

Accomplishments of the National Science and Technology Council (NSTC)

1996

Prepared by the NSTC Executive Secretariat

WHITE HOUSE

Dear Colleague:

The Clinton Administration considers science and technology one of the most vital investments for America's future. Our Nation relies on Federal investments in science and technology to contribute to: the growth of our economy; the health of our citizens; the sustainability of our environment and natural resources; the United States', leadership in critical world markets; the education of our children; the ensuring of our national security; and the addressing of global problems through cooperation with other countries.

When President Clinton delivered his State of the Union Address in February 1997, he reaffirmed the Administration's strong commitment to using science and technology to prepare our country for the future--To prepare America for the 21st century we must harness the powerful forces of science and technology to benefit all Americans...we've only begun to spread the benefits of a technology revolution that should become the modern birthright of every citizen. Over the past three years, the NSTC has served a vital role in identifying and prioritizing how Federal investments in science and technology can be wisely applied toward addressing our Nation's critical needs, in the context of balancing the budget.

I am pleased to present to you 1996 Accomplishments of The National Science and Technology Council (NSTC). Over the course of 1996, the NSTC made considerable progress in helping Federal research and development organizations move from an autonomous, fiscally expansive environment to a collaborative fiscally constrained one. Working through the NSTC represents a paradigm, and as such, will become even more compelling as the players are more comfortable with change, as innovators recognize the untapped opportunities, and the Federal research and development enterprise is guided toward a unified set of goals.

Sincerely,

John H. Gibbons
Assistant to the President
for Science and Technology

About the National Science and Technology Council

President Clinton established the National Science and Technology Council (NSTC) by Executive Order on November 23, 1993. This cabinet-level council is the principle means for the President to coordinate science, space and technology policies across the Federal Government. NSTC acts as a "virtual" agency for science and technology (S&T) to coordinate the diverse parts of the Federal research and development (R&D) enterprise. The NSTC is chaired by the President. Membership consists of the Vice President, Assistant to the President for Science and Technology, Cabinet Secretaries and Agency Heads with significant S&T responsibilities, and other White House officials.

An important objective of the NSTC is the establishment of clear national goals for Federal S&T investments in areas ranging from information technologies and health research, to improving transportation systems and strengthening fundamental research. The Council prepares R&D strategies that are coordinated across Federal agencies to form an investment package that is aimed at accomplishing multiple national goals.

To obtain additional information regarding the NSTC, contact the NSTC Executive Secretariat at 202-456-6100.

About the Office of Science and Technology Policy

The Office of Science and Technology Policy (OSTP) was established by the National Science and Technology Policy, Organization and Priorities Act of 1976. OSTP's responsibilities include advising the President in policy formulation and budget development on all questions in which S&T are important elements; articulating the President's S&T policies and programs, and fostering strong partnerships among Federal, State and local governments, and the scientific communities in industry and academe.

This report was prepared by the Executive Secretariat for the National Science and Technology Council (NSTC), Angela Phillips Diaz, NSTC Executive Secretary, Andrea I. Razzaghi, NSTC Policy Analyst.

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EXECUTIVE SUMMARY

The Clinton Administration considers science and technology (S&T) one of the best investments the U.S. Government can make in America's future. Investments in S&T contribute to: a growing economy with more high-skill, high-wage jobs for American workers; a healthier population; a cleaner environment where energy efficiency, information technology, and advanced technology increase profits and reduce pollution; a stronger, more competitive private sector able to maintain U.S. leadership in critical world markets; an educational system where every student is challenged; and an inspired scientific and technological research community focused on ensuring our national security, on improving the quality of life for ourselves and our children, and on successfully meeting global problems through cooperation with other countries. The most important measure of success will be the U. S. Government's ability to make a difference in the lives of the American people, to harness S&T to improve the quality of life and the economic strength of our Nation.

The Clinton Administration is changing the nature of Federal S&T policy and policymaking. The President established the NSTC in 1993 to coordinate the diverse parts of the Federal research and development (R&D) enterprise and to foster synergy among the varied talents of the Federal S&T workforce. In November 1996, the NSTC completed its third year of operation and moved from the identification of strategic goals, as defined in the 1995 NSTC committees' strategic plans, to implementation of specific initiatives that redirect the Federal Government's investments in S&T toward fundamental national goals, while streamlining Government and saving taxpayers' dollars.

A critical function of the NSTC is the identification and issuance of R&D priorities and goals to serve as guidance for all Federal agencies to use in their budget development. In 1996, the NSTC committees contributed to the development of the FY 1998 R&D budget guidelines for Federal S&T agencies.

A list of initiatives was developed for the NSTC to undertake during 1996 and other issues were addressed in response to rising needs. The issues addressed by the NSTC during 1996 are grouped according to six overarching Presidential themes, though many fall under more than one category. The six themes are:

- I. Maintaining World Leadership in Science, Mathematics, and Engineering
- II. Promoting Long-Term Economic Growth
- III. Sustaining a Healthy, Educated Citizenry
- IV. Improving Environmental Quality
- V. Harnessing Information Technology
- VI. Enhancing National Security and Global Stability

During 1996, each of the nine NSTC committees--fundamental science; health, safety, and food; environment and natural resources; computing, information, and communications; national security; technological innovation; transportation; education and training; and international science, engineering, and technology--achieved significant accomplishments in addressing specific issues within each of the six R&D goal areas.

I. Maintaining World Leadership in Science, Mathematics, and Engineering. The NSTC made several significant accomplishments toward this goal, including addressing the challenge of how to assess fundamental science by offering basic assessment principles and providing information about performance measures. The NSTC also assessed how well agencies had responded to the Presidential Decision Directive (PDD NSTC-5), Guidelines

for Federal Laboratory Reform, revealing that progress had been made, but more effort was required to be fully responsive to the PDD. To address bioethical issues arising from research on human biology, the President appointed 18 non-government experts to serve on the National Bioethics Advisory Commission (NBAC) under the auspices of the NSTC. The NBAC charter was signed by the Assistant to the President for Science and Technology in June 1996 and NBAC met for the first time in October 1996. Another important accomplishment during 1996 was the NSTC review of the United States Antarctic Program, which concluded that the science performed under that program was of high quality and high interest and should be maintained within funding constraints. Finally, in response to communications to the President emphasizing that the Nation's university research system was going through a period of stress, the President directed that a review be conducted, Presidential Review Directive (PRD NSTC-4), to evaluate the need to revisit Federal policies concerning the capacity of U.S. universities to meet the Nation's research and educational requirements of the next century.

II. Promoting Long-Term Economic Growth. The NSTC continued to foster collaborations between industry, academia, and Federal, State and local governments. The Partnership for a New Generation of Vehicles (PNGV) and the National Electronics Manufacturing Initiative (NEMI) are examples of how an impetus from the Federal Government can strengthen U.S. industry. Each of the Big Three U.S. automakers-- Ford, Chrysler and General Motors--produced a PNGV concept vehicle demonstrating different "Supercar" possibilities. NEMI successfully transitioned into a completely industry-funded, industry-led incorporation. In the area of construction and building, progress was made toward streamlining and coordinating regulatory permitting of construction projects, as well as meeting the National Construction Goals and the Department of Housing and Urban Developments' National Home Ownership Strategy. To enhance the technology partnerships between the Federal and State governments, the United States Innovation Partnership (USIP) was established. To address civil, military, scientific, and commercial interests, new Presidential Directives were issued for National Space Policy and the Global Positioning System. Additional areas of progress in 1996 that address this goal include biomass energy, aeronautics and aviation R&D, and human factors in transportation systems.

III. Sustaining a Healthy, Educated Citizenry. The NSTC established and presented awards through two new programs that will contribute significantly toward this goal: 1) Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring; and 2) Presidential Early Career Awards for Scientists and Engineers (PECASE). The NSTC also developed a policy statement on the Nation's health, safety, and food. With increased attention focused on children's issues Nation-wide, the NSTC sponsored A National Research Initiative for Children for the 21st Century to examine the research agenda on the biological, cognitive, and social development of America's children and adolescents. In addition, the NSTC played a vital role in supporting the President's Education Technology Initiative, launched in February 1996, through active participation in activities such as NetDays, Tech Corps, and America's Technology Literacy Challenge.

IV. Improving Environmental Quality. The NSTC fostered the development of partnerships between the Federal Government and non-Federal researchers working toward improving environmental quality by making information available to the public on: 1) Federal environmental testing and demonstration sites; and 2) Federally-funded environment and natural resources R&D. The NSTC made progress toward the goal of integrating the many national environmental monitoring systems through a series of

workshops, with experts from Federal, State and local governments, academia, non-governmental organizations, and industry, aimed at building the broadest possible foundation for integrating this complex, uncoordinated system. The health and safety issues related to natural disasters, oxygenated fuels and endocrine disrupting chemicals were also addressed through NSTC efforts.

V. Harnessing Information Technology. The NSTC sponsored a number of activities during 1996 related to High Performance Computing and Communications (HPCC) including the PetaSoft Systems Software Summer Study, workshops on software for high performance computing systems and PetaFlops architecture, and an exhibit at the Supercomputing '96 Conference. The NSTC was also active in supporting the Administration's initiatives on the global and national information infrastructures by coordinating Federal R&D efforts in telecommunications and information technologies.

