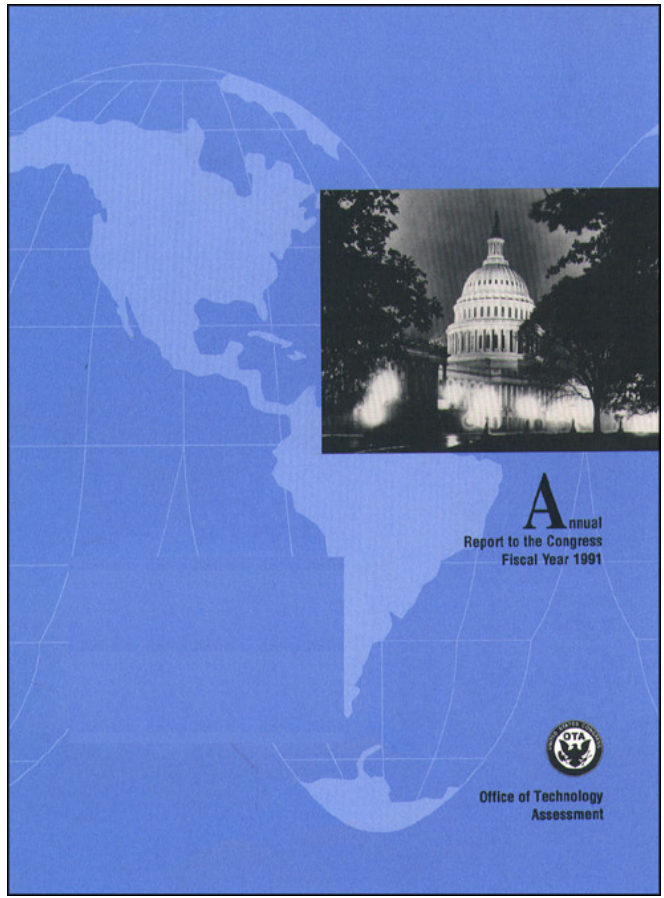
Annual Report to the Congress: Fiscal Year 1991

March 1992

OTA-A-473



About the Report

The Office of Technology Assessment is an analytical support agency of the United States Congress. OTA works directly with and for the Committees of Congress, providing them with objective, thorough analysis of technological issues. This report to Congress is required under Sec. 11 of the Technology Assessment Act of 1972, Public Law 92434. It describes the activities of the Office in **Fiscal Year 1991 within the** context of the legislative agenda of the 101st Congress and the events in the United States and the world during 1991.

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Chairman's Statement

It has been my distinct pleasure to serve as Chairman of the Technology Assessment Board for the 102d Congress. Because my involvement with OTA stretches back to the agency's earliest days, becoming chairman has had special meaning to me.

Public policy is more than ever being determined by technology. This poses a true challenge for the Congress, for the issues with a technology content are often the most complex and subtle; yet science and technology is a field in which the average Member of Congress is not well equipped.

As OTA has become a mature and respected source of advice on science and technology, it has been of enormous assistance helping the Congress meet that challenge. When OTA staff address an issue of enormous complexity, they have had great success in distilling the issue to a range of options based on fact instead of rhetoric, and in a form that Members of Congress can understand and use. While the political judgments are properly left to us, we make them on a foundation of reality and hard analysis, as opposed to guesswork.

Some examples will illustrate the serious role that OTA now plays in Congressional policy consideration. The OTA work, Federally *Funded Research: Decisions For A Decade,* has given the Congress a wholly new view about how to manage the federal civilian research enterprise. OTA'S work in energy, such as the studies addressing fuel economy and our vulnerability to disruptions in our imported fuel supply, have become benchmarks in Congress' consideration of energy policy. The study, *Exploring The Moon and Mars: Choices For A Nation,* is now being used as a textbook by the Committees charged with deciding the future of our program for space exploration. OTA continues to give the Congress sophisticated advice on issues ranging from the management of our global environment to the future of our defense structure.



OTA has become one of the Congress' success stories, which perhaps are in short supply. So I look forward with happiness to a continuing relationship with this unique agency.

CONGRESSMAN GEORGE E. BROWN, JR.

Vice Chairman's Statement



The Office of Technology Assessment has grown over the years as Congress realized the value of shared staff.

In my judgment, this organization of technical experts has greatly matured-both as a resource to Congress and as a useful source of information to the public. OTA reports and background papers are used to help frame policy debates here in Congress and are used by those ranging from academics to engineers in the field. And, it is important to note most of these studies would have been done in the House and the Senate by separate staffs if OTA'S reputation for fairness had not been established.

OTA'S recent study, *U.S. Oil Import Vulnerability: The Technical Replacement Capability,* was a very helpful document in the debate over energy policy. The study makes clear the Nation's growing dependence on imported oil, and our vulnerability in the event of disruption of foreign oil supply.

Another study, *Coping With An Oiled Sea,* has been very helpful to Congress. It got out the true facts about which oil spill cleanup measures are technologically feasible. Importantly, it told us that huge technological breakthroughs are not necessary, but good planning, training, and engineering are most helpful when addressing an oil spill.

OTA has done a good job providing Congress with sound technical analysis so that members of Congress and our staffs can make decisions based on the best facts available. OTA avoids waste and duplication because it is a resource shared by all the committees of Congress. In these times of tight budgets, I am glad we have such a resource—and believe we should do more to prevent duplication in basic staff research by the House and Senate.

I look forward to working with OTA in the future.

SENATOR TED STEVENS

AAC Chairman's Statement

It is a pleasure to submit this statement for the annual report. I wish to thank my Vice Chairman, Joshua Lederberg, and the Members of the Council for their support and assistance in what has been a most interesting and fulfilling year.

OTA has continued to perform as a first-rate analytical organization. Our 1991 review of four of OTA'S nine programs has reaffirmed our opinion that OTA'S staff and work product are very high. This applies to the quality of the work product, the experience and judgment of the staff, and the directions the agency is taking in the longer term.

The return on the Congress' investment in OTA is appreciable, and we strongly support appropriations to ensure that OTA continues to receive the resources it needs not only to maintain its staff, but also to tap outside expertise, This latter support is especially important for an agency that has a small staff but a diverse, variable agenda of analytical responsibilities.

CHASE N. PETERSON





Director's Statement

In last year's report we projected that 1991 would be a ''year undoubtedly filled with extraordinary events. That turned out to be a pretty safe bet. Some of the phenomena the world experienced in 1991, particularly the collapse of the Soviet-dominated system of centrally planned economies, will continue to ' 'try our National spirit and our commitments to future generations' for some time to come, making each new year unique and informed policymaking more important than ever.



OTA has long studied many of the technical issues that influenced the demise of the Soviet Union. For example, in 1981, we projected that the impending fall-off in Scviet gas and oil production (dominated by poor use of technology} would result in a slackened economic grip on Eastern Europe and decreased access to hard currency. Several OTA studies have illuminated the extraordinary impacts of computer and telecommunications technologies on production and service economies and have revealed the fact that these tools were readily adopted in market economies while they languished in centrally planned economies. Individuals who played crucial roles in the revolutions in Russia and Eastern Europe surely sensed that the globally integrating market was racing out of sight of the centrally planned economies and knew that radical change was imperative. Although the growing importance of information technologies contributed to the revolution, those same technologies also placed a subtle but effective control on its course by assuring universal access to events as they transpired.

Here at home, telecommunications provided constant contact with the rapid deployment, swift movements, in-process innovative problem-solving, and technologically advanced weapons wielded by well-trained coalition forces in Kuwait and Iraq. The world's voracious appetite for oil lay at the heart of this conflict and lies at the heart of many of the environmental problems that threaten the community of Nations. Energy and environment issues continue to occupy a fourth of OTA'S analysis effort.

The stubborn and persistent deficits in international payments, led by oil and auto imports, and federal entitlement programs that inexorably race beyond receipts contribute toward a double-dip recession. The Nation is questioning the priority of big technology projects—from the faulty billion dollar Hubble Telescope and

Galileo space probe to the anachronistic Strategic Defense Initiative strategy to protect the continental U.S. And our revered halls of science are showing disturbing signs of stress. The country seems to yearn for a change for the better and remains an innovative, responsive, and capable society. How can OTA contribute to meeting the challenges before us?

First, the Nation needs to become more acutely aware of the facts and they need to be ordered and integrated. An old Chinese proverb states: ‘ ‘If we don’t change direction, we’re very likely to end up where we’re headed, ” That early equivalent of Isaac Newton’s first law of motion is as true today as it was 3000 years ago. OTA not only describes where we are and where we are headed, but also how our trajectory can be modified if the country so chooses. In 1991, for example, OTA crafted a variety of energy and environmental strategies, including alternative long-range goals for levels of imports, reductions in greenhouse gases and cost-effective efficiency opportunities, stressing the vastly different endpoints likely to result from options ranging from maintaining the status quo all the way to decisions to make significant shifts in the economy. We pointed out the unhappy but true dimensions of our loss of industrial manufacturing competitiveness, its impact on U.S. standards of living, and the tough and long-term but necessary steps to turn things around. We described the serious health deficits of our children in a landmark review of adolescent health, and examined the crumbling health delivery system to rural America in our study of rural health care. We defined the sobering situation of the Nations defense nuclear and chemical waste mess and offered ways for more effective management and clean-up. We examined both the disadvantages and opportunities of rural areas to utilize telecommunications to improve public services as well as to improve their economic futures. We tackled the manifold issues surrounding point-of-sale record checks of firearms purchasers and helped clarify constraints and options, which resulted in successful legislation. And we outlined the principal conflicts facing the U.S. basic research system.



Second, we need to help leaders who can help define who we are, as a people and Nation, and who can articulate plans of action that are fair and achievable. In carrying out studies for committees of Congress, OTA draws on a wide variety of

perspectives from outside government and delivers its studies to the public as well as the congressional requesters. Hopefully, this provision of carefully drawn information enables leaders to articulate well-conceived choices and goals, and helps citizens to have better access to the power that knowledge gives, so that a stronger democratic society can prevail.



