the September 11 terrorist attacks. Much of the emergency spending on homeland security would continue in FY 2003. Nearly all of the increase, however, would go to the Department of Defense (DOD, up $45 billion). Two

other agencies, the National Institutes of Health (NIH, up $3.7 billion) and the Department of Education (up $0.5 billion) would also rank as high priorities and would receive increases. Just like last year's budget, this would leave all other discretionary programs with slightly less than FY 2002. Non-NIH nondefense R&D joins other programs such as foreign aid, immigration, justice programs, national parks, and environmental protection in a competition for shrinking resources. Not surprisingly, then, in the FY 2003 R&D request NIH and DOD R&D programs would receive substantial increases while other agencies' R&D programs would be flat overall, with increases balanced out by cuts.

Although the discretionary spending proposals look similar to last year's Bush budget, the overall budgetary context could not be more different. Last year, budget projections showed $5.6 trillion in projected surpluses over the next 10 years, with surpluses growing each year into the future. This allowed President Bush to propose large tax cuts, which were enacted into law last June. As recently as August, Democrats and Republicans were united in the commitment to keep the federal budget in balance even without counting the Social Security program's surpluses, thus allowing Social Security surpluses to pay down and possibly even erase the national debt. Although they were bitterly divided about how to do so, the task seemed possible even as the first signs of an economic slowdown manifested themselves in falling tax revenues and the first installments of the June tax cut bill flowed out of the Treasury. But the September 11 terrorist attacks, a recession now judged to have begun in March 2001, and the need for emergency funds for war, homeland security, and disaster relief blew large holes in all previous budget scenarios.

The federal budget is now back in deficit and looks to stay that way for several years to come, as shown in Figure 4. Thirty years of deficits gave way to four years of surpluses beginning in FY 1998, but it now seems certain that the federal government will end FY 2002 in deficit. And although both parties committed to balancing the budget even without the Social Security surplus (the lower line in Figure 4), that commitment was fulfilled only in FY 1999 and FY 2000; the non-Social Security accounts fell into deficit in FY 2001. In a sign of just how much things have changed over the past year, the FY 2002 non-Social Security deficit is now projected to reach $262 billion. Instead of paying down the national debt, the federal government is again adding to it.

President Bush's FY 2003 budget is the first budget in five years to propose deficit spending for the coming year, even though it would have been possible to propose a balanced budget. Asserting that the first priority of the federal government is to provide for national defense, homeland defense, and economic security, the FY 2003 budget proposals would lead to a unified deficit of $80 billion (and a non-Social Security deficit of $259 billion). Although the large spending increases for defense and homeland security within discretionary spending contribute to the deficit, the FY 2003 budget contains proposals for another series of tax cuts in an economic stimulus package that would reduce tax revenues by $77 billion in FY 2003 and far larger amounts in future years.

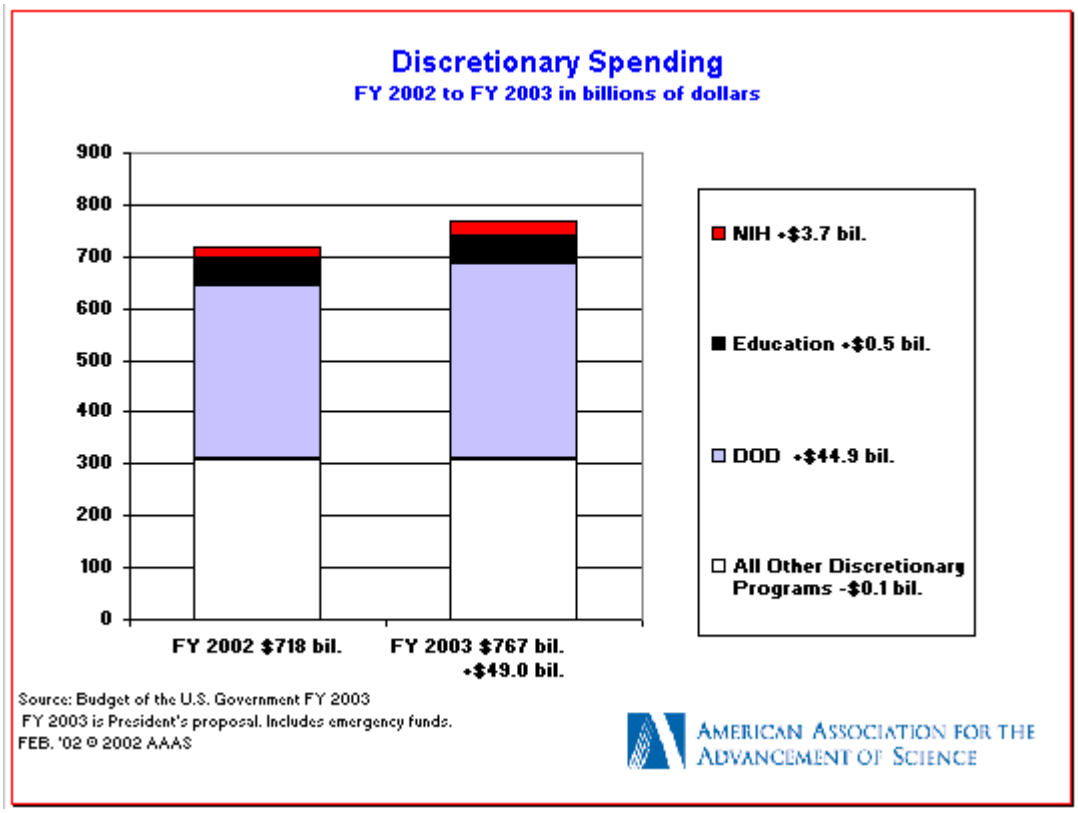


Figure 3.