VI. Enhancing National Security and Global Stability. Two threats with international dimensions, emerging infectious diseases and natural disasters, were addressed by the NSTC. In response to an NSTC study, Vice President Gore announced PDD NSTC-7, directing the Federal Government to strengthen the U.S. ability to respond to the growing threat of emerging and re-emerging infectious diseases. To address the international dimensions of natural disasters, the NSTC formed a working group to consider ways in which U.S. engagement internationally in the S&T of natural disaster reduction could be more fully exploited to reduce the costs to life and property from natural hazards. The NSTC also coordinated U.S. positions for Ministerial meetings on S&T with key nations and regions. Additionally, the NSTC prepared several classified reports to allow the Office of Science and Technology Policy (OSTP) to effectively assess and articulate how the total Federal program on nonproliferation (such as plutonium disposition) and arms control meets the President's goals in this area.

President Clinton established the President's Committee of Advisors on Science and Technology (PCAST) at the same time that he established the NSTC to advise the President on matters involving S&T, and to assist the NSTC in securing private sector involvement in its activities. The PCAST, which consists of distinguished individuals from industry, education and research institutions, and other non-governmental organizations, serves as the highest level private sector advisory group for the President and the NSTC. The direct link to the activities of the NSTC reflects the Administration's intention to incorporate advice from the private sector in developing the S&T budgets and policies of this Administration and to secure private sector advice on the implementation and evaluation of budgets and policies. Appendix A describes accomplishments of the PCAST for 1996.

R&D BUDGET GUIDANCE

At the beginning of his Administration, President Clinton made a commitment to the American people to integrate Federal agency R&D budgets to ensure that the Nation's S&T investments served broad national goals, as well as agency missions. This Administration recognizes the contributions that R&D can make to the vitality of this country as we move to the 21st century. R&D guidance--in the form of broad policy principles and goals--was issued, for the third consecutive year, to guide individual agencies in preparing their FY 1998 budgets. This R&D guidance, built on the previous year's deliberations, was

developed by the NSTC committees, each of which sought input from a wide spectrum of stakeholders. Providing this guidance to the R&D agencies reinforced the significant paradigm shift in the way the Federal R&D enterprise is addressed, both from a budget and a policy standpoint.

In the interest of maintaining excellence, while minimizing Federal costs and maximizing effectiveness, the FY 1998 R&D policy principles directed the agencies to:

1. emphasize peer review and select programs through a merit based competitive process;
2. jointly fund research and education programs through industry, university, or State partnerships;
3. support multiple goals that provide promise of a high social rate of return, such as improving the environment and helping American businesses compete internationally; ensuring national security while contributing to a strong technical base in civilian businesses; or coupling research, education, and training to strengthen the technical literacy of our diverse workforce; and
4. establish and use metrics to measure progress and performance realistically.

1996 Accomplishments of the National Science and Technology Council in R&D Goal Areas

I. Maintaining World Leadership in Science, Mathematics, and Engineering

Scientific discoveries inspire and enrich us, teaching us about the mysteries of life and the nature of the world. The Federal Government has an essential mission in ensuring U.S. leadership across the frontiers of scientific knowledge, as clearly articulated in the Clinton/Gore policy statement *Science in the National Interest*¹. This science base forms the foundation for all practical technical advances. Public investment in fundamental research-- both in the domestic sphere and increasingly in international collaborations-- generates returns from both the direct contributions to knowledge and the education of future scientists and engineers. Scientific inquiry is embedded throughout the complex and interactive web of discovery and practical invention. Advances in scientific understanding form the basis of new technological achievements; advances in technologies, in turn, enable and stimulate the search for fundamental knowledge.

Assessing Fundamental Science

The Government Performance and Results Act (GPRA) and the National Performance Review (NPR) call for improved accountability, productivity, and effectiveness of Federal programs through strategic planning, goal setting, and performance assessment. Assessing

fundamental science presents a challenge that requires the capture of quantitative, qualitative, and institutional dimensions.

Accomplishments. Building on previous activities conducted in 1995, the NSTC Committee on Fundamental Science released *Assessing Fundamental Science*². This report distills public and private experience to date with the assessment of fundamental science, offers basic assessment principles, and provides information about performance measures. *Assessing Fundamental Science* provides Federal agencies and departments with a consistent set of general principles and high-level goals for the assessment process in fundamental science.

Federal Laboratory Review

The Department of Defense (DoD), the Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA) laboratory systems account for at least one-fifth of the entire Federal investment in R&D--approximately \$15 billion of an approximate \$70 billion total. In 1995, the NSTC reviewed these laboratory systems to evaluate their effectiveness in responding to national S&T needs, and to identify ways the laboratories could contribute their best with maximum efficiency. This review resulted in the September 1995 Presidential Decision Directive (PDD NSTC-5)³, directing the agencies to better focus laboratory missions, reduce excessive agency oversight, and streamline agency and laboratory administrative processes. Additional emphasis on balancing the Federal budget by the year 2002 has placed even greater pressure on national laboratories to streamline and focus their missions.

Accomplishments. During the summer 1996, OSTP assessed each agency's response to the PDD. The review confirmed that the agencies are making progress in meeting the PDD goals, however, much still needs to be done to be fully responsive. Opportunities exist to advance the goals of the PDD through simplified directives and better use of Federal personnel rules and other regulations.

National Bioethics Advisory Commission

On October 3, 1995, President Clinton signed Executive Order 12975, establishing the National Bioethics Advisory Commission (NBAC). The Commission came about as the result of a proposal developed by OSTP in consultation with members of the NSTC and interested members of Congress, to create a standing body of experts to consider bioethical issues arising from research on human biology and behavior, including clinical research, and the applications of such research.

Accomplishments. The NBAC charter was signed by the Assistant to the President for Science and Technology on July 28, 1996. The key points of the charter are:

- The immediate charge to NBAC is to consider issues in the protection of the rights and welfare of human research subjects and management and use of genetic information.
- The general charge to NBAC is to consider current and prospective issues pertinent to the conduct of research on human biology and behavior and to identify broad, overarching principles to govern the ethical conduct of such research. NBAC will have the authority to establish its own priorities and agenda, in accordance with four

criteria described in the charter and subject to NSTC approval.

- NBAC will be composed of experts in the fields of philosophy and theology, social and behavioral science, law, medicine and biological research, in addition to representatives of the general public. Its members will be appointed by the President.

The President appointed 18 members to NBAC, which is chaired by Dr. Harold Shapiro, president of Princeton University. The inaugural meeting was held on October 4, 1996.

United States Antarctic Program

The U.S. has important foreign policy, national security, scientific and environmental interests in Antarctica. A strong year-round presence in Antarctica, in the form of cutting-edge scientific research supported by infrastructure at three research stations, is the principal means of realizing these interests. In late 1995, Congress requested that the NSTC examine the U.S. Antarctic Program and its policy foundations⁴. This examination would entail review of geopolitical factors, the science program, and the program costs and management. Policy recommendations would be developed with respect to the scale and scope of the U.S. presence and with respect to the research infrastructure at the South Pole.

Accomplishments. Under the auspices of the NSTC Committee on Fundamental Science, a working group with representatives from all Federal agencies with Antarctic interests, prepared a report on the United States Antarctic Program⁵. The report reviewed the National Science Foundation's management of U.S. Antarctic operations as well as the program's scientific research and its infrastructure needs. NSTC found the science to be of high quality and high interest and recommended that the National Science Foundation form an external, blue-ribbon panel to suggest how to maintain the science within funding constraints. The report has been very well received by Congress and the scientific community. The blue-ribbon panel has been assembled, is chaired by Norman Augustine (Chief Executive Officer (CEO), Lockheed-Martin Corporation), and studies detailed questions about U.S. Antarctic operations, including the major task of rebuilding the South Pole Station. The Panel should complete their analysis by March 1997.

University-Government Partnership

During 1996, the President received several communications from national, political, corporate, and educational leaders emphasizing that the Nation's universities are going through a period of stress. These stresses could have an impact on the ability of the Nation's universities to play their traditional role as partners with the Federal Government in the conduct of R&D and the preparation of future generations of scientists and engineers. A letter from the President's Committee of Advisors on Science and Technology (PCAST) on the subject recommended a government-wide policy and administrative review of the U.S. university research system. To sustain the U.S. national level of innovation for the long term, it is appropriate to examine the data on what stresses these universities may be faced with and whether the Federal Government might be contributing to them.

Accomplishments. The President directed that a review, Presidential Review Directive (PRD NSTC-4), be conducted by a multiagency task force under the auspices of NSTC, to revisit Federal policies concerning the capacity of universities to meet the Nation's research and educational requirements in the next century. The review will: 1) examine data to determine what might be the major stresses in the areas of research, education, and

administrative regulations; and 2) determine what the Federal Government's role should be in addressing any issues raised by the examination.

II. Promoting Long-Term Economic Growth

Technical progress is the single most important factor in generating sustained economic growth, estimated to account for as much as half of the Nation's long-term growth over the past 50 years. Technology underpins our fastest growing industries and high-wage jobs, provides the tools needed to compete in every business today, and drives growth in every major industrialized nation. For more than 200 years, the Federal Government has played a vital role in establishing scientific and technological infrastructure that has contributed substantially to U.S. economic growth and the competitive success of U.S. industry. As outlined in *Technology in the National Interest*⁶, the rich portfolio of policies and programs being carried out by departments and agencies across the Federal Government ensure that technology remains the Nation's engine of economic growth, creating high-wage jobs in the U.S. and improving the standard of living and quality of life for the American people.

Partnership for a New Generation of Vehicles (PNGV)

The Federal Government and the U.S. automobile industry have joined in a historic partnership to establish global technical leadership in the development and production of commercially-viable vehicle technology that, over the long term, can preserve personal mobility while further reducing the impact of cars and light trucks on the environment and reducing dependence on imported petroleum. This unprecedented alliance was established on September 29, 1993, and included Federal agencies, national laboratories, universities, suppliers and the United States Council of Automobile Research (USCAR)--a conglomerate of the Big Three U.S. automakers (Ford, Chrysler, and General Motors). The partnership includes research on: 1) manufacturing productivity improvement; 2) near-term improvement in fuel efficiency and emission reduction; and 3) development of a production prototype by the year 2010 that can achieve three times the fuel efficiency of today's vehicles with comparable cost and performance. The research plan is annually peer-reviewed by the National Research Council (NRC).

Accomplishments. In 1996, each USCAR company produced a PNGV concept vehicle that demonstrated different "Supercar" possibilities. At the 1996 Detroit Auto Show, both Ford and Chrysler released their PNGV experimental concept cars--Ford's Synergy 2010 and Chrysler's Intrepid ESX. In December 1996, General Motors introduced the industry's first electric car (EV1) which incorporates various PNGV technologies.

As detailed in the *PNGV Technical Accomplishments Report*⁷, both public and private sector participants in PNGV made significant progress in 1996 in the areas of fuel cell system development, advanced battery chemistries and other energy storage devices, and new manufacturing processes. The NRC conducted their second peer review of the PNGV program and reported their assessment in March 1996, reaffirming the merits of the program.

Construction and Building

Construction is one of the largest industries in the U.S. and a critical asset for enhancing the Nation's international competitiveness. The U.S. Government and Industry Cooperative Program was established under the auspices of the NSTC's Committee on Technological Innovation (formerly known as the Committee on Civilian Industrial Technology) to develop and deliver to practice high performance construction materials and systems, advanced information systems addressing industry needs, automation for construction processes and constructed facilities, knowledge needed for productivity and safety, and measures of effectiveness for construction technology. This initiative responds to a high level of industry interest, and combines Government and industry goals.

Accomplishments. Building on the work of *Construction and Building: Federal Research and Development in Support of the U.S. Construction Industry*⁸, and the 1994 National Construction Goals workshop, the NSTC Construction and Building Subcommittee held a workshop in April 1996 to define potential collaborations between industry, academia, and Federal, State, and local governments.

In September 1996, with the NSTC working group on State-Federal Technology Partnerships, the Subcommittee on Construction and Building initiated a project to be performed by the National Council of States Building Codes and Standards (NCSBCS) to streamline and coordinate the regulatory permitting of construction projects by developing model regulations and standards. Permitting involves compliance with land use, zoning, environmental, and health and safety regulations of local, State, and Federal agencies. These model regulations and procedures will be developed in consultation with industry and State and local governments, then, once finalized, recommended for use by agencies at the local, State and Federal levels.

In December 1996, the NSTC Subcommittee on Construction and Building, the Departments of Housing and Urban Development (HUD), Commerce, Energy and Defense, and the National Association of Homebuilders collaborated to develop a research agenda and implementation plan for the residential sector of the industry. The primary focus of this effort is to help the residential sector meet the National Construction Goals and the HUD National Home Ownership Strategy by cutting costs (e.g., production, energy, and maintenance costs) through the introduction of innovations in technology and practice. This program is expected to favorably impact competitiveness, affordable housing and the environment.

United States Innovation Partnership (USIP)

State governments have increasingly vital roles to play in the national system of S&T as the traditional division of effort among Federal and State governments shift. States have better knowledge of industry needs in their jurisdiction and financing and venture capital availability to commercialize innovations to support their economic development goals. In response to the States heightened interests in S&T as part of their economic development plans, the State-Federal Technology Partnerships (SFTP), now known as the United States Innovation Partnership (USIP), was initiated. The Assistant to the President for Science and Technology coordinates the Federal participation and interface with the States on this initiative.

A task force co-chaired by former Governors Celeste and Thornburgh was commissioned to recommend actions to be undertaken to create a partnership to combine the talents and

infrastructure of State and Federal governments in planning and executing S&T programs. The task force issued their final report in September 1995⁹. In an effort to implement the recommendations contained in this report, the Assistant to the President for Science and Technology appointed Dr. Mary Good, Under Secretary for Technology at the Department of Commerce, to chair an NSTC working group on State-Federal Technology Partnerships (STFP). The working group was tasked to establish a framework for multiagency collaboration with the States in deploying technology to promote economic development and to identify and initiate partnership programs in several S&T priority areas.

Key departments and agencies participating in USIP include: the Department of Commerce; the National Science Foundation; the Environmental Protection Agency; the Small Business Administration; the Department of Energy; the Department of Defense; the Department of Transportation; the Department of Labor; the National Aeronautics and Space Administration; the National Institutes of Health; and the Department of Education.

Accomplishments. In March 1996, the Assistant to the President for Science and Technology invited Governor Tommy Thompson, then chair of National Governors Association (NGA), to a White House conference where Governors expressing interest in the SFTP and Federal officials, with major responsibilities for S&T programs, would convene to establish an organization under which the partnership would operate. In preparation for the conference, task forces were appointed, consisting of both State and Federal members, to prepare issue papers in four potential areas of technology partnerships: 1) regulatory innovation; 2) technology partnerships and manufacturing; 3) capital formation; and 4) information infrastructure.

These issue papers were presented at regional meetings to solicit input from a wide audience (Hartford, Connecticut, December 1996; Las Vegas, Nevada and Kansas City, Missouri, January 1997). While working to formalize a partnership organization, an on-line information network is being built for partnership participants. One component of this network is a compilation of all State and Federal manufacturing development and outreach activities active at this time.

Biomass Energy

The Administration is evaluating the near- and long-term potential for biomass to serve as a major fuel source for electricity generation, and for converting biomass fuels for transportation. A carefully designed program could result in a new source of income for farmers and farm communities while reducing greenhouse gas emissions and oil imports. This initiative involves continued research into feedstock development and conversion of biomass to electricity and fuels. A major element of this initiative has been the cooperative agreement between the Departments of Energy and Agriculture in the Biomass for Rural Development Program. Through this program, solicitations for pilot projects were issued with a goal to develop and ultimately commercialize biomass energy systems.

Accomplishments. Three pilot biomass energy projects were funded in 1996 through cooperative agreements with the Departments of Energy and Agriculture. The first project, with the Salix Corporation of New York, seeks to use willow feedstocks to produce power directly and through cofiring. The second project, with the Minnesota Valley Alfalfa Producers, seeks to develop an integrated alfalfa processing and biomass power system using integrated gasification combined-cycle technology. The third project, with the Iowa-

Charlton Valley Partnership, seeks to use underutilized marginal conservation reserve program cropland to grow switchgrass for use in generating power through cofiring at an existing coal-fired facility. Each of these projects, expected to achieve their objectives by the year 2001, will contribute significantly toward demonstrating the feasibility of these technologies, increasing understanding of the problems, and reducing the costs associated with biomass energy systems.

National Electronics Manufacturing Initiative

Sustained growth and competitiveness of electronics manufacturing in the U.S. are vital contributors to the strength of the overall U.S. economy. This initiative supports a public-private partnership focused on leveraging resources in electronics manufacturing with a goal to create an environment that is competitive, even in low margin consumer electronics markets.

Accomplishments. The NSTC's Electronics Subcommittee of the Committee on Technological Innovation undertook an initiative with the American Electronics Association (AEA) to develop a research partnership with the Nation's electronics manufacturing industry. This effort came to fruition on March 13, 1996, with the announcement of National Electronics Manufacturing Initiative, Incorporated (NEMI). NEMI is a consortium created to ensure the sustained growth and competitiveness of electronics manufacturing in the U.S. NEMI is an industry-funded, industry-led, private-public partnership that brings together the largest electronic equipment manufacturers in the U.S. and their key suppliers with government agencies to foster development of the world's best electronics manufacturing supply chain. NEMI will improve manufacturing technology by establishing development and implementation projects between users and suppliers. In addition, NEMI has identified key R&D activities which will require the coordination of its members and outside organizations. NEMI is working with Government and non-government organizations including the NSTC, OSTP, Defense Advanced Research Projects Agency (DARPA), Semiconductor Industry Association (SIA) and SEMATECH to establish linkages to ensure this coordination. NEMI is a prime example of the NSTC providing an initial Federal Government impetus and moving forward to a non-government activity.

Global Positioning System (GPS)

The Global Positioning System (GPS) was designed as a dual-use system with the primary purpose of enhancing the effectiveness of U.S. and allied military forces. GPS is also rapidly becoming an integral component of the emerging Global Information Infrastructure (GII), with applications ranging from mapping and surveying to international air traffic management and global change research. The growing demand from military, civil, commercial, and scientific users has generated a U.S. commercial GPS equipment and service industry that leads the world, making it essential to articulate a clear statement of national policy on the future of GPS. OSTP/NSTC and the National Security Council (NSC) were tasked to co-chair an interagency working group to review GPS policy issues and make appropriate recommendations for national policy on the future management and use of GPS.

Accomplishments. On March 29, 1996, the President approved a new national policy on the future management and use of the GPS, PDD NSTC-6. The President's policy will open

the door for rapid growth in a burgeoning civil and commercial GPS market, which already exceeds \$1 billion per year, and could add 100,000 jobs to the U.S. economy by the year 2000.

Aeronautics and Aviation Research and Technology

The Administration's *Goals for a National Partnership in Aeronautics Research and Technology*¹⁰, prepared by the NSTC's Committee on Transportation R&D in cooperation with industry and academia, presents the Administration's vision and goals for future Federal investments in aeronautics and aviation research and technology. The research agenda outlined in this report is meant to achieve three fundamental goals: 1) maintaining the superiority of U.S. aircraft and engines; 2) improving the safety, efficiency, and cost effectiveness of the global air transportation system; and 3) ensuring the long-term environmental compatibility of the aviation system.

Accomplishments. Progress was made in fostering a renewed spirit of cooperation and partnership in the fields of aeronautics and aerospace R&D. During 1996, a number of Memoranda of Understanding were developed between NASA and the Federal Aviation Administration (FAA) in areas ranging from advanced air traffic technologies to general aviation and human factors.

Space Policy

After a comprehensive NSTC/National Security Council review of the U.S. space policy, including all previous Presidential directives affecting the civil, commercial, and national security space sector, it became clear that many were not consistent with the priorities of the Clinton Administration.

Accomplishments. The President issued a Presidential Decision Directive (PDD NSTC- 8) to update the national space policy to be consistent with the Administration's civilian, national security, and commercial space programs and policies.

Human Factors in Transportation Systems

Today's transportation system is structurally, mechanically, and technologically sound. Now, the greatest challenge is to ensure it is fully designed for human operators, maintainers, and users. Government agencies must work in partnership with industry and academia to maintain and improve the safety and productivity of the U.S. transportation systems in order to realize the world's safest, most responsive and competitive transportation system by considering human behavior in all aspects, now and in the future.

Accomplishments. The brochure *Human-Centered Transportation*¹¹ outlines the goals of this initiative:

1. Focus multi-agency resources to realize the world's safest and most accessible transportation system.
2. Refine techniques for reducing operator error in safety-critical decision situations and characterize the role of automation.

3. Expand transportation system access for diverse and physically- challenged populations.
4. Enhance passenger protection against accidents and crime.

In August 1996, the NSTC Committee on Transportation created a planning team to examine the specific issue of how insights into human factors could be used to improve transportation safety. The Human- Centered Transportation Safety Team offered preliminary recommendations in November 1996, forming key input to a Transportation Technology Strategy to be finalized in 1997.

III. Sustaining a Healthy, Educated Citizenry

Through scientific discovery and technological innovation, humans enlist the forces of the natural world to solve many of the uniquely human problems we face--feeding and providing energy to a growing population, improving human health, taking responsibility for protecting the environment and the global ecosystem and ensuring our own Nation's security. Investment in S&T aimed at helping the economy, jobs, and the environment must be matched by investments in the people who must introduce and operate new technologies and perform the future research needed to maintain U.S. leadership. Since virtually every job in the U.S. will be transformed by new technology during the decades to come, the demands that will be placed on the U.S. education system have increased. Federal efforts in education focus in two areas: 1) using technology to increase the productivity of education at all levels, and ensuring that learners in all locations, with all kinds of backgrounds, are able to receive instruction shaped for their unique needs and interests, and 2) ensuring that Americans have an education in science, mathematics, and engineering needed to prosper in an economy where sophisticated technology and quantitative skills will be an integral part of most employment.

Health, Safety, and Food

Past investments to create the health, safety, and food knowledge base of today have enjoyed broad public and bipartisan support and have proven to be among the most cost-effective ever made. The NSTC Committee on Health, Safety, and Food has developed a research agenda for maintaining and improving America's health and food supply. The goals include creating fundamental knowledge, promoting prevention, disseminating information broadly and rapidly, and improving education in the areas of health, safety, and food.

Accomplishments. The NSTC Committee on Health, Safety, and Food developed the policy document, *Meeting the Challenge*¹², reflecting public stakeholder views expressed at a November 1994 forum related to improvements in health and quality of life. This policy document lays out the following five initiatives: 1) establish the Presidential Early Career Scientist Award; 2) strengthen domestic health, safety, and food data systems; 3) strengthen the integrated, multidisciplinary human nutrition research initiative; 4) develop an integrated research agenda to develop technologies to assure the safety and quality of food for consumers; and 5) develop methods for assessing exposures and other factors influencing health.

Excellence in Science, Mathematics, and Engineering Mentoring

Producing the world's finest scientists and engineers for the 21st century and helping all Americans achieve basic scientific literacy are two central goals of the Administration's S&T policy. The Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring program was established in 1996 as one strategy to achieve the goal of developing a pool of highly trained scientists and engineers that reflects the Nation's diverse population. This award is presented to individuals who have demonstrated outstanding and sustained mentoring and provided effective guidance to a significant number of students at the K-12, undergraduate, or graduate level. Institutions or organizations that have outstanding records in mentoring students from underrepresented groups (e.g., minorities, women, and persons with disabilities) toward significant achievement in science, mathematics, and engineering are also eligible. Approximately 10 individual and 10 institutional awards are expected to be made each year.

Accomplishments. In September 1996, President Clinton named 10 individual and six institutional recipients of the first Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring. The winners were selected from 131 nominees, which included 90 individuals and 40 institutions, by leaders in the community using National Science Foundation review procedures.

Presidential Early Career Awards for Scientists and Engineers (PECASE)

President Clinton approved this new awards program for early investigators across Government agencies on February 1, 1996. The purpose of this award is to recognize demonstrated excellence and promise of future success in scientific or engineering research, and the potential for eventual leadership of the recipients in their respective fields. Maintaining leadership across the frontiers of scientific knowledge and producing the finest scientists and engineers for the 21st century, two of the five goals enunciated in the NSTC's *Science in the National Interest*¹³, are both significantly served by this award.

Accomplishments. In December 1996, the President selected 60 individuals to receive the first annual Presidential Early Career Awards for Scientists and Engineers (PECASE). These young researchers are recognized as having the potential to become the future leaders in S&T, university faculties, and Nobel laureates. The recipients were nominated by the following agencies/departments: 1) the Department of Agriculture; 2) the Department of Commerce; 3) the Department of Defense; 4) the Department of Energy; 5) the Department of Veterans Affairs; 6) the Environmental Protection Agency; 7) the National Aeronautics and Space Administration; 8) the National Institutes of Health; 9) the Department of Health and Human Services; and 10) the National Science Foundation.

A National Research Initiative for Children for the 21st Century

Many of the Nation's most serious health and social problems result from certain risk behaviors and environmental conditions that have their roots in childhood. Many of these negative consequences are preventable. This children's health initiative will result in a

federally-sponsored research agenda that: 1) reviews the methods and measurements used in studying health problems of childhood and adolescence; 2) examines the basic behavioral and social science underpinnings of effective preventive programs; 3) supports research on the etiology and prevention of risk behaviors; and 4) advances research on the interplay between environmental conditions and childhood health problems.

Accomplishments. The NSTC Committees on Health, Safety, and Food and on Fundamental Science co-sponsored the National Research Initiative for Children for the 21st Century to examine the research agenda on the biological, cognitive, and social development of America's children and adolescents. With OSTP leadership, this work was undertaken by a working group, chaired by representatives from the Environmental Protection Agency, the National Science Foundation, and the National Institutes of Health, with representation from all Federal stakeholders in research on children, including the Domestic Policy Council. The size and scope of the Federal research portfolio on children and adolescents has been assessed, and gaps in the current knowledge base and in research funding have been identified. The research priorities of the Federal agencies were reviewed and recommendations were formulated for sustainable collaborations and communications within the Federal Government and for partnerships with appropriate public and private sector parties. Recommendations were also made regarding the use of research findings to improve the quality of services and the formulation of policies regarding children.

President's Educational Technology Initiative

In 1996, President Clinton challenged the Nation's parents, teachers, government, community, and business leaders to work together to ensure that all American children are technologically literate by the dawn of the 21st century--equipped with the communication, math, science, and critical thinking skills essential for the 21st century economy. He established four specific goals:

1. Connect every school and classroom in America to the information superhighway.
2. Provide access to modern computers for all teachers and students.
3. Develop effective and engaging software and on-line learning resources as an integral part of the school curriculum.
4. Provide all teachers the training and support they need to help students learn through computers and the information superhighway.

Accomplishments. The work of the NSTC in this area has supported the President's Educational Technology Initiative, launched in February 1996, and has included public/private partnership activities such as NetDays, Tech Corps, and America's Technology Literacy Challenge.

NetDay96 was a volunteer effort by California companies, universities, parents, teachers, and engineers to install internal wiring in California schools. On March 9, 1996, the President and Vice President and more than 20,000 volunteers laid six million feet of cable connecting thousands of California schools with the technology needed to link classrooms, libraries, and laboratories to the information superhighway. This effort sparked an enormous response around the Nation and in the fall 1996, over 40 States organized and

participated in NetDays, wiring over 25,000 schools, using over 250,000 volunteers. NetDays across the country will continue in April 1997, bringing the Nation dramatically closer to our goal of connecting all classrooms to the Net by the end of the decade.

The President announced the creation of the Tech Corps--a national organization of private sector volunteers with technological expertise dedicated to improving K-12 education at the local level. Tech Corps was launched as a private-sector response to the President's national mission to make all children technologically literate by the dawn of the 21st century. Its purpose is to recruit, place, and support volunteers from the private sector to advise and assist schools in integrating new technologies into the classroom. Official Tech Corps chapters have been formed in 35 States plus the District of Columbia.

To implement his 1996 State of the Union proposal, President Clinton asked Congress to fund a \$2 billion, five-year Technology Literacy Challenge designed to catalyze State, local, and private sector partnerships in each State to achieve the four educational technology goals. Congress supported the President's request and appropriated \$200 million in FY 1996 for the first installment of funding for the five-year program that will provide State grants to help fulfill this challenge.

IV. Improving Environmental Quality

Environmental issues and the scientific understanding needed to address them are enormously complex. The dramatic increase in world population and industrial activities during the last century are affecting the environment in profound and potentially irreversible ways. The future of the U.S. rests on understanding how to sustain the bounty of natural resources our environment provides.

Improving environmental quality requires supporting a broad and comprehensive research agenda, including observing, documenting, understanding, assessing and predicting environmental change and its consequences; using natural resources in a sustainable manner; understanding and preserving biodiversity; and developing analytical tools that integrate social, economic and natural sciences to support policy formation. Improving environmental quality also requires the implementation of scientifically-based decisions that would prevent or mitigate activities that adversely affect public health or ecological systems.

Environmental Technology

Environmental technologies are the bridge to a sustainable future that will facilitate the achievement of long-term environmental, energy, and economic goals. As a follow-on action from the policy document *Technology for a Sustainable Future: A Framework for Action*¹⁴, the NSTC established a national strategy for environmental technologies with goals to: 1) facilitate the development and deployment of environmental technologies; 2) provide better access to Federal environmental technology programs; 3) support technology verification and demonstration; 4) enhance export promotion for U.S. technology; and 5) identify and reduce regulatory barriers impeding the use and financing of innovative environmental technologies.

Accomplishments. Following a series of workshops held across the country with more than 1000 key stakeholders, the NSTC hosted a White House Conference with 200 high-level representatives from industry, non-governmental organizations, and State and local governments, to facilitate a dialogue and build a consensus on how to improve Federal policies and procedures related to the development and deployment of environmental technologies. A number of non-Federal representatives at this conference inquired about how to partner with the Federal Government to test their technologies. In response, *Environmental Technologies Testing and Demonstration Sites: A Federal Directory*¹⁵ was compiled and distributed, listing over 100 sites at Federal facilities around the country where the private sector can partner with the Government to demonstrate new approaches to remediation, monitoring, pollution control, or prevention.

National Environmental Monitoring and Research

A fundamental improvement in the way the U.S. monitors its environment is required to meet the challenges of the next several decades. Current monitoring programs do not provide integrated data across multiple natural resources at the various temporal and spatial scales needed to develop policies based on current scientific understanding of ecosystem processes. An integrated framework for environmental monitoring and assessment will enable the evaluation of the Nation's natural resources and their sustainability on national and regional scales. Such an integrated framework is essential for an accurate description of environmental conditions. Current programs, while effective at tracking specific components of the ecosystems, often are deficient in providing information on how different components interact.

Accomplishments. The NSTC Committee on Environment and Natural Resources fostered an interagency effort to integrate the Nation's environmental monitoring and related research. Coordination of the 15,000 Federal environmental monitoring sites and the approximately \$650 million annual expenditures will enable policymakers to better understand the causes and effects of environmental change and the ability to predict how an action will affect the health of ecosystems in the future. A framework for this integration is being developed and will be published in Spring 1997. A Mid-Atlantic Regional Workshop, held in April 1996, laid the basis for a pilot demonstration project. A national workshop, with representatives from State and local governments, industry, non-governmental organizations, and academic experts, was held in September 1996, to build the broadest possible foundation for integrating national monitoring efforts.

Natural Disaster Reduction¹⁶

Although earthquakes are inevitable natural hazards, they need not be inevitable disasters. Through prudent actions, the U.S. can reduce losses of life, casualties, property losses, and social and economic disruptions from future earthquakes. The NSTC has established a goal to reduce the cost of natural disasters to the U.S. economy through support of a coordinated multidisciplinary, multi-agency research program. Key aspects of this program include focusing R&D efforts on improving future risk assessment and risk management capabilities, and improvement of analytical, modeling, forecasting, and information dissemination tools.

Accomplishments. Following a thorough review of the U.S. earthquake policy by the NSTC National Earthquake Strategy Working Group, *Strategy for National Earthquake*

*Loss Reduction*¹⁷ was developed. This strategy recommends the establishment of a National Earthquake Loss Reduction Program (NEP), under the leadership of the Federal Emergency Management Agency, designed to strengthen and extend the National Earthquake Hazards Reduction Program (NEHRP). The NEP would aim to: 1) focus scarce R&D dollars on the most effective means for saving lives and property and limiting the social disruptions from earthquakes; 2) coordinate Federal mitigation R&D and emergency planning in a number of agencies beyond those represented in the NEHRP; and 3) disseminate existing information to the user community and cooperate with the private sector and State and local jurisdictions to apply effective mitigation strategies and measures.

Interagency Assessment of Oxygenated Fuels

To address public concerns and to take full advantage of the extensive expertise across the Federal Government, the Environmental Protection Agency (EPA) requested the assistance of the NSTC Committee on Environment and Natural Resources to coordinate a comprehensive assessment of the winter oxygenated gasoline program. The use of oxygenated gasoline was mandated under the Clean Air Act Amendments of 1990 in areas of the country that did not meet the Federal ambient air standard for carbon monoxide. Soon after the oxygenated gasoline program was introduced nationally in the winter of 1992-1993, anecdotal reports of acute health symptoms were received by health authorities in various areas of the country and complaints were voiced about reduced fuel economy and engine performance.

Accomplishments. To address public concerns, an NSTC steering committee performed an assessment on the health effects from exposure to evaporative and exhaust emissions from oxygenated gasoline and reported their findings in *Interagency Assessment of Potential Health Risks Associated with Oxygenated Gasoline*¹⁸. The development of an expanded assessment report was initiated soon after. To enhance the information on the health effects in the expanded report, each chapter of *Interagency Assessment of Potential Health Risks Associated with Oxygenated Gasoline* underwent extensive external peer-review prior to review of the entire report by the National Research Council (NRC) of the National Academy of Sciences. The NRC review was completed in June 1996 and, for the most part, the NRC concurred with the NSTC assessment. The expanded assessment report, to be released to the public in the Spring of 1997, will take into consideration the findings and comments from the NRC review and will also include evaluations on the effects of oxygenated gasoline on air quality, water quality, fuel economy, and engine performance. This report will help inform EPA decisionmakers on the impacts of using oxygenated gasoline and has the potential to influence future decisions relative to the wintertime oxygenate program.

Program Guide to Federally Funded Environmental Research

The Federal Government supports a diverse array of R&D, providing the scientific and technical information needed to address environment and natural resources issues from global climate change to toxic waste remediation. Merit-based competitive award of funding is a critical aspect of maintaining the highest standard of excellence in this endeavor. In order to provide the research community with comprehensive information about the scope and content of competitive funding opportunities, the NSTC Committee on Environment and Natural Resources compiled and published the first-ever guide to

Federally- funded environment and natural resources R&D.

Accomplishments. A *Program Guide to Federally Funded Environment and Natural Resources R&D*¹⁹ provides information to colleges, universities, and other research institutions on programs within Federal agencies that fund R&D in environment and natural resources areas. It describes the general competitive process of merit review and evaluation for the types of environment and natural resources research that is supported by Federal agencies. It provides researchers with an understanding of the scope of Federally-funded environment and natural resources research, and potential funding opportunities. This compendium will be updated and published on a yearly basis and available on the Internet through the NSTC Home Page.

Endocrine Disruptor Research

Endocrine disruptors are chemicals present in the environment in low concentrations as pollutants, such as DDT, dioxins, PCBs, phthalates and pharmaceuticals, that may affect the endocrine systems of vertebrates. Hormones produced by the endocrine system control many aspects of growth, development, and reproduction in vertebrates. Endocrine disruptors are important because any chemical that has the ability to mimic or interfere with the action of hormones has the potential to have major effects on human health and survival of wildlife. Consequences of such exposures may include hormone related problems such as decreased fertility, certain types of cancer (i.e., breast and testicular) and wildlife population loss. The development of a research strategy and program to measure and understand the human health and ecological effects of environmental exposures to endocrine disruptors is needed to address this issue.

Accomplishments. An NSTC working group, established under the auspices of the Committee on Environment and Natural Resources, developed a planning framework for Federal research related to the human health and ecological effect of endocrine disrupting chemicals and conducted an inventory of on-going Federal research programs. The framework, *The Health and Ecological Effects of Endocrine Disrupting Chemicals: A Framework for Planning*²⁰, reviews the current state of the science and major uncertainties related to endocrine disrupting chemicals and, in a preliminary way, identifies research areas in need of attention. In conjunction with the inventory, the framework will be used to identify research gaps and to develop a coordinated interagency plan by Spring 1997.

V. Harnessing Information Technology

Information technology has the potential to promote economic growth, expand opportunities for learning, protect the environment, and improve our national security. For that reason, the Clinton Administration has made the development and use of information technology one of its top priorities and is working in a number of areas to promote deployment of the Global Information Infrastructure, a "network of networks" that will connect every town and village worldwide.

While the private sector will build and run the Global Information Infrastructure, the Federal Government has a number of important roles to play, including the funding of computing and communications research in our universities, Federal labs, and companies.

One of the reasons the U.S. is predominant in so many aspects of information technology is because of the billions of dollars that the Federal Government invested in research in this area and close cooperation between researchers in Government, industry, and academia.

High Performance Computing and Communications (HPCC)

The Federal High Performance Computing and Communications (HPCC) Program coordinates Federal efforts to accelerate progress in the crucial areas of computation, information, and communications. By facilitating deployment of easy-to-use information technology, this program has clearly generated important societal benefits and encouraged the information revolution. The Federal HPCC Program, initiated in the 1991 HPCC Act, marked its fifth year in October 1996. Continued R&D in high performance computing, communications, and information technology is needed to sustain America's leadership in the Information Age.

Accomplishments. The recent accomplishments of the HPCC program are described in the supplement to the President's 1997 Budget: *Advancing the Frontiers of Information Technology*²¹. The program plans and goals for the coming year are outlined in the *HPCC 1997 Implementation Plan*²².

Additionally, the NSTC Committee on Computing, Information, and Communications (CCIC) sponsored several HPCC-related events during 1996:

- PetaFlops Architecture WorkShop (PAWS), April 1996
- PetaSoft Systems Software Summer Study (PetaSoft '96), June 1996
- Workshop on Software Tools for High Performance Computing Systems, co-sponsored by the High End Computing and Computation Working Group of the Computing, Information, and Communications R&D Subcommittee of the CCIC, October 1996
- A research exhibit at Supercomputing '96, the premier U.S. conference on high performance computing, November 1996

National Information Infrastructure (NII) Initiative

The Administration's National Information Infrastructure (NII) initiative was launched to ensure the development of an NII that enables all Americans to access information and communicate with each other using voice, data, images, or video at anytime, anywhere. The NSTC Committee on Computing, Information, and Communications has been involved in coordinating the Federal R&D efforts for the Administration's NII initiative.

Accomplishments. Throughout 1996, the NSTC Committee on Computing, Information, and Communications provided advice to the Office of Management and Budget, OSTP, and the NII Advisory Committee on new technological developments. By working with the mission agencies, the committee helped to coordinate the Federal telecommunications and information technology investments. Through this coordination, the technologies required for the high-speed communications infrastructure were defined.

Global Information Infrastructure (GII) Initiative

The Administration launched the Global Information Infrastructure (GII) Initiative in February 1995 to foster the cooperation necessary to spur the transformation of regions split into thousands of discrete networks and incompatible information resources into a global community connected by a unified information infrastructure. In order to implement the Administration's GII Initiative, the NSTC Committee on Computing, Information, and Communications has been actively involved in coordinating Federal high performance network R&D. The research agenda includes technologies that enable wireless, optical, mobile, and wireline communications.

Accomplishments. Throughout 1996, the NSTC Committee on Computing, Information, and Communications has coordinated Federal investments in large scale network engineering, management, and services, and systems software and program development environments for network-centric computing. The Committee worked with the mission agencies to eliminate duplication and identify areas where additional R&D investments are required.

VI. Enhancing National Security and Global Stability

The defense of the U.S. and the protection of American interests abroad are fundamental responsibilities of the Federal Government. National security and global stability are critical areas where international S&T collaboration and interagency coordination are needed for progress. Collaboration and coordination are needed because the issues faced cannot be solved through the efforts of a single country or a single agency. Threats to human health and safety, such as diseases and natural disasters, do not recognize national borders and require international coordination and effective application of S&T to address. International S&T relations have become an integral part of the overall U.S. foreign policy and plays a vital role in the nonproliferation of weapons of mass destruction, arms control, meeting the challenges of global threats, and strengthening economic security.

Emerging and Re-emerging Infectious Diseases

Emerging infectious diseases--new, resurgent, or drug resistant infections of which incidence in humans has increased within the past two decades or threatens to increase in the near future--present one of the most significant health challenges facing the global community. To address this issue, the NSTC developed a detailed action plan for implementation of the recommendations made in its report, *Infectious Disease--A Global Health Threat*²³. The actions were classified as administrative, budgetary, and legislative and called for strengthened efforts in research and training. Progress on these actions will lead to improved national and international monitoring and surveillance. An international priority, Emerging Infectious Disease, recognizes the domestic, international and security dimensions of the threat posed.

Accomplishments. On June 12, 1996, Vice President Gore announced a Presidential Decision Directive (PDD NSTC-7) on Emerging and Re-emerging Infectious Diseases. This PDD calls for strengthening the U.S. ability to respond to the growing global threat of emerging and re-emerging infectious diseases. This policy is based on the recommendations

of the report, *Infectious Disease--A Global Health Threat*. The priorities of this policy initiative include:

1. Strengthen domestic infectious disease surveillance and response, at the Federal, State, and local levels and at ports of entry into the U.S.
2. Work with other nations and international organizations to establish a global infectious disease surveillance and response system.
3. Strengthen research activities to improve diagnostics, treatment and prevention, and to improve the understanding of the biology of infectious agents.
4. Ensure the availability of the drugs, vaccines, and diagnostic tests needed to combat infectious diseases and infectious disease emergencies through public and private sector cooperation.
5. Expand missions and establish the authority of relevant U.S. Government agencies to contribute to a worldwide infectious disease surveillance, prevention, and response network.
6. Promote public awareness of emerging infectious diseases through cooperation with non-governmental organizations and the private sector.

Since the announcement of the PDD: 1) the National Institutes of Health announced new programmatic efforts to strengthen international cooperation in emerging infectious disease research and training, including the establishment of four new Cooperative Research Centers and three new Emerging Virus Groups; and 2) The Emerging Infectious Diseases Task Force, under the auspices of the NSTC Committee on International Science, Engineering, and Technology, has drafted a surveillance and response implementation plan, including specific work plans to address antibiotic resistance, product availability, and communications.

International Dimensions of Natural Disaster Reduction²⁴

Although natural disasters are not frequent events in a given locality, they are common events globally. The data, knowledge, procedures, facilities and technologies developed internationally are essential resources for effectively mitigating the damage caused by these events. U.S. engagement abroad also enhances stability, reduces through preventative means the resources contributed to mitigating the effects of international disasters, and strengthens U.S. foreign policy. Natural disaster mitigation is an effort broader than any single nation's or agency's interest and is an area in which advances in S&T can significantly improve prediction and response.

Accomplishments. Recognizing that natural disasters cause the loss of thousands of lives and hundreds of billions of dollars in damage annually worldwide, an interagency working group was formed under the auspices of the NSTC (co-sponsored by the Committees on Environment and Natural Resources and International Science, Engineering, and Technology) to consider ways in which U.S. engagement internationally in the S&T of natural disaster reduction can be more fully exploited to reduce the costs to life and property

from natural disasters at home and abroad.

International Engagement

Strategic coordination was provided for the Administration's S&T relations with priority nations and regions through the NSTC's Committee on International Science, Engineering and Technology. Through the NSTC interagency process, international S&T relations have been more fully integrated into our overall foreign policy and specifically sharpened with Japan, Russia, China, South Africa, the European Union, as well as the Asia Pacific Economic Cooperation forum and the Summit of the Americas.

Accomplishments. Coordinated U.S. positions were developed for Ministerial meetings on S&T with the nations and regions noted above. In the case of China, this effort contributed to the five-year renewal of the U.S.- China Science and Technology Agreement.

Nonproliferation

The Nonproliferation and Arms Control Technology Working Group (NPAC TWG) is the designated mechanism for the President to coordinate all Federally-funded R&D supporting the controlling of arms and stemming the proliferation of weapons of mass destruction. The NPAC TWG systematically inventories programs, coordinates among departments and agencies, identifies gaps and overlaps, highlights areas in need of high-level attention, and makes recommendations for maximizing the effectiveness of the total program. It has made a substantial contribution to ensuring the effectiveness of nonproliferation and arms-control-related R&D.

Accomplishments. The NPAC TWG completed its second year of operation. Its classified reports--the annual NPAC TWG summary, the report of the Technology Needs Subcommittee, and the focus group reports--represent the best source of detailed interagency budget crosscuts in nonproliferation and arms control R&D. These crosscuts allow OSTP to effectively assess and articulate how the total program meets the President's goals in this area. The NPAC reports to the NSTC Committee on National Security.

Appendix A

Accomplishments of the President's Committee of Advisors on Science and Technology

President Clinton established the President's Committee of Advisors on Science and Technology (PCAST) at the same time that he established the NSTC to advise the President on matters involving S&T and to assist the NSTC in securing private sector involvement in its activities. The PCAST, which consists of distinguished individuals from industry, education, and research institutions, and other non- governmental organizations, serves as the highest level private sector advisory group for the President and the NSTC. The PCAST held two plenary sessions in 1996 and issued three reports to the President: 1) *Principles on the U.S. Government's Investment Role in Technology* (June 1996); 2) *Letter Report on Research Universities* (June 1996); and 3) *Preventing Deadly Conflict* (November, 1996).

PCAST is co-chaired by the Assistant to the President for Science and Technology, Dr. John H. Gibbons, and Mr. John Young, former President and Chief Executive Officer (CEO) of Hewlett-Packard Co. The membership includes:

- Norman Augustine, Chairman of the Board and CEO, Lockheed Martin Corporation
- Francisco Ayala, Professor, University of California, Irvine
- Murray Gell-Mann, Professor, Santa Fe Institute and Professor Emeritus, California Institute of Technology
- David Hamburg, President, Carnegie Corporation of New York
- John Holdren, Professor, Harvard University
- Diana MacArthur, Chair and CEO, Dynamac Corporation
- Shirley Malcom, Directorate Head, American Association for the Advancement of Science
- Mario Molina, Professor, Massachusetts Institute of Technology
- Peter Raven, Director, Missouri Botanical Garden
- Sally Ride, Director, California Space Institute, and Professor, University of California - San Diego
- Judith Rodin, President, University of Pennsylvania
- Charles A. Sanders, Former Chairman and CEO, Glaxo-Wellcome, Inc.
- Phillip Sharp, Professor, Massachusetts Institute of Technology
- David Shaw, CEO, D.E. Shaw and Co.
- Charles Vest, President, Massachusetts Institute of Technology
- Virginia Weldon, Senior Vice President, Monsanto Company
- Lilian Shiao-Yen Wu, Research Staff, Thomas J. Watson Research Center, IBM

The Committee's fifth and sixth plenary sessions were held April 18-19, 1996, and September 16-17, 1996, respectively. At the April meeting, PCAST returned to the issue of reviewing the Federal R&D budget priorities, but focused more narrowly on how various Federal Government agencies support research universities in their budgets. In addition, they reviewed drafts from several of the PCAST working groups, reviewed progress on NSTC initiatives, and received briefings by the OSTP Associate Directors on new NSTC initiatives. At the September meeting, PCAST sponsored a "round-table" with invited university presidents, corporate executives, and Nobel laureates to discuss key issues on university-Government partnerships. PCAST also discussed S&T issues related to improving international cooperation.

During 1996, in addition to providing informal advice to the President and several Federal agencies, writing letters, and working with Congress to help its members understand the importance of the S&T enterprise to the Nation's security and economic growth, PCAST issued the following three reports to the President:

- *Principles on the U.S. Government's Investment Role in Technology* (June 1996) provides criteria to be used by policymakers in identifying essential investments in technology, as well as targets of opportunity for support. The transmittal letter underscores the importance of these investments for the Nation's economic security. Copies of the Principles were also forwarded to members of Congress with a special interest in or responsibility for S&T issues.
- *Letter Report on Research Universities* (June 1996) concluded that the stresses on these institutions threaten their two fundamental missions: 1) discovery of new knowledge; and 2) preparation of the next generation. PCAST recommended that the

Federal Government initiate a full policy and administrative review, including its current policies, programs, and regulations affecting the university- Government partnership, and that the results of this review be reported to the President. In response to this letter report, as well as to similar letters from corporate leaders and Nobel laureates, the President directed the NSTC to issue a Presidential Review Directive (PRD NSTC-4), Review of the University-Government Partnership, calling for an assessment by June 1997. Actions recommended could then be incorporated into agency budget planning for FY 1999.

- *Preventing Deadly Conflict* (November, 1996) concluded that: 1) scientific research can clarify the causes of deadly conflict at the individual, group, and international levels; 2) R&D sharpen the concepts and techniques of conflict resolution; 3) application of research can diminish the development of prejudice and ethnocentrism during childhood and adolescence; and 4) international cooperation among scientists can help prevent deadly conflict. PCAST recommended that the Administration support enhanced activities in each of these areas as well as encourage ongoing efforts already underway at several U.S. Government agencies. Furthermore, PCAST recommended that the NSTC should coordinate the efforts across the Government.

For Copies of PCAST Reports and Letters and Further Information, Contact:

PCAST Executive Secretariat
202-456-6100 (phone) 202-456-6026 (fax)

Also Available on the PCAST Home Page via Link from the OSTP Home Page at:

<http://www.whitehouse.gov><http://www.ostp.gov>

Appendix B
List of NSTC Presidential Directives
Summary of National Science and Technology Council
(NSTC)
Presidential Review Directives (PRDs)
and Presidential Decision Directives (PDDs)
(as of December 31, 1996)

NSTC PRDs:

1. Federal Laboratories, dated 5/5/94--Interagency review of the Department of Defense (DoD) the Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA)--the three largest laboratory systems--to evaluate and develop recommendations for ways to improve their efficiency and effectiveness. The NSTC's review provides guidance, building upon and integrating the individual agency reviews. Completion of review led to PDD-5.

2. Space Policy dated, 5/15/95--Comprehensive review of national space policy identifying and recommending changes and ensuring written policies reflect the Administration's civilian, national security, and commercial space programs and policies. Identifies and recommends changes to related national security directives containing guidance on space policies and programs. Completion of review led to PDD-8.
3. Global Positioning System (GPS) Policy Review, dated 5/18/95-- Review of GPS policy issues and recommendations on national policy on the future management and use of GPS. Considers national security, economic policy and foreign policy issues. Completion of review led to PDD-6.
4. Review of the University-Government Partnership, dated 9/26/96-- A Government-wide policy and administration review of the U.S. university research system. The NSTC will form a task force to conduct the review to determine what might be the major stresses in the areas of research, education, and administrative regulations, and determine what the Federal Government's role should be in addressing any issues raised by this examination. Due 6/30/97.

NSTC PDDs:

1. Establishment of Presidential Review and Decision Series/NSTC, dated 1/25/94.
2. Convergence of U.S. Polar-Orbiting Operational Environmental Satellite Systems, dated 5/5/94--Integrates the Department of Commerce (DOC) and DoD polar-orbiting environmental satellite systems to reduce the cost of acquisition and operation. Directs DoD, NASA and DOC to: create an Integrated Program Office no later than 10/1/94 and form a convergence Executive Committee to ensure that both civil and national security requirements are satisfied; coordinate program plans, budgets and policies; and ensure that agency funding commitments are equitable and sustained.
3. Landsat Remote Sensing Strategy, dated 5/5/94--Provides for continuation of the Landsat 7 program, assuring continuity and quality of Landsat-type data and reducing the risk of a data gap.
4. National Space Transportation Policy, dated 8/5/94--Establishes national policy, guidelines, and implementing actions for the conduct of national space transportation programs that will sustain and revitalize U.S. space transportation capabilities. Recognizes criticality of space program for achieving national security, scientific, technical, commercial and foreign policy goals. Assures that reliable and affordable access to space through U.S. space transportation capabilities is a fundamental goal of the U.S. space program. Makes DoD the lead agency responsible for improvement and evolution of current Expendable Launch Vehicle (ELV) fleet. Makes NASA responsible for improving the space shuttle system, focusing on reliability, safety, and cost-effectiveness. Assigns the Department of Transportation (DOT) and DOC responsibility for private sector and State/local government arrangements. Directs NASA and DoD to develop a Memorandum of Agreement to consolidate future expendable launch service requirements.
5. Guidelines for Federal Laboratory Reform, dated 9/24/95-- Response to NSTC PRD

1. Review of DoD, DOE, and NASA, concluding that these laboratories provide essential services to the Nation in fundamental science, national security, environmental protection and cleanup, and industrial competitiveness. States that all three DOE nuclear weapons labs are essential. Directs DOE to maintain nuclear weapons responsibilities and capabilities adequate to support the science-based stockpile stewardship program required to ensure continued confidence in the safety and reliability of the nuclear- weapons stockpile in the absence of nuclear testing. Directs Federal agencies to: 1) review and, as appropriate, rescind internal management instructions and oversight that impede laboratory performance; 2) clarify and focus the mission assignments of their laboratories; and 3) achieve all possible budget savings through streamlining and management improvements before productive R&D programs are sacrificed.
6. U.S. Global Positioning System Policy, dated 3/28/95--Response to NSTC PRD 3. Establishes national policy for the management and use of the U.S. GPS and related U.S. Government augmentations. The policy presents a strategic vision for the future management and use of GPS, addressing a broad range of military, civil, commercial and scientific interests, both national and international.
7. Emerging Infectious Diseases, dated 6/12/96--Establishes national policy and implementing actions to address the threat of emerging and re-emerging infectious diseases by improving surveillance, prevention, and response measures. A Task Force under the auspices of the NSTC will provide strategic planning and further coordination on issues of emerging infectious diseases. The task force will provide the President with annual reports on the progress realized, including recommendations for further action.
8. National Space Policy, dated 9/19/96--Response to NSTC PRD 2. Updates the national space policy to be consistent with the Administration=s civilian, national security, and commercial space programs and policies.

For Fact Sheets and/or Press Releases on NSTC Presidential Directives, Contact:

National Science and Technology Council Executive Secretariat
202-456-6100 (phone) 202-456-6026 (fax)

Appendix C

Reports Issued by

The National Science and Technology Council

Reports Issued by the National Science and Technology Council (as of December 31, 1996)

1. *High Performance Computing and Communications Program Successes*, NSTC Committee on Computing, Information, and Communications, June 1994
2. *High Performance Computing and Communications Technology for the National Information Infrastructure*, NSTC Committee on Computing, Information, and

Communications, 1994

3. *Technology for a Sustainable Future: A Framework for Action*, NSTC Committee on Environment and Natural Resources, July 1994
4. *Partnership of a New Generation of Vehicles (PNGV) Program Plan*, NSTC Committee on Technological Innovation, July 1994
5. *Science in the National Interest*, NSTC Committee on Fundamental Science, August 1994
6. *A Strategic Planning Document for Meeting the 21st Century*, NSTC Committee on Education and Training, March 1995
7. *Preparing for the Future through Science and Technology*, NSTC Committee on Environment and Natural Resources, March 1995
8. *America in the Age of Information*, NSTC Committee on Computing, Information, and Communications, March 1995
9. *Bridge to a Sustainable Future*, NSTC Committee on Environment and Natural Resources, April 1995
10. *Interagency Federal Laboratory Review Final Report*, NSTC Federal Laboratory Review Working Group, May 1995
11. *High Performance Computing and Communications 1996 Implementation Plan*, NSTC Committee on Computing, Information, and Communications, May 1995
12. *High Performance Computing and Communications Foundation for America's Information Future*, NSTC Committee on Computing, Information, and Communications, 1995
13. *Setting a New Course for U.S. Coastal Ocean Science*, NSTC Committee on Environment and Natural Resources, July 1995
14. *Biotechnology for the 21st Century: New Horizons*, NSTC Committee on Fundamental Science, July 1995
15. *Global Microbial Threats in the 1990's*, NSTC Committee on International Science, Engineering, and Technology, July 1995
16. *Goals for a National Partnership in Aeronautics Research and Technology*, NSTC Committee on Transportation, August 1995
17. *Infectious Disease--A Global Health Threat*, NSTC Committee on International Science, Engineering, and Technology, September 1995
18. *National Security Science and Technology Strategy*, NSTC Committee on National Security, September 1995

19. *National R&D Strategy for Toxic Substances and Hazardous Solid Waste*, NSTC Committee on Environment and Natural Resources, September 1995
20. *Construction and Building: Federal Research and Development in Support of the U.S. Construction Industry*, NSTC Committee on Technological Innovation, October 1995
21. *Forum on Future Directions in Transportation R&D*, NSTC Committee on Transportation, October 1995
22. *Our Changing Planet: The FY 1996 U.S. Global Change Research Program*, NSTC Committee on Environment and Natural Resources, October 1995
23. *NSTC Accomplishments (November 1993 - September 1995)*, NSTC Executive Secretariat, October 1995
24. *Interagency Report on Orbital Debris*, NSTC Committee on Transportation, November 1995
25. *Building a Scientific Basis to Ensure the Vitality and Productivity of U.S. Ecosystems*, NSTC Committee on Environment and Natural Resources, December 1995
26. *National Planning for Construction and Building R&D*, NSTC Committee on Technological Innovation, December 1995
27. *Interagency Assessment of Potential Health Risks Associated with Oxygenated Gasoline*, NSTC Committee on Environment and Natural Resources, February 1996
28. *Meeting the Challenge (A Research Agenda for America's Health, Safety, and Food)*, NSTC Committee on Health, Safety, and Food, February 1996
29. *United States Antarctic Program*, NSTC Committee on Fundamental Science, April 1996
30. *Strategy for National Earthquake Loss Reduction*, NSTC Committee on Environment and Natural Resources, April 1996
31. *NSTC Accomplishments--Calendar Year 1995*, NSTC Executive Secretariat, May 1996
32. *Human-Centered Transportation Systems Brochure*, NSTC Committee on Transportation, May 1996
33. *Assessing Fundamental Science Report*, NSTC Committee on Fundamental Science, July 1996
34. *Technology in the National Interest*, NSTC Committee on Technological Innovation, July 1996
35. *Program Guide to Federally Funded Environment and Natural Resources R&D*,

NSTC Committee on Environment and Natural Resources, June 1996

36. *Environmental Technologies Testing and Demonstration Sites: A Federal Directory*, NSTC Committee on Environment and Natural Resources, September 1996
37. *Our Changing Planet: The FY 1997 U.S. Global Change Research Program*, NSTC Committee on Environment and Natural Resources, September 1996
38. *Committee on Environment and Natural Resources Brochure*, NSTC Committee on Environment and Natural Resources, September 1996
39. *The Federal Research and Development Program in Materials Science and Technology*, NSTC Committee on Technological Innovation, November 1996
40. *High Performance Computing and Communications (HPCC) Advancing The Frontiers of Information Technology*, NSTC Committee on Computing, Information, and Communications, November 1996
41. *The Health and Ecological Effects of Endocrine Disrupting Chemicals: A Framework for Planning*, NSTC Committee on Environment and Natural Resources, November 1996

Reports and Further Information May be Obtained by Contacting:

The NSTC Executive Secretariat
202-456-6100 (phone) 202-456-6026 (fax)

Reports are Also Available on the NSTC Home Page via Link from the OSTP Home Page at:

<http://www.whitehouse.gov><http://www.ostp.gov>

ABSTRACT

The President established the National Science and Technology Council (NSTC) in 1993 to coordinate the diverse parts of the Federal R&D enterprise and to foster synergy among the varied talents of the Federal S&T workforce. In November 1996, the NSTC completed its third year of operation and matured from the definition of strategic goals, as defined in the 1995 NSTC committee strategic plans, to the implementation of specific initiatives. The NSTC initiatives are aimed at redirecting the Federal Government's investments in S&T toward fundamental national goals, while streamlining Government and saving taxpayers' dollars. This report presents the accomplishments of the NSTC for 1996 according to the six Presidential goal areas for R&D: 1) Maintaining World Leadership in Science, Mathematics, and Engineering, 2) Promoting Long-term Economic Growth, 3) Sustaining a Healthy, Educated Citizenry, 4) Improving Environmental Quality, 5) Harnessing Information Technology, and 6) Enhancing National Security and Global Stability.

The accomplishments of the private sector President's Committee on Science and

Technology (PCAST) for 1996 are also included as Appendix A of this report. PCAST was established at the same time as the NSTC with a primary function to assist the NSTC to ensure that Federal S&T policies reflect the full spectrum of the Nation's needs.

For Additional Copies and Further Information, Contact:

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<http://www.whitehouse.gov><http://www.ostp.gov>

¹ Science in the National Interest, NSTC Committee on Fundamental Science, August 1994.

² Assessing Fundamental Science, NSTC Committee on Fundamental Science, July 1996.

³ NSTC Presidential Directives issued to date are described in Appendix B.

⁴ In September 1995 the Senate VA, HUD, Independent Agencies Appropriations Committee (Report 104-140) asked the NSTC to review U.S. Antarctic policy.

⁵ United States Antarctic Program, NSTC Committee on Fundamental Science, April 1996.

⁶ Technology in the National Interest, NSTC Committee on Technological Innovation, July 1996

⁷ PNGV Technical Accomplishments Report, United States Council for Automotive Research, July 1996.

⁸ Construction and Building: Federal Research and Development in Support of the U.S. Construction Industry, NSTC Committee on Technological Innovation, October 1995.

⁹ The State-Federal Technology Partnership Task Force Final Report, State-Federal Technology Partnership Task Force, September 1995.

¹⁰ Goals for a National Partnership in Aeronautics Research and Technology, NSTC Committee on Transportation, August 1995.

¹¹ Human-Centered Transportation Systems Brochure, NSTC Committee on Transportation, May 1996.

¹² Meeting the Challenge (A Research Agenda for America's Health, Safety, and Food), NSTC Committee on Health, Safety, and Food, February 1996.

- ¹³ Science in the National Interest, NSTC Committee on Fundamental Science, August 1994.
- ¹⁴ Technology for a Sustainable Future: A Framework for Action, NSTC Committee on Environment and Natural Resources, July 1994.
- ¹⁵ Environmental Technologies Testing and Demonstration Sites: A Federal Directory, NSTC Committee on Environment and Natural Resources, September 1996.
- ¹⁶ This effort is linked to the International Dimensions of Natural Disaster Reduction work cited in section VI of this report on Enhancing National Security and Global Stability.
- ¹⁷ Strategy for National Earthquake Loss Reduction, NSTC Committee on Environment and Natural Resources, April 1996.
- ¹⁸ Interagency Assessment of Potential Health Risks Associated with Oxygenated Gasoline, NSTC Committee on Environment and Natural Resources, February 1996.
- ¹⁹ Program Guide to Federally Funded Environment and Natural Resources R&D, NSTC Committee on Environment and Natural Resources, June 1996.
- ²⁰ The Health and Ecological Effects of Endocrine Disrupting Chemicals: A Framework for Planning, NSTC Committee on Environment and Natural Resources, November 1996.
- ²¹ High Performance Computing and Communications (HPCC) Advancing The Frontiers of Information Technology, NSTC Committee on Computing, Information, and Communications, November 1996.
- ²² HPCC 1997 Implementation Plan , Office for Computing, Information, and Communications, December 1996.
- ²³ Infectious Disease--A Global Health Threat, NSTC Committee on International Science, Engineering, and Technology, September 1995.
- ²⁴ This effort is linked to the Natural Disaster Reduction work cited in section IV of this report on Improving Environmental Quality.