Mindful of our role in the policy process, OTA carefully leaves decisionmaking to elected officials. OTA neither advocates particular decisions nor takes political sides. The agency's job is to help focus, elevate, and illuminate debates about socio-technical issues. In a world increasingly dominated by technology, in a society increasingly influenced by science, people need trustworthy access to the specialized knowledge of science and technology.

As we look forward to 1992, OTA already has a full plate of analyses underway. These include studies of defensive medicine and health insurance, nuclear disarmament, counter-terrorism, defense conversion in our economy, renewable energy, defense waste cleanup, options to adapt to an unknown and future climate, computer soft ware and intellectual property, prevention and treatment of osteoporosis, evaluation of the Oregon Medicaid proposal, agricultural alternatives to coca production, technology to improve literacy and learning by adults, and many more issues confronting Congress and the American people. With the continued assistance of hundreds of experts and stakeholders throughout the private and public sectors, both in the U.S. and from other countries, OTA will illuminate the facts, winnow the uncertainties, and weigh various potential impacts. With that task complete, we will faithfully synthesize, translate, and deliver the results for the Congress and the public to use as they see fit. The existence of knowledge-the fruit of research—is necessary but not sufficient. OTA'S job is to make knowledge truly accessible and therefore useful as we struggle as a Nation to govern ourselves wisely in a world full of both peril and opportunity.

JOHN H. GIBBONS



Organization and Operations

Created by the Technology Assessment Act of 1972 [86 Stat. 797], OTA is an agency of the legislative branch of the Federal Goverment (a copy of the Act is found on p. 50). OTA'S primary function is to provide congressional committees studies that identify the positive and negativc consequences of policy alternatives affecting the uses of technology.

OTA assists Congress by identifying existing or probable impacts of technology; alternative technological methods and management programs for implementing specific actions (estimating and comparing the Impacts of alternatives); and areas where additional research or data collection is required to provide support for assessments. (OTA presents its completed analyses to the appropriate legislative authorities and, whenever possible, undertakes whatever additional related activities are necessary.

The Act provides for a bipartisan Technology Assessment Board, a director, and other employees and consultants that are necessary for the Office to conduct its work. The congressional board is made up of six Senators, appointed by the President pro tempore of the Senate, and six Representatives,



appointed by the Speaker of the House, evenly divided by party. In 1991, Rep. George E, Brown, Jr. (D-California) and Sen. Ted Stevens (R-Alaska) served as the Chairman and Vice Chairman, respectively, of the board. The two posts alternate between the Senate and House with each Congress. The board members from each Chamber select their respective officer.

The congressional board sets the policies of the Office and is the sole and exclusive body governing OTA. The board appoints the director, who is OTA'S chief executive officer and a nonvoting member of the board.

The Act also calls for a Technology Assessment Advisory Council composed of 10 public members eminent in scientific and technological fields, the Comptroller General of the United States, and the Director of the Congressional Research Service of the Library of Congress. The advisory council advises the board and the director on such matters as the balance, comprehensiveness, and quality of OTA'S work, and OTA'S nongovernmental resources.

Requests for OTA assessments may be initiated by:

- the chairman of any standing, special, select or joint committee of Congress, acting alone, at the request of the ranking minority member, or at the request of a majority of the committee members;
- the OTA board; or
- the OTA director, in consultation with the board.

The authorization of specific assessment projects and the allocation of funds for their performance are the responsibilities of the OTA board.

The analytical work of the Office is organized into three divisions, each headed by an assistant director. They encompass assessments grouped in the areas of energy and materials; international security and commerce; industry, technology, and employment; biological applications; food and renewable resources; health; oceans and environment; science, education, and transportation; and telecommunications and computing technologies.

Staff of the Operations Division support the analytical work of the Office. The Operations Division is divided into three main sections. Finance and Administrative Services includes Administrative Services and Budget and Finance. Information Management and Publishing Services includes Telecommunication and Information Systems, the InformationCenter, Publishing and Information Marketing. Personnel Services includes the Personnel Office. The Division provides the research staff and management with a variety of services and technologies vital to successful functioning of the Office. The Information Center also provides public access to the full collection of OTA publications, including an online index, and the Publications Unit within Information Marketing handles public dissemination of OTA publications.

The Congressional and Public Affairs Office assists in coordinating OTA'S work with various committees of the House and Senate, by initiating communications between OTA management and staff, and the Technology Assessment Board and the Technology Assessment Advisory Council. OTA publications are then widely dissemi-

nated on Capitol Hill and to the press. (General Information on OTA and availability of OTA publications is listed on the inside back cover.)

FY1991 Activities

The United States finds itself simultaneously propelled by centripetal and centrifugal forces. Domestic problems, such as unemployment, lack of affordable health care, illiteracy, force the Federal Government to focus on internal business at an unusually fine level of detail which encourage a growing degree of isolationism among U.S. citizens. Yet global problems like climate change, loss of control over nuclear weapons, and increasing tensions between the economic "have's" and "have not's" force the government's attentions outward, to focus on affairs far beyond national boundaries.

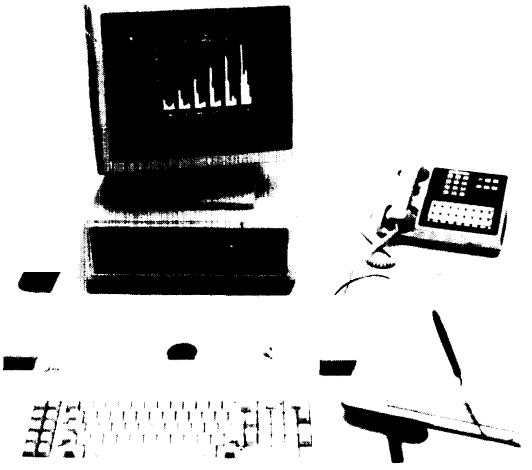
Concern about the technological changes which may impact the creation of a global economy lies at the heart of many of these problems. OTA provides Congress with thorough, impartial analyses of the potential role of science and technology in creating and addressing the pressing concerns of today . . . and tomorrow.

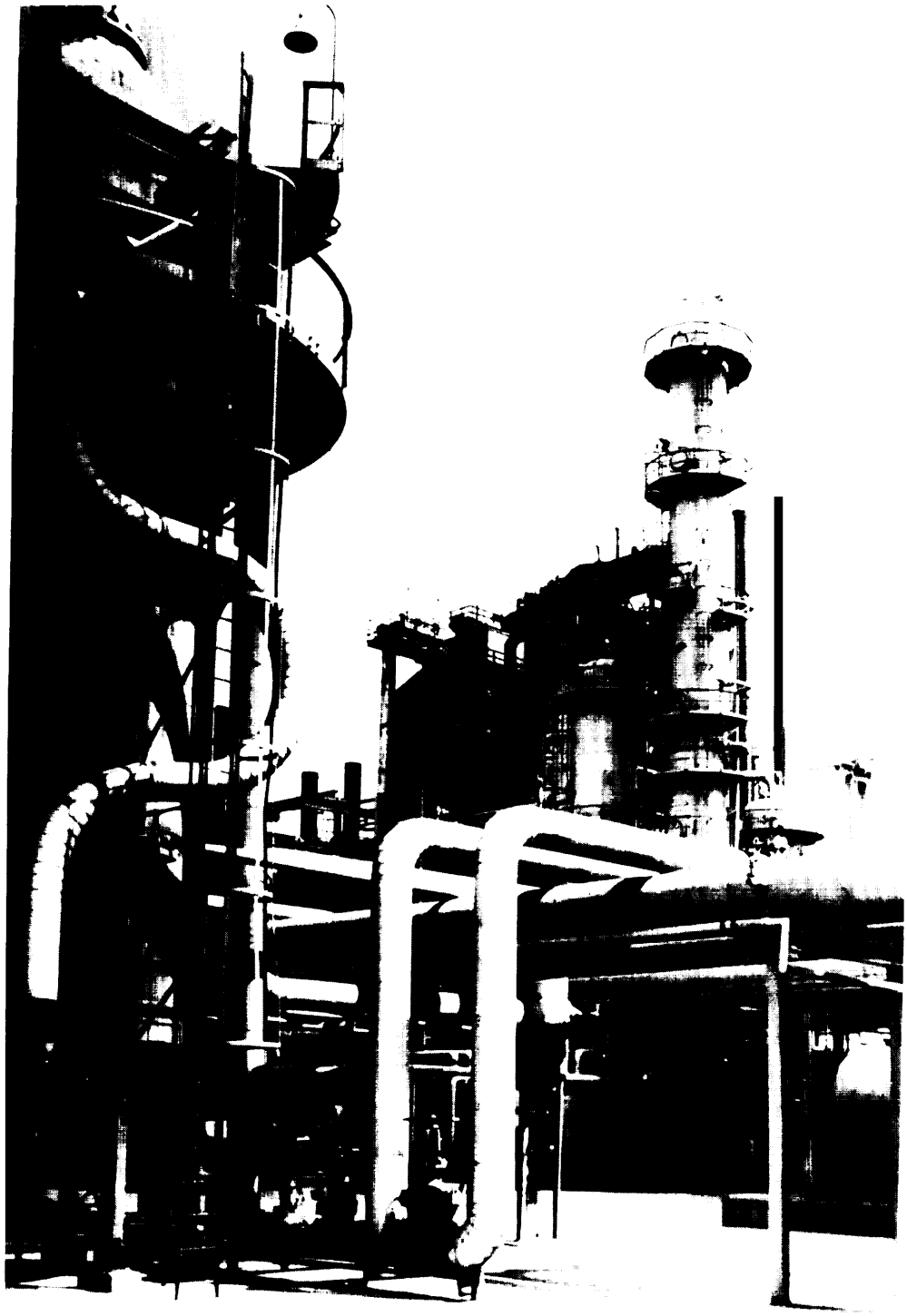
In FY1991, OTA highlighted the national and international implications of many technologies essential to economic well-being, such as energy supply and demand technologies. To help Congress grapple with domestic energy requirements (in particular the threat to Kuwait's oil supplies imposed by war), OTA published assessments on U.S. oil import vulnerability and on energy efficiency in the Federal Government. OTA also addressed the energy needs of developing countries, and looked specifically at the contributions of energy consumption to climate change.

OTA furthered its comprehensive examination of the U.S. position in the world economy with studies on such diverse topics as public works infrastructure, trade, and biotechnology. In FY1991, OTA continued to be shaped and guided by the bipartisan Technology Assessment Board, reflecting the explicit needs of the committees of jurisdiction, OTA serves as a shared resource for Congress, providing high-quality analyses of scientific and technological issues that are intrinsic to all important policy decisions, in a cost-effective way.

During FY1991, OTA delivered 44 formal publications to Congress, including assessment reports, background papers, a special report, staff papers, and administrative documents. As of September 30, 1991,46 approved studies were in progress. An integral aspect of OTA's assessments includes providing expert advice, briefings, testimony, and results of OTA research to committees throughout the projects.

OTA served over 40 different Committees and Subcommittees of both Houses, typically in response to bipartisan requests.





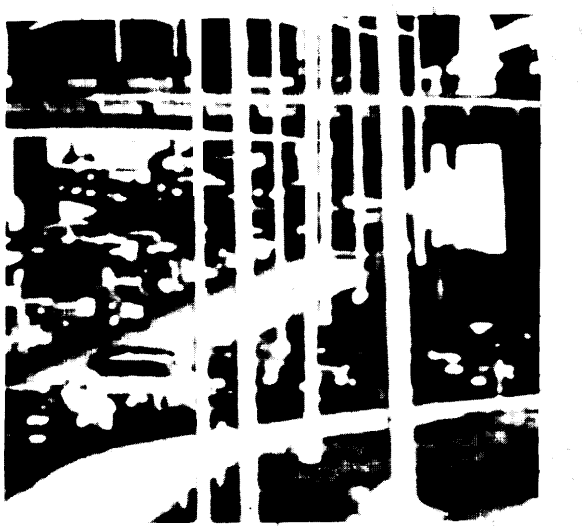
Energy, Materials, and International Security Division

The Energy and Materials Program is responsible for assisting Congress in understanding the technological possibilities for developing our energy and materials resources and the consequences of these developments for society. OTA'S Energy and Materials Program covers those technologies that concern the extraction, delivery, and use of energy and materials, in addition to focusing attention on world markets and policies, including imports and exports of energy and materials.

The Industry, Technology, and Employment Program examines how technology affects the ability of U.S. industry to contribute to a healthy national economy. Its responsibilities include consideration of the competitiveness of U.S. industries in international markets, trade and economic development issues, the number and nature of employment opportunities, needs for worker education, training and retraining, and ways to ease adjustment in structural economic transitions. A Program with a specific employment focus is new at OTA (the Program was established in 1983), although many assessments have considered employment impacts, and employment and training issues have



The Division comprises three programs: Energy and Materials; lndustry, Technology, and Employment," and lnternational Security and Commerce.



been of central importance in several studies. This section of the program centers on the quantity, nature, and quality of jobs, the nature of and changes in job skills, and training and retraining across the work force.

OTA'S analyses of issues of national defense, international security, and space are conducted primarily by the International Security and Commerce Program. In recent years this has included: defense industry and technology, aspects of defense management, international collaboration, space transportation, orbital debris, nuclear offense and defense, arms control, export controls, NATO defensive strategy, terrorism, and commercial uses of space. The multi-disciplinary staff-including scientists, engineers, social scientists, and others-brings a broad perspective to these and other complex problems.

FY1991 Activities

The Division contributed considerably to the debate on major issues in the 102d Congress. Its work on improving automobile fuel economy was used extensively in the draft legislation on increasing Corporate Average Fuel Economy (CAFE) standards, and its assessment on U.S. oil import vulnerability

was critical to the debate on the National Energy Security Act of 1991. Other important work in energy-related areas included studies of energy efficiency in the Federal Government and energy in developing countries.

Assessments focusing on trade and worker training assisted Congress in developing legislation which will expand America's ability to compete in the global economy. Work on manufacturing and the economy provided critical information for Congress on the need for the development and diffusion of commercially important technologies.

Finally, the Division's work in international security, defense reindustrialization, and space has broadened the debate in Congress. Assessments as diverse as technology against terrorism, the global arms trade, and exploration of the Moon and Mars have assisted Congress in sorting through these very complex issues. The timely study of defense reindustrialization issues is critical to the work in this area by the House and Senate Armed Services Committees.

ENERGY IN DEVELOPING COUNTRIES, JANUARY 1991
Requested by.
Senate Committee on Governmental Affairs
House Committee on Energy and Commerce

ENERGY EFFICIENCY IN THE FEDERAL GOVERNMENT: GOVERNMENT BY GOOD EXAMPLE?, MAY 1991
Requested by:
Senate Committee on Governmental Affairs
Senate Committee on Energy and Natural Resources
House Committee on Energy and Commerce
House Committee on Science, Space, and Technology

ENERGY TECHNOLOGY CHOICES: SHAPING OUR FUTURE, JULY 1991
Requested by:
House Committee on Energy and Commerce
House Committee on Government Operations

ORBITING DEBRIS: A SPACE ENVIRONMENTAL PROBLEM—BACKGROUND PAPER, OCTOBER 1990
Requested by:
Senate Committee on Commerce, Science, and Transportation
House Committee on Science, Space, and Technology

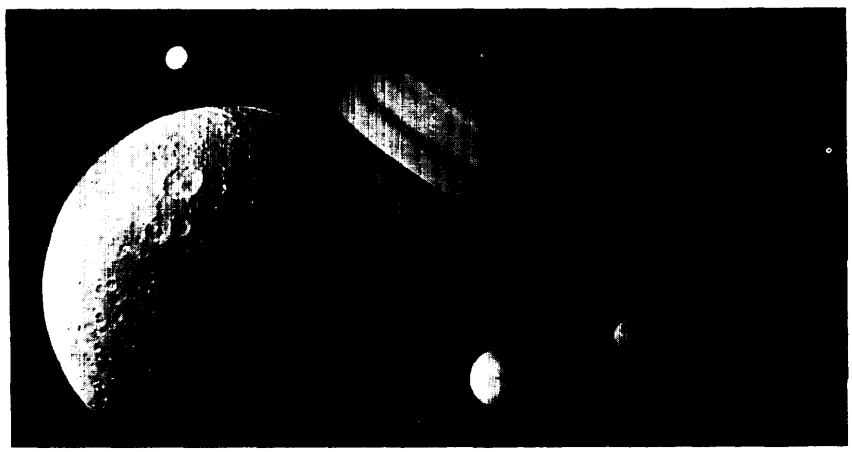
TECHNOLOGIES FOR START AGREEMENT:
Verification Technologies: Measures for Monitoring Compliance With the START Treaty, December 1990
Verification Technologies: Managing Reseach and Development for Cooperative Arms Control Monitoring Measures, May 1991
Verfication Technologies: Cooperative Aerial Survillance in International Agreements, July 1991
Requested by:
Senate Committee on Foreign Relations
House Committee on Foreign Affairs

WAGING THE NATION'S DEFENSE INDUSTRIAL STRENGTH IN A CHANGING SECURITY ENVIRONMENT:
Adjusting to a New Security Environment: The Defense Technology and Industrial Base Challenge-Background Paper, February 1991
Redesigning Defense: Planning the Transition to the Future U.S. Defense Industrial Base, July 1991
Requested by:
Senate Committee on Labor and Human Resources
Senate Committee on Commerce, Science, and Transportation
Senate Committee on Foreign Affairs
Senate Committee on Armed Services
House Committee on Interior and Insular Affairs
House Committee on Government Operations

GLOBAL ARMS TRADE: COMMERCE IN ADVANCED MILITARY TECHNOLOGY AND WEAPONS, JUNE 1991
Requested by:
Senate Committee on Armed Services
House Committee on Government Operations

TECHNOLOGY AGAINST TERRORISM: THE FEDERAL EFFORT, JULY 1991
Requested by:
Senate Committee on Governmental Affairs
Senate Committee on Foreign Relations
Senate Committee on Commerce, Science, and Transportation

EXPLORING THE MOON AND MARS: CHOICES FOR THE NATION, JULY 1991
Requested by:
Senate Committee on Appropriations
House Committee on Appropriations



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Photo credit: General Electric Company

Health and Life Sciences Division

The Biological Applications Program assesses state-of-the-art technologies arising from the cutting edge of biolog - ical science. The Program is responsible for assisting Congress in understanding biomedical technologies by exploring the consequences of those technologies and their applications on society, government, the economy, ethics, and the law.

The Food and Renewable Resources Program assesses national and international agriculture-related technologies used to provide society with food, fiber, and chemicals; technologies that affect the ability to sustain in perpetuity the renewable resource base that makes such production possible; and other technologies that affect the provision of environmental services derived from renewable resource systems. The Program also provides extensive experience in these fields as they relate to the problems of developing countries.

The Health Program's charter is reflected in two primary efforts: 1) assessment of specific clinical and general health care technologies, and 2) studies of broader issues of health policy related to, or with implications for, technology. In addition, it has



The Division comprises three programs: Biological Application s," Food and Renewable Resources; and Health.



certain statutory methodology oversight responsibilities regarding Vietnam veterans health studies, and provides staff work for OTA's mandated responsibility to appoint members of the Prospective Payment Assessment Commission and the Physician Payment Review Commission.

FY1991 Activities

The Health and Life Sciences Division contributed heavily to congressional consideration of issues in the 102d Congress. Studies on biotechnology addressed issues both economic and global as well as the specific concerns of the domestic dairy industry. Complex subjects such as neural grafting and health risks of immunotoxic substances were addressed in studies enabling several committees' evaluation of policy in these important areas.

The Division's work on agricultural approaches to reduce agrichemical contamination of groundwater was used to support development of several programs in the 1990 Farm Bill, and continues to be used to develop further legislation related to nitrate contamination of groundwater. The study on universities and development assistance has been used in rewriting the

Foreign Assistance Act, and work on agricultural commodities as industrial raw materials has been used in oversight of research on traditional and new crops for industrial use.

OTA'S Health Program completed a major assessment on adolescent health. Its continuing work on AIDS-related issues has been essential in keeping legislators informed on this most critical of health care issues.

NEW DEVELOPMENTS IN NEUROSCIENCE:
Neural Grafting: Repairing the Brain and Spinal Cord, October 1990
Biological Rhythms: Implications for the Worker, September 1991
Requested by:
House Committee on Energy and Commerce
House Committee on Veterans Affairs
House Committee on Science, Space, and Technology
House Committee on Appropriations

GENETIC MONITORING AND SCREENING IN THE WORKPLACE, OCTOBER 1990
Requested by:
Senate Committee on Commerce, Sciencc and Transportation
House Committee on Energy and Commerce
House Committee on Science, Space, and Technology

IDENTIFYING AND CONTROLLING IMMUNOTOXIC SUBSTANCES—BACKGROUND PAPER, MAY 1991
Requested by:
Snate Committee on Environment and Public Works

BENEATH THE BOTTOM LINE: AGRICULTURAL AppROACHES TO REDUCE AGRICHEMICAL CONTAMINATION OF GROUNDWATER NOVEMBER 1990
Requested by:
House Committee on Agriculture
House Committee on Public Works and Transportation

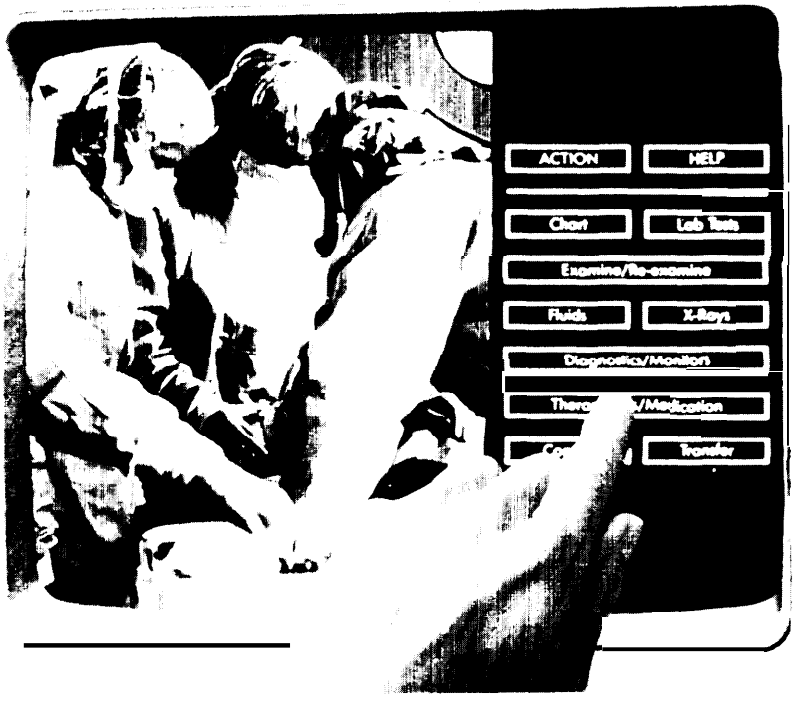
EMERGING AGRICULTURAL TECHNOLOGY: ISSUES FOR THE 1990s:
U.S. Dairy Industry at a Crossroad: Biotechnology and Policy Choices, May 1991
Agricultural Commodities as Industrial Raw Materials, June 1991
Requested by:
Senate Committee on Agriculture, Nutrition, and Forestry
House Committee on Agriculture

NEW OPPORTUNITIES FOR U.S. UNIVERSITIES AND DEVELOPMENT ASSISTANCE: AGRICULTURE, NATIONAL RESOURCES, AND ENVIRONMENT—BACKGROUND PAPER SEPTEMBER 1991
Requested by:
House Committee on Foreign Affairs
House Committee on Science, Space, and Technology
Senate Committee on Foreign Relations

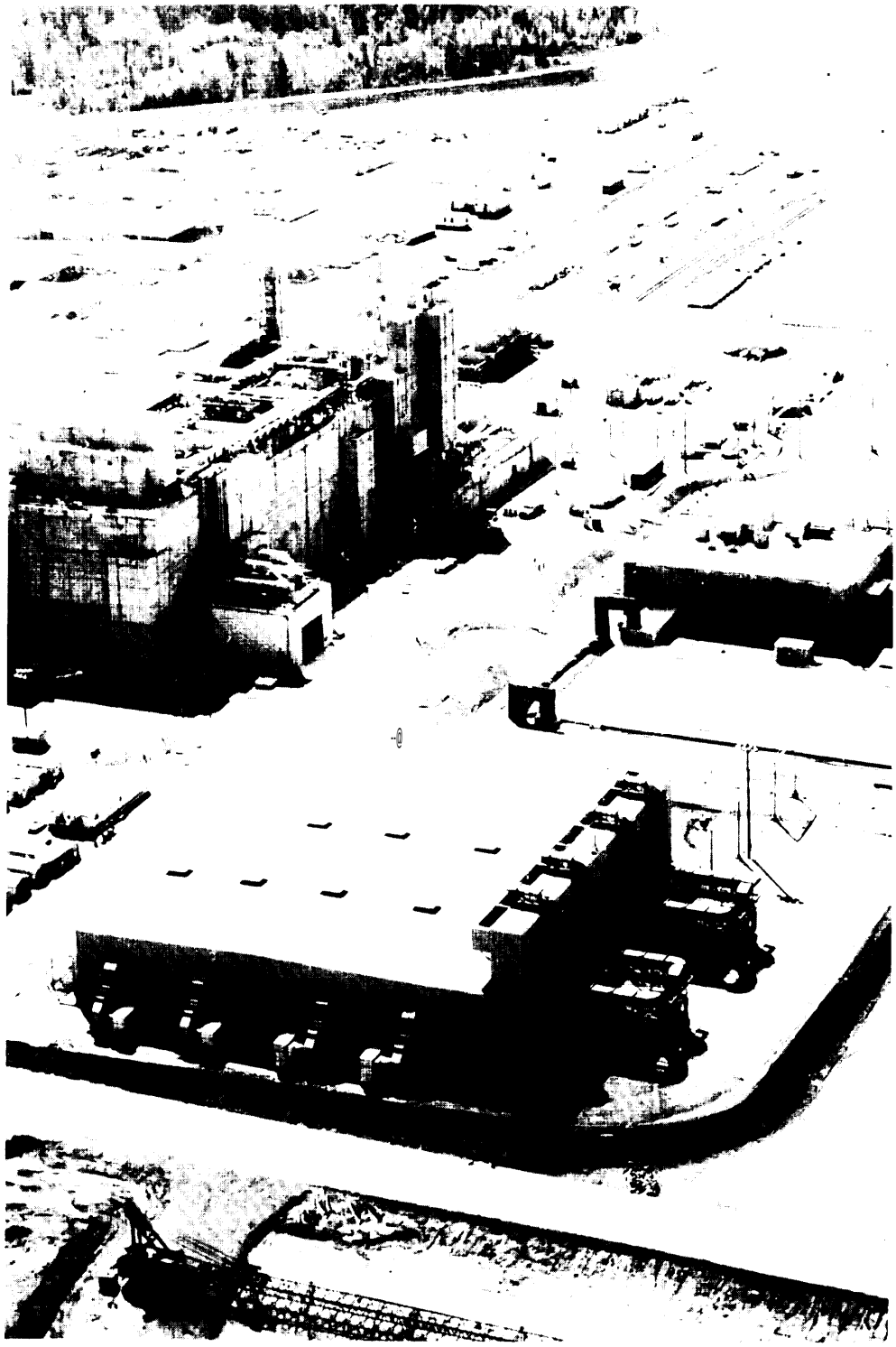
CHILDREN'S DENTAL SERVICES UNDER THE MEDICAID PROGRAM-BACKGROUND PAPER, OCTOBER 1990
Requested by:
House Committee on Energy and Commerce

ADOLESCENT HEALTH:
Volume I: Summary and Policy Options, April 1991
Volume 111: Crosscutting Issues m the Delivery of Health and Related Services, June 1991
Requested by:
Senate Select Committee on Indian Affairs
Senate Committee on Commerce, Science, and Transportation

OUTPATIENT IMMUNOSUPPRESSIVE DRUGS UNDER MEDICARE, AUGUST 1991
Requested by:
Senate Committee on Finance



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Science, Information, and Natural Resources Division

OTA's Oceans and Environment Program is responsible for all ocean-related questions, including ocean resources and maritime policy, and for large-scale environmental issues, such as climate modification and water pollution. The work of the Program usually falls under one of five basic categories: Federal services, natural resources, pollution control, marine industry, and large-scale environmental issues.

The Science, Education, and Transportation Program is responsible for work on a variety of topics, ranging from transportation and infrastructure to the newer issues of science policy and education, Science policy considers viability of the U.S. scientific enterprise, as well as allocation and decision-methods available to the Congress to support and manage research. Research in education, while concentrating on schools, also includes studies using technology for alternative learning environments.

The Telecommunication and Computing Technologies Program is responsible for assisting Congress in developing national policies related to telecommunications, information, microelectronics, software, and computer technologies. The Program's responsibilities include monitoring the research



The Division comprises three programs: Oceans and Environment; Science, Education, and Transportation; and Telecommunication and Computing Technologies.



and development of new information technologies and assessing the implications of these technologies for the American industry and the public.

FY1991 Activities

The diversified nature of the subjects the Division covers made it particularly useful in the legislative process of the 102d Congress. The Division released two major environmental studies during the year, both of which were used heavily in Congressional debate. Its study of defense nuclear waste was significant in developing such legislative proposals as the Federal Facilities Compliance Act and measures incorporated into the Department of Defense authorization act. The assessment of global climate change assisted Congress in the consideration of more than 150 bills dealing with some aspect of climate change.

OTA transportation studies played a prominent role in legislative action in FY1991. The study on infrastructure technology, management, and financing provided major impetus for consideration of dramatically new surface transportation legislation. The analysis of issues related to tiltrotor aircraft and

magnetic levitation vehicles was valuable in assisting committees in determining funding, OTA's work on federally funded research has been instrumental in assisting the House Science, Space, and Technology Committee's Task Force on the Health of Research.

The Division released a major assessment of rural telecommunications issues in FY1991 which has been instrumental in legislation relevant to the Rural Electrification Administration. The Division's work on automated record checks for Firearm purchasers was critical in the debate on significant new crime legislation.

CHANGING BY DEGREES, STEPS TO REDUCE GREENHOUSE GASES, FEBRUARY 1991
Requested by:
Senate Committee on Environment and Public Works
Senate Committee on Commerce, Science, and Transportation

COMPLEX CLEAN UP.
THE ENVIRONMENTAL LEGACY OF NUCLEAR WEAPONS PRODUCTION, FEBRUARY 1991
Long-Lived Legacy Managing High-Uvel and Transuranic Waste at the DOE Nuclear Weapons Complex- Background Paper, May 1991
Requested by:
Senate Committee on Armed Services
House Committee on Merchant Marine and Fisheries
House Committe on Interior and Insular Affairs

FINDING THE RX FOR MANAGING MEDICAL WASTE, FEBRUARY 1991
Requested by:
House Committee on Science, Space, and Technology

BIOREMEDIATION FOR MARINE OIL SPILLS—BACKGROUND PAPER, MAY 1991
Requested by:
Technology Assessment Board

DELIVERING THE GOODS: PUBLIC WORKS TECHNOLOGIES, MANAGEMENT, AND FINANCING, APRIL 1991
Requested by:
Senate Committee on Environment and Public Works
Senate Committee on Commerce, Science, and Transportation

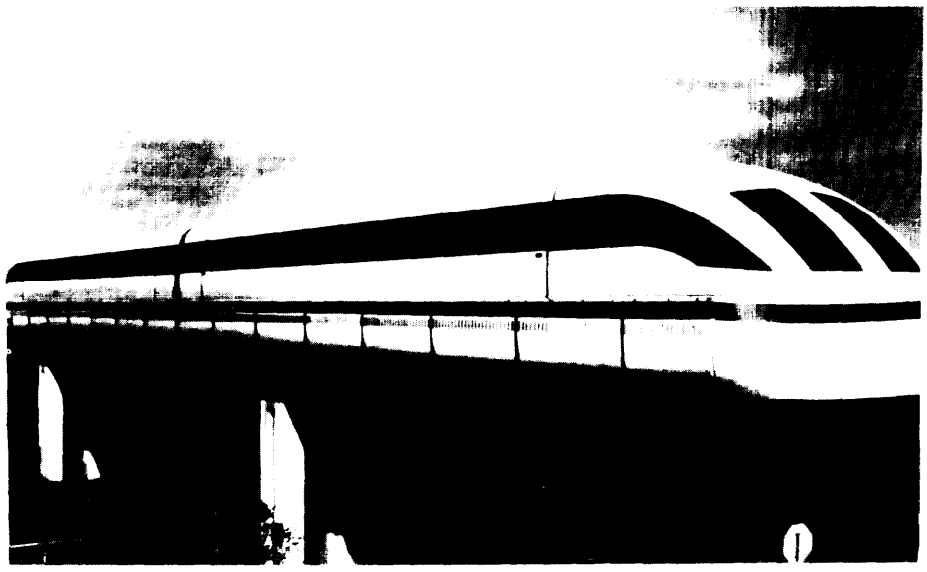
FEDERALLY FUNDED RESEARCH: DECISIONS FOR A DECADE, MAY 1991
Requested by:
House Committee on Science, Space, and Technology

MOVING AHEAD: 1991 SURFACE TRANSPORTATION LEGISLATION, JUNE 1991
Requested by:
Senate Committee on Environment and Public Works

SEEKING SOLUTIONS. HIGH-PERFORMANCE COMPUTING FOR SCIENCE—BACKGROUND PAPER, MARCH 1991
Requuested by:
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

RURAL AMERICA AT THE CROSSROADS: NETWORKING FOR THE FUTURE, MAY 1991
Requested by:
Joint Economic Committee

AUTOMATED RECORD CHECKS OF FIREARM PURCHASERS: ISSUES AND OPTIONS, JULY 1991
Requested by:
Senate Committee on the Judiciary



317-734 - 92 - 7 : QL *3*

Work in Progress at Year-End

More than 45 projects were in progress during fiscal year 1991. In addition, 16 new studies were undertaken.

This section lists the titles of assessments underway or in press, as of September 30, 1991.

ENERGY, MATERLAILS, AND INTERNATIONAL SECURITY DIVISION

Energy and Materials Program

- Technological risks and opportunities for future U.S. energy supply and demand
- New energy technologies in developing countries
- U.S. energy efficiency: past trends and future opportunities
- Materials technology: integrating environmental goals with product design
- Renewable energy technology: research development and commercial prospects
- Aging nuclear powerplants: life attainment, license extension and decommissioning

Industry, *Technology, and Employment Program*

- Competing economies: America, Europe, and the Pacific Rim
- Technology opportunities for economic conversion
- U.S.-Mexico trade, technology, and investment
- American industry and the environment: implications for trade and U.S. competitiveness

International Security and Commerce Program

- Technologies for START agreement
- Technology against terrorism
- Managing the Nation's defense industrial strength in a changing security environment
- Policy body armor standards and testing

HEALTH AND LIFE SCIENCES DIVISION

Biological Applications Program

- New developments in neuroscience
- Biotechnology in a global economy
- Cystic fibrosis: implications of population screening
- Research on risk assessment of chemical carcinogens
- Technologies for understanding the root causes of substance abuse and addiction

Food and Renewable Resources Program

- Emerging agricultural technology: issues for the 1990s
- Forest service planning: accommodating uses, producing outputs, and sustaining ecosystems
- Agricultural alternatives to coca production
- Non-indigenous species in the United States

Health Program

- Monitoring of mandated veteran studies
- Drug labeling in developing countries
- Federal response to AIDS: congressional issues
- Adolescent health
- Government policies and pharmaceutical research and development
- Evaluation of the Oregon Medicaid Proposal
- Home intravenous and immunosuppressive drug therapies under the Medicare Program
- Appointment and monitoring of the prospective payment assessment commission and the physician payment review commission
- Technology, insurance and health care system
- Defensive medicine and the use of medical technology
- Policy issues in the prevention and treatment of osteoporosis

SCIENCE, INFORMATION, AND NATURAL RESOURCES DIVISION

Oceans and Environment Program

- Medical waste and other ''non-hazardous" solid waste issues

Science, Education, and Transportation Program

- Schools, kids, and measurement: technologies of assessment
- New ways: tilt rotor aircraft and magnetically levitated vehicles
- Technologies for literacy
- Intercity bus access for individuals with disabilities
- Aviation research, technology development, and implementation: looking to the future

Telecommunication and Computing Technologies Program

- Information technology and research
- Computer software and intellectual property: meeting the challenges of technological change and global competition
- Miniaturization technologies
- Federal telecommunications for the 21st century: transforming the delivery of government services

Technology Assessment Advisory Council

The Technology Assessment Advisory Council (TAAC) was established by OTA'S statute, and members are appointed by OTA'S congressional Technology Assessment Board (TAB). The council advises TAB and the Director on issues and other matters related to science, technology, and technology assessment.

TAAC Members

CHASE N. PETERSON, *Chairman*
Dr. Peterson, formerly President, is a Professor of Medicine at the University of Utah. He practiced medicine at the Salt Lake Clinic and taught at the LDS Hospital and University of Utah Medical School until his appointment as Dean of Admissions and Financial Aids at Harvard College. There he also served as Vice President for Alumni Affairs and Development. Dr. Peterson returned to the University of Utah in 1978 as Vice President for Health Sciences, and has served as University President from 1983-1991.

JOSHUA LEDERBERG,
Vice Chairman
Dr. Lederberg, former President, is now Professor at Rockefeller University. He is the former Chairman of the Department of Genetics at Stanford University School of Medicine. He is a member of the National Academy of Sciences and is a Nobel Laureate in Physiology and Medicine.

LEWIS M. BRANSCOMB
Dr. Branscomb is the Albert Pratt Public Service Professor at Harvard's John F. Kennedy School of Government. He is a former executive of International Business Machines. Prior to joining IBM, he was the Director of the National Bureau of Standards.

MICHEL T. HALBOUTY
Mr. Halbouty is Chairman of the Board of Michel T. Halbouty Energy Co. in Houston, Texas. Prior to establishing his company, he was a chief geologist and petroleum engineer with Glenn H. McCarthy and also with Yount-Lee Oil Co.

NEIL E. HARL
Dr. Harl is the Charles F. Curtiss Distinguished Professor of Economics at Iowa State University, where he has served on the faculty since 1964.

JAMES HUNT
Dr. Hunt is the chancellor of the University of Tennessee Health Science Center in Memphis. He previously served as the Dean of Medicine for the University and as Chairman of the Department of Medicine at the Mayo Clinic.

HENRY KOFFLER
Dr. Koffler, formerly President, is a Professor of Biochemistry and Microbiology at the University of Arizona. He previously served on the faculties of the University of Massachusetts, University of Minnesota, and Purdue University.

MAX LENNON
Dr. Lennon is President of Clemson University. He is the former Vice President for Agricultural Administration and Executive Dean for Agriculture at the Ohio State University. He previously served as Dean of Agriculture at the University of Missouri and Associate Dean and Professor at Texas Tech University.

JOHN F.M. SIMS
Dr. Sims is Vice President of Marketing for Usibelli Coal Mine, Inc. He previously served as Director of the Office of Mineral Development with the Alaska Department of Commerce and Economic Development. Dr. Sims also taught Geological Engineering at the University of Alaska-Fairbanks.

MARINA v.N. WHITMAN
Dr. Whitman is Vice President and Group Executive for Public Affairs Staff Group at General Motors Corporation. She previously served as Vice President and Chief Economist at General Motors. She also taught at the University of Pittsburgh.

Statutory Members

CHARLES A. BOWSHER
Mr. Bowsher is Comptroller General of the United States and Director of the U.S. General Accounting Office.

JOSEPH E. ROSS
Mr. Ross is Director of the Congressional Research Service, U.S. Library of Congress.



The Distinguished Service Award is given to those individuals who have made notable outstanding contributions to OTA and the accomplishment of OTA'S mission. Nominations are made by all OTA staff, and employees in all job categories are eligible. A rotating Employee Recognition Committee selects the recipients. The following OTA staff were honored with the Distinguished Service Award for 1991 at the Employee Recognition Reception, October 3. 1991:

Peter Blair, Program Manager, Energy and Materials Program
Larry Bond, Senior Systems Analyst, Telecommunications & Information Systems
Kerry Kemp, Senior Analyst, Health and Life Sciences Division
Peter Johnson, Senior Associate, Oceans and Environment Program

- John P. Andelin, Assistant Director, Science, Information, and Natural Resources
  California Institute of Technology
  1991 Distinguished Alumni
- John H. Gibbons, Director
  Federation of American Scientists
  1990 Public Service Award
  American Physical Society
  1991 Leo Szilard Award
- Linda G. Roberts, Senior Associate, Science, Education, and Transportation Program
  Electronic Learning magazine,
  Educator of the Decade

The National Association of Government Communicators conducts the Blue Pencil Competition as an annual recognition of outstanding government communications projects and their producers. Entries are judged on writing, editorial content, layout and design, achievement of purpose and cost-effectiveness, This year three OTA reports were recognized in the Blue Pencil Competition:

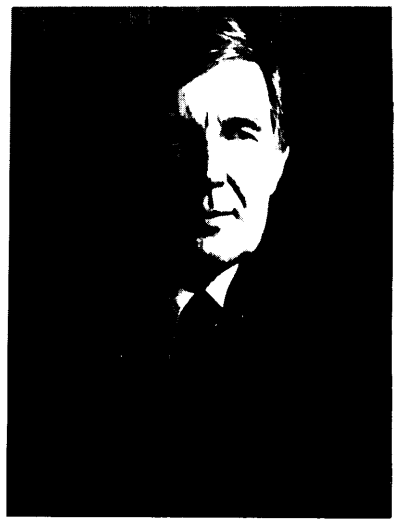
- Genetic Monitoring and Screening in the Workplace, Biological Applications Program, Margaret Anderson, Project Director—Second Place in the Publication for Technical Audience Category

- Electronic Bulls and Bears: U.S. Securities Markets and Information Technologies, Telecommunication and Computing Technologies Program, Vary Coates, Project Director—Honorable Mention in the Monographs Category
- Rural America at the Crossroads: Net working for the Future, Telecommunication and Computing Technologies Program, Linda Garcia, Project Director—Honcrable Mention in the Monographs Category

In April 1991, the Technology Assessment Board established the Morris K. Udall Fellowship Program in honor of the retiring congressman from Arizona who served 30 years in the House of Representatives. Udall, one of the founders of OTA, had been a member of the Technology Assessment Board since February 6, 1973. He served as chairman during the 96th, 98th and 10Oth Congresses and as Vice Chairman during the 97th and 99th Congresses.

Udall contributed significantly to the work and direction of OTA. ''Congressman Udall has supported, defended, and guided the OTA with great dignity, humor, wisdom, and sensitivity, " said John H. Gibbons, Director of OTA, in announcing the new program. ''We are surely saddened to see him retire. We express profound thanks for giving such full measure to public service.

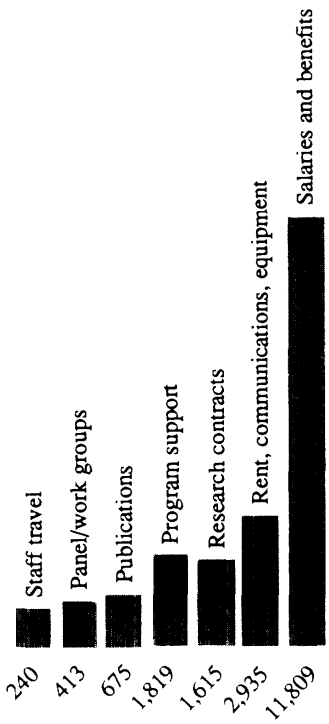
The Udall Fellowship Program carries on the OTA Confessional Fellowship Program and is awarded to up to six individuals each year for a 1-year appointment at OTA. Qualified candidates must demonstrate exceptional ability in areas needed in OTA'S work, such as the physical or biological sciences, engineering, law, economics, environmental and social sciences, and public policy. Candidates must have significant experience in technical fields or management or have completed research at the doctoral level.



Jacqueline Corrigan, Health Program
David Reeker, Health Program
Kathy Hudson, Food and Renewable Resources Program

Carol Edwards, Science, Education, and Transportation Program

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Fiscal year '91 breakdown
(in thousands)

OFFICE OF THE *DIRECTOR*

John H. Gibbons, *Director*
Susanne Baehtel, Executive *Assistant*
Holly Gwin *General Counsel*
Barbara Murphy, *Division Assistant*
Gilda Squire, *Secretary*

Congressional and Public Affairs

James Jensen *Director, Congressional Affairs*
Jean McDonald, *Director, Press Affairs*
Barbara Ketchum, *Administrative Secretary*
Karen Piccione, *Administrative Assistant*
Eugenia Ufholz, *Congressional Affairs Officer*

ENERGY, MATERIALS, AND INTERNATIONAL SECURITY DIVISION

Lionel S. Johns, *Assistant Director*
Beth Alexiou, *Division Assistant*
Henry Kelly, *Senior Associate*

Energy and Materials Program

Peter Blair, *Program Manager*
Tina Aikens, *Secretary*
Samuel Baldwin, *Senior Analyst*
Pidge Chapman, Office *Administrator*
Alan Crane, *Senior Associate*
Joy Dunkerley, Senior *Analyst*
Gregory Eyring, *Senior Analyst*
Karen Larsen, *Senior Analyst*
Linda Long, *Administrative Secretary*
John Newman, *Senior Analyst*
Steven Plotkin, *Senior Associate*
Robin Roy, *Senior Analyst*

Industry, Technology, and Employment Program

Audrey Buyrm *Program Manager*
John Alic, *Senior Associate*
Wendell Fletcher, *Senior Analyst*
Kitty Gilhman, *Senior Associate*
Julie Gorte, *Senior Associate*
Carol Guntow, Office *Administrator*
William Keller, *Senior Analyst*
Gretchen Kolsrud, *Senior Associate*
Robert Weissler, *Senior Analyst*
Diane White, *Administrative Secretary*

International Security and Commerce Program

Alan Shaw, *Program Manager*
Jacqueline Boykin Office *Administrator*
Michael Callaham, *Senior Analyst*
Arthur Charo, Senior Analyst
Gerald Epstein, *Senior Analyst*
Anthony Fainberg, *Senior Associate*
Thomas Karas, Senior Associate
Jack Nunn, *Senior Analyst*
Louise Staley, Administrative Secretary
Christopher Waychoff, *Analyst*
Ray Williamson, *Senior Associate*

HEALTH AND LIFE SCIENCES DIVISION

Roger Hendman, *Assistant Director*
Barbara Murphy, *Division Assistant*
Kerry Kemp, *Analyst*

Biological Applications Program

Michael Gough, *Program Manager*
Margaret Anderson, Analyse
Joyce Brentley, *Analyst*
Laura Lee Hall, *Analyst*
Kathi Hanna, *Senior Analyst*
Jacqueline Keller, *Research Assistant*
Jene Lewis, *Secretary*
David Liskowsky, *Senior Analyst*
Margaret McLaughlin *Analyst*
Robyn Nishimi, *Senior Analyst*
Kevin O'Connor, *Senior Analyst*
Cecile Parker, Office *Administrator*
Linda Rayford, *Administrative Secretary*

Food and Renewable Resources Program

Walter E. Parham, *Program Manager*
Patricia Durana, *Analyst*
Nellie Hammond, *Administrative Secretary*
Alison Hess, *Senior Analyst*
Nathaniel Lewis, Office *Administrator*
Michael Phillips, *Senior Associate*
Carolyn Swann, *PC Specialist*
Robin White, *Analyst*
Phyllis Windle, *Senior Associate*

Health Program

Clyde J. Behney, *Program Manager*
Jackie Corrigan, *Senior Analyst*
Virginia Cwalina, Office *Administrator*
Denise Dougherty, *Senior Associate*
Jill Eden, *Senior Analyst*
Hellen Gelband, *Senior Associate*
Michael Gluck *Senior Analyst*
Marion Grochowski, *Secretary*
Maria Hewitt, *Senior Analyst*
Katie Maslow, *Senior Analyst*
Robert McDonough, *Senior Analyst*
Elizabeth Moliter, *Research Assistant*
Eileen Murphy, *PC Specialist*
Elaine Power, *Senior Analyst*
Judith Wagner, *Senior Associate*
Leah Wolfe, *Research Analyst*

OTA Staff as of September 1991

SCIENCE, INFORMATION, AND NATURAL RESOURCES DIVISION

John Andelin, *Assistant Director*
Christopher Clary, *Division Assistant*

Oceans and Environment Program

Robert Niblock *Program Manager*
Kathleen Beil, Office *Administrator*
Rosina Bierbaum, *Senior Associate*
Robert Friedman, *Senior Associate*
Emilia Govan, *Senior Analyst*
Joan Harn, *Senior Analyst*
Peter Johnsorn, *Senior Associate*
Howard Levenson, *Senior Associate*
Tara O'Toole, *Senior Analyst*
German Reyes, *Analyst*
Beth Robinson, Analyst
Sally Van Aller, *Administrative Secretary*
William Westermeyer, *Senior Analyst*

Science, Education, and Transportation Program

Nancy Carson, *Program Manager*
Jonathan Atkin *Analyst*
Daryl Chubin, *Senior Associate*
Tamara Cyrnanski, *Administrative Secretary*
Kevin Dopart, *Senior Analyst*
Marsha Fenn, Office *Administraror*
Michael Feuer, *Senior Analyst*
Kathleen Fulton, *Senior Analyst*
Gay Jackson, *PC Specialist*
Edith Page, *Senior Associate*
Linda Roberts, *Senior Associate*

Telecommunication and Computing Technologies Program

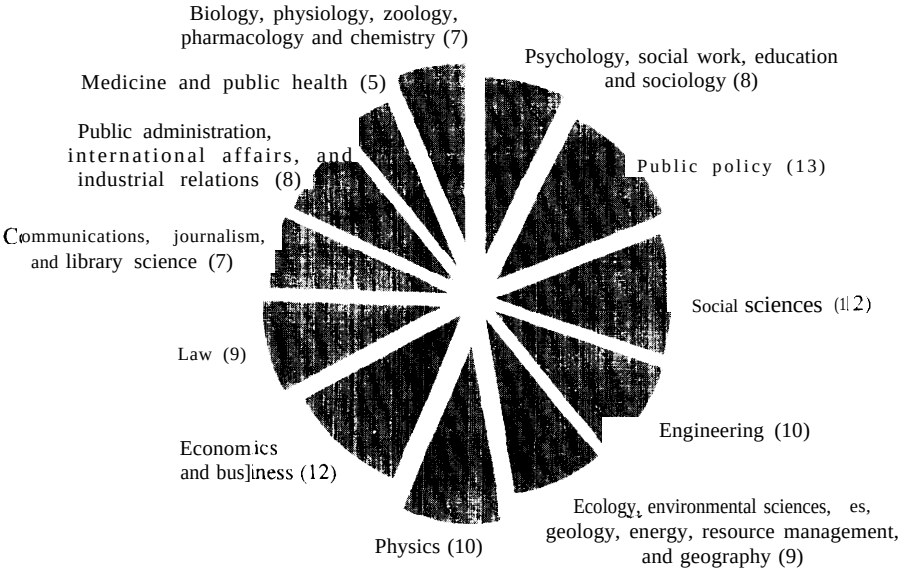
James Curlin, *Program Manager*
Karen Bandy, *Senior Analyst*
Alan Buzacott, *Analyst*
Vary Coates, *Senior Associate*
Elizabeth Emanuel, Office *Administrator*
Linda Garcia, *Senior Analyst*
Karolyn St. Clair, *PC Specialist*
Joan Winston *Senior Analyst*
Fred Wood, Senior Associate
David Wye, *Analyst*
Jo Anne Young, *Secretary*

OPERATIONS DIVISION

Bart McGarry, *Operations Manager*

Finance and Administrative Services

Claude Bowen, *Director, Finance* and Administrative *Services*
Diann Hohenthaner, *Contract Specialist*



OTA is composed of 143 permanent staff members of which 75 percent are analytical and 25 percent are administrative.

Budget and Finance

Carolyn Harris, *Budget and Finance Officer*
Carolyn Datcher, *Senior Accounting Technician*
Frances Hemingway, *Senior Finance Analyst*
Carrie Miller, *Accounting Technician*

Information Management and Publishing Services

Martha Dexter, *Director, Information Management and Publishing Services*

Information Marketing

Debra Datcher, *Information Marketing Officer*

Publishing Office

Katie S. Boss, *Manager, Publishing Services*
Dorinda Edmondson, *Electronic Publishing Specialist*
J. Christine Onrubia, *Graphic Designer/ Illustrator*

Telecommunications and Information Systems

Sylvester Boyd, *Manager, Telecommunications and Information Systems*
Larry Bond, *Senior Systems Analyst*
Mary Beth Breitbach, *Systems Support* Specialist
Darcel Copeland, *Software-c Systems Specialist*
Brenda Hahn, *Systems Support Analyst*
Philip Jackson, *Senior Systems Integrator*

Information Center

Gail Kouril, *Manager, Information Services*
Debra McCurry, *Information Specialist*
Linda Trout *Reference Librarian*
Keith West, *Information Technician*

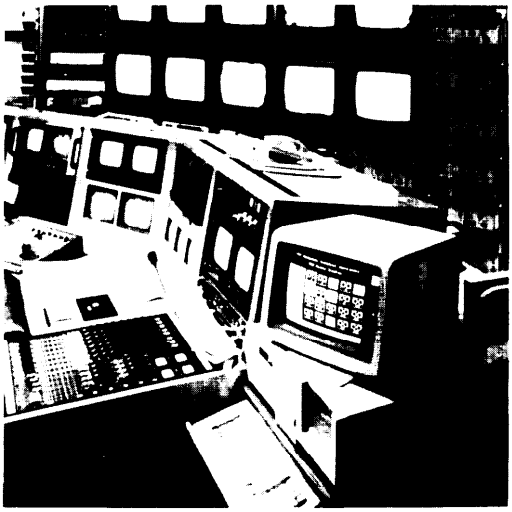
Personnel Office

William Norris, *Personnel Director*
Lola Craw, *Personnel Specialist*
Laura Ellinger, *Administrative Assistant*

Medical Services

Janet Hammond

Information Technology and OTA



The Office of Technology Assessment is an information resource for Congress. Within OTA itself, information management and technology are a high priority in gathering information, analyzing it, and producing high-quality reports for the Congress. In FY1991, OTA emphasized the importance of information management by reorganizing the Operations Division to include a group, Information Management and Publishing Services, which combines the Telecommunications and Information Systems office, the Information Center, the Publishing Office, and the Information Marketing office. The group is responsible for office automation support, information retrieval and research services, publishing services, and dissemination of OTA information and products.

The introduction of microcomputer technology in office systems has dramatically affected the quality and productivity of OTA. Since the first personal computer was purchased in 1984, the number of publications produced by OTA has increased from an average of 35 in 1984 to an average of 45-50 in 1991. Gradually, each OTA staff workstation was equipped with a personal computer and a local area network was established. The advantages this system has brought include more efficient communication of information within the agency, higher productivity for research staff, a higher proportion of research staff to support staff, and streamlined publishing services.

Information technology in OTA also includes sophisticated use of information retrieval technology, including online access to research databases from each workstation and research use of CD-ROM databases in the Information Center. In FY1991, OTA gained access for each workstation to the Internet international research network, advancing our abilities to communicate with the research community worldwide.

Looking to the future, OTA will continue to explore the leading edge of information technology for improvements in our own productivity and dissemination of information. Electronic delivery of OTA publications via online information systems and international research networks is currently being explored. Advanced systems for transfer of information and communication within the legislative branch are in the planning stages with the coordination of offices and agencies across Capitol Hill. OTA does more than assess technology-the application of new technologies in producing high-quality, cost-efficient information for the Congress is a top priority.

Advisory Panel Members*

Energy and Materials Prorgram

ENERGY, TECHNOLOGY AND THE ENVIRONMENT IN DEVELOPING COUNTRIES ADVISORY PANEL

Harry G Barnes, Jr , *Chairman*
Exceutive Director
Critical Languages & Area Studies Consortium

Irma Adelman
Professor
Department of Agriculture and Resource Economics
University of Califormia, Berkeley

Jeffrey Anderson
Director
Comparative Country Analysis
Insttitue of International Finance

Edward S. Ayensu
President
Pan-African Union for Science & Technology

Gerald Barnes
Manager
International Regulations Department
General Motors

Mohamed T El-Ashry
Director of Environment
World Bank

Erik Hansen
Principal Technical Advisor
Bureau of Program Policy & Evaluation
United Nations Development Programmed

Carl N. Hodges
Director
Enviromental Research Laboratory
University of Arizona

Amory Lovins
Director
Research Department
Rocky Mountain Institute

Mohan Munasinghe
Chief
Environment Department
World Bank

Henry Normam
Executive director
Volunteers in Technical Assistance

Mrs. Waafas Ofosu-Amaah
Project Director
Network

R.K. Pachauri
Director
Data Energy Research Institute

D. Lou Peoples
Senior Vice President
RCG/Hagler, Bailly, Inc.

Gabriel Sanchez.-Slcna
Executivc Director
OLADE

Kirk R. Smith
Program Coordinator
Risk, Resources, & Development
Environment & Policy Institute

Irving Snyder
Director
Research and Developmcnt
Dow Chemical Co.

Thomas B Stoel, Jr.
Private Consultant

Lu Yingzhong
Professor
Professional Analysis Inc.

Montague Yudehman
Senior Fellow
World Wildlife Fund and
The Conservation Foundation

Jack W. Wilkinson
Chief Economist & Director
International Economics
Sun Refining & Marketing Co.

Robert H Williams
Senior Research Scientist
Center for Energy and Environmental Studies
Princeton University

Eugene Zeltmann
Manager
Trade & Industry Associations
General Electric Co

ENERGY TECHNOLOGY CHOICES: SHAPING OUR FUTURE ADVISORY PANEL

John Sampson Toll, *Chairman*
President
Universities Research Association, Inc.

Charles A. Berg
Professor & Chairman of Mechnical Engineering
Department of Mechanical Engineering
Northwestern University

James H Caldwell, Jr
Consultant

Daniel A. Dreyfus
Vice President
Strategic Analysis & Energy Forecasts
Gas Research Institute

Frederick J. Ellart
Consultant

David Lee Kulp
Manager
Fuel Economy Planning & Compliance
Ford Motor Co.

Jessica Mathews
Vice President and Director of Research
World Resources Institute

Edwin Rothschild
Citizen Action
Citizen/Labor Energy Coalition

Maxine Savitz
Director
Garrett Ceramic Components
Garrett Processing Co.

Jack W. Wilkinson
Chief Economist & Director
International Economics
Sun Refining & Marketing Co.

Mason Willrich
Senior Vice President
Corporate Planning and Information Systems
Pacific Gas & Electric Enterprise

MATERIALS TECHNOLOGY: INTEGRATING ENVIRONMENTAL GOALS WITH PRODUCT DESIGN ADVISORY PANEL

Indira Nair, Chairman
Associate Head
Department of Engineering and Public Policy
Carnegie Mcllon University

Frank van den Akker
Head
Department of Environmental technology
Ministry of Housing, Physical Planning. and the Environment
The Netherlands

Hanvey Alter
Manager
Resources Policy Department
U.S. Chamber of Commerce

David Chittick
Vice President
Environment and Safety Engineering
AT&T

**Affiliations are at time of appointment to panel or workshop.*

Michael G. DeCata
Manager
Materials Management
GE Plastics

Michael A. Gallo
Professor
Environmental and Community Medicine
University of Medicine & Dentistry of New Jersey

Robert Garino
Director
Commodities
Institute of Scrap Recycling Industries

Gil Gavlin
President
Gavlin Associates, Inc.

Denis Hayes
Chair and CEO
(member Energy Foundation)
Green Seal

Kenneth Hunnibell
Professor and Head
Industrial Design Department
Rhode Island School of Design

Richard L. Klimisch
Executive Director
Environmental Activities Staff
General Motors Corporation

Michael H. Levin
Counsel
Nixon, Hargrave, Devans & Doyle

Stewart Mosberg
Senior Director of Client Services
Walter Dorwin Teague Associates, Inc.

Thomas Rattray
Associate Director
Product Packaging Development
Procter & Gamble Co.

Clifford S. Russell
Director
Vanderbilt Institute for Public Policy Studies
Vanderbilt University

Mary T. Sheil
Senior Policy Analyst
Office of Policy Planning
New Jersey Department of Environmental Protection and Energy

T.S. Sudarshan
Technical Director
Materials Modifications, Inc.

Don Theissen
Director
Corporate Product Responsibility
3M Co.

Jeanne Wirka
Private Consultant

Dennis A. Yao
Commissioner
Federal Trade Commission

U.S. ENERGY EFFICIENCY ADVISORY PANEL

James F. Gibbons, *Chairman*
Dean
School of Engineering
Stanford University

Dale Compton
Professor
School of Industrial Engineering
Purdue University

Marc Cooper
Director of Research
Consumers Federation of America

Robert deHaan
Director of Engineering
Amana Refrigeration Company

Daniel A. Dreyfus
Vice President
Strategic Planning & Analysis
Gas Research Institute

Clark W. Gellings
Director
Customer Systems Division
Electric Power Research Institute

David B. Goldstein
Senior Scientist
Natural Resources Defense Council

Cheryl Barrington
Commissioner
Maine Public Utilities Commission

Kenneth Hickman
Vice President
Applied Systems Division
The York International Corporation

Edward McLnerney
Chief Engineer
GE Appliance Division
General Electric Company

Alan Miller
Professor
Center for Global Change
University of Maryland-College Park

Gary Nakarado
Commissioner
Public Utility Commission of Colorado

John W. Rowe
President and Chief Executive Officer
New England Electric System

Maxine Savitz
Director
Garrett Ceramic Components
Garrett Processing Company

Sherwood Smith
Chairman & President
Carolina Power & Light Company

Richard Tracey
Director of Engineering Services
Ryland Homes

B.C. Way Caster
Vice President & General Manager
Hydrocarbons & Energy Department
Dow Chemical

Irvin White
President
New York State Energy R&D Authority

Mason Willrich
President
Pacific Gas and Electric Enterprise

James L. Wolf
Executive Director
The Alliance to Save Energy

Eric R. Zausner
President
Strategic Performance Management

LIFESTYLE AND PERSONAL ENERGY USE WORKSHOP

OIL SUPPLY DISRUPTION OIL REPLACEMENT CAPABILITY WORKSHOP

Industry, Technology, and Employment Program

TECHNOLOGY AND ECONOMIC CONVERSION TO A PEACETIME ECONOMY ADVISORY PANEL

MeGeorge Bundy, *Chairman*
Professor Emeritus of History
New York University

Michael Borrus
Deputy Director
Berkeley Roundtable on International Economics
University of California

Kent H. Bowen
Co-Director
Leaders for Manufacturing
Massachusetts Institute of Technology

Charles Bradford
Director
Apprenticeship, Employment Training & Rehabilitation Programs
International Association of Machinists and Aerospace Workers

Anne Buck
Manager
Economic Adjustment Unit
California Department of Commerce

Robert S. Carlton
Vice President
Community and Business Services
Jackson Community College, Jackson, MI

Philip W. Cheney
Vice president of Engineering
Raytheon Co.

Robert S. Cooper
President, CEO & Chairman of Board of Directors
Atlantic Aerospace Electronics Corp.

Jerry Crowley
Chairman & CEO
Trechouse, Ltd.

Christopher Demisch
Partner
McFadden Brothers

Robert C. Dynes
Professor
Department of Physics
University of California San Diego

Craig Fields
president
Chief Technical Officer & Chief Operating Officer
Microelectronics & Computer Technology Corp.

Arthur Flathers
Director of Independent R&D
GE Aerospace

Douglas Fraser
Professor
Labor Studies
Wayne State University

Gregory S. Frisby
Chief Executivc Officer
Frisby Airborne Hydraulics

Donald A. Hicks
professor
Political Economy
The Bruton Center for Development Studies
University of Texas, Dallas

Frank J. Lewis
Senior Vice President and Special Assistant to Chairman & CEO
Harris Corp.

John P. McTaguc
Vice President for Technical Affairs
Ford Motor Co.

Ira Magaziner
President
SJS Inc.

Ann Markusen
Professor
Director of the Project on Regional & Industrial Economics
Rutgers University

Basal Papadales
Director
Survivability Enhancement programs
Boeing Military Airplanes

Suzanne Teegarden
Executivc Director
Industrial Services Program
State of Massachusetts

Charles D. Vollmer
Vice President
Technology Initiatives
Booz-A1len and Hamilton, Inc.

TECHNOLOGY, Innovation AND U.S. TRADE-PART 3 ADVISORY PANEL

Peter J. Sharfman, *Chairman*
Director of Policy Analysis
The MITRE Corp.

Alice Amsden
Graduate Faculty
Economics Department
New School of Social Research

Marietta L. Baba
professor of Anthropology and Acting Chair
Department of Anthropology
Wayne State University

Wolfgang Demisch
Managing Director
Director of Research
UBS Securities

Jean-Jacques Duby
Group Director
Science & Technology
BM—Europe

Mark Eaton
Director
International & Associates Program
Microelectronics & Computer Technology Corp.

John T. Eby
Executive Director
Corporate Strategy
Ford Motor Co.

Larry French
Consultant

Glen S. Fukushima
Director
Public Policy & Business Development
AT&T Japan Ltd.

Edward Graham
Research Fellow
Institute for International Economics

Joseph A. Greenwald
Attorney/Consultant

Howard Greis
president
Kinefac Corp.

Peter Hall
professor
Government
Harvard University

F. William Hawley
Director
Governmental Relations for International Affairs
Citicorp

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WORKSHOP ON MAGLEV AND TILTROTOR TRANSPORTATION: RESEARCH, DEVELOPMENT AND TESTING NEEDS AND THE FEDERAL ROLE

WORKSHOP ON MAGLEV AND TILTROTOR TRANSPORTATION: SYSTEM CONCEPTS, ECONOMIES, AND REGULATORY ISSUES

OTA ACT

Public Law 92-484
92d Congress, H.R. 10243
October 13, 1972
An Act

To establish an Office of Technology Assessment for the Congress as an aid in the identification and consideration of existing and probable impacts of technological application; to amend the National Science Foundation Act of 1950; and for other purposes.

Technology Assessment Act of 1972.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Technology Assessment Act of 1972."

Findings and Declaration of Purpose

SEC. *2. The* Congress hereby finds and declares that:

(a) As technology continues to change and expand rapidly, its applications are-

(1) large and growing in scale; and

(2) increasingly extensive, pervasive, and critical in their impact, beneficial and adverse, on the natural and social environment.

(b) Therefore, it is essential that, to the fullest extent possible, the consequences of technological applications be anticipated, understood, and considered in determination of public policy on existing and emerging national problems.

(c) The Congress further finds that:

(1) the Federal agencies presently responsible directly to the Congress are not designed to provide the legislative branch with adequate and timely information, independently developed, relating to the potential impact of technological applications, and

(2) the present mechanisms of the Congress do not and are not designed to provide the legislative branch with such information.

(d) Accordingly, it is necessary for the Congress to-

(1) equip itself with new and effective means for securing competent, unbiased information concerning the physical, biological, economic, social, and political effects of such applications; and

(2) utilize this information, whenever appropriate, as one factor in the legislative assessment of matters pending before the Congress, particularly in those instances where the Federal Government may be called upon to consider support for, or management or regulation of, technological application.

Establishment of the office of Technology Assessment

SEC. 3. (a) In accordance with the findings and declaration of purpose in section 2, there is hereby created the Office of Technology Assessment (hereinafter referred to as the "Office') which shall be within and responsible to the legislative branch of the Government.

(b) The Office shall consist of a Technology Assessment Board (hereinafter referred to as the ' 'Board') which shall formulate and promulgate the policies of the Office, and a Director who shall carry out such policies and administer the operations of the Office.

Technology Assessment Board.

(c) The basic function of the Office shall be to provide early indications of the probable beneficial and adverse impacts of the applications of technology and to develop other coordinate information which may assist the Congress. In carrying out such function, the Office shall:

Duties.

(1) identify existing or probable impacts of technology or technological programs;

(2) where possible, ascertain cause-and-effect relationships;

(3) identify alternative technological methods of implementing specific programs;

(4) identify alternative programs for achieving requisite goals:

(5) make estimates and comparisons of the impacts of alternative methods and programs;

(6) present findings of completed analyses to the appropriate legislative authorities;

(7) Identify areas where additional research or data collection is required to provide adequate support for the assessment and estimates described in paragraph (1) through (5) of this subsection; and

(8) undertake such additional associatcd activities as the appropriate authorities specified under subsection (d) may direct.

(d) Assessment activities undertaken by the Office may be initiated upon the request of:

(1) the chairman of any standing, special, or select committee of either House of the Congress, or of any joint committee of the Congress, acting for himself or at the request of the ranking minority member or a majority of the committee members:

(2) the Board: or

(3) the Director, In consultation with the Board.

(e) Assessments made by the Office, including Information, surveys, studies, reports, and findings related there to, shall be made available to the initiating committee or other appropriate committees of the Congress. In addition, any such information, surveys, studies, reports, and findings produced by the Office may be made available to the public except where-

Information, availability.

(1) to do so would violate security statutes; or

(2) the Board considers it necessary or advisable to withhold such information in accordance wit h one or more of the numbered paragraphs in section 552(b) of title 5, United States Code.

81 stat. 54.

Technology Assessment Board

Membership.

SEC. 4. (a) The Board shall consist of thirteen members as follows:

(1) six Members of the Senate, appointed by the President pro tempore of the Senate, three from the majority party and three from the minority party;

(2) six Members of