Without the controversial economic stimulus proposals, it would have been relatively easy to erase a remaining $3 billion deficit to present a balanced budget. The fact that the budget proposes a deficit, however, gives Congress and the President more flexibility to reduce taxes or increase spending by whatever amounts they feel are necessary, without the constraint of forcing the budget to balance. Gone for now, of course, are any ideas about balancing the budget without the Social Security surplus.

Outlook for the FY 2003 Budget Process

The FY 2003 budget now moves to Congress. Congress is faced with task of approving a FY 2003 budget resolution, Congress' own blueprint of its budget priorities for FY 2003 and beyond. This task occurs in a far different Congress than last year. With the Senate now under Democratic control, the consensus on balancing the budget shattered, and the temporary partisan truce in the aftermath of September 11 long ended, the process is expected to be lengthy and contentious. Senate Democrats have already criticized the Bush budget for spending too little on domestic programs and are looking for ways to block another round of tax cuts, while on the other side there are conservative Republicans who criticize the Bush proposals for spending too much and would like to return to a balanced budget in FY 2003. But with President Bush having taken the lead to prepare the public for budget deficits for the next few years, the most likely outcome is that Congress will spend whatever it feels it needs in order to adequately fund defense, domestic programs, homeland security, other priorities, and its electoral hopes in the November 2002 elections. Since the difference between a

deficit and a higher deficit is much more politically palatable than the difference between a deficit and a surplus, Congress will treat the Bush request as a base upon which it can add spending for its own priorities. This outcome became even more likely this week, when the Senate killed the economic stimulus package of tax cuts, freeing up more resources for spending.

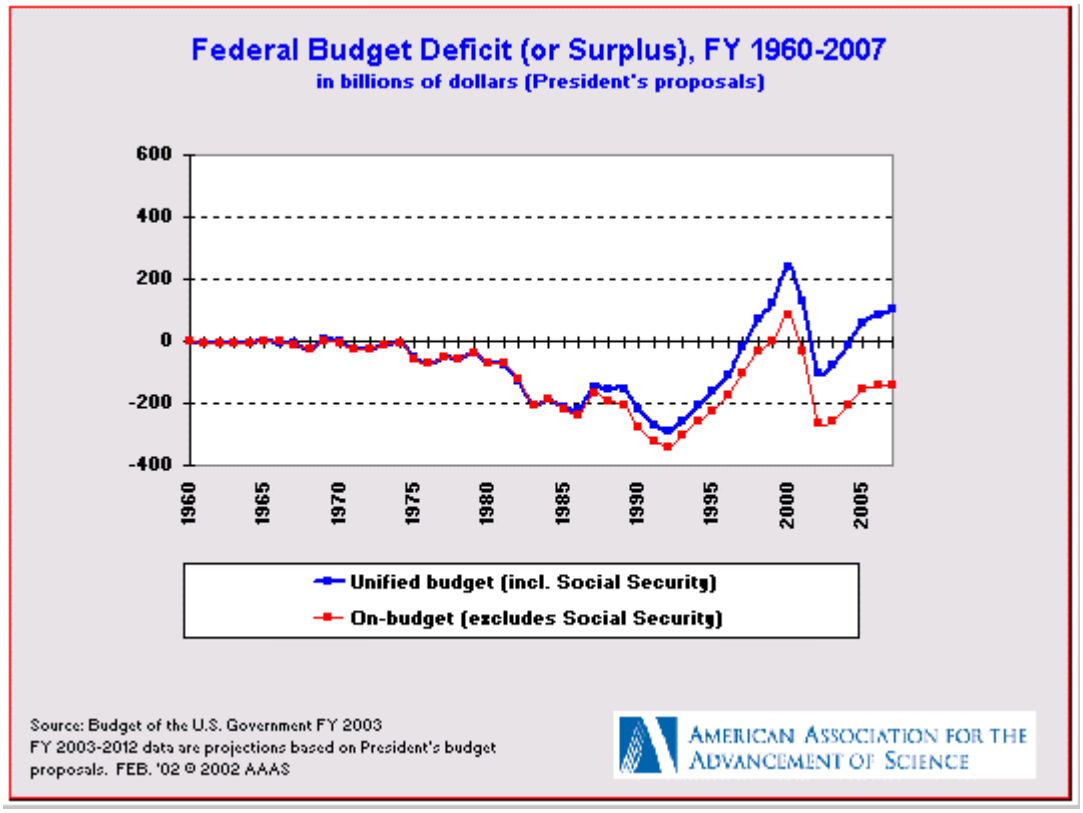


Figure 4.

For federal R&D programs, the only thing certain is that NIH will eventually receive its requested $27.3 billion, and perhaps even more. For other agencies, congressional appropriators will disagree with the President, and at the moment it appears that, like last year, the President will offer little resistance to Congress adding in spending for its own priorities on top of the request. In an election year, the pressures for Congress to add on more money will be even greater than last year. Combined with the continuing crisis atmosphere on matters related to war and security and the near-disappearance of balancing the budget as a constraint, the President's budget will almost certainly be a floor rather than a ceiling for R&D appropriations action to come.

- February 7, 2002

(More materials on R&D in the FY 2003 budget, historical data and charts, and more information on *AAAS Report XXVII: Research and Development FY 2003*, can be found on the AAAS R&D Web site at http://www.aaas.org/spp/R&D, or by calling 202-326-6607.)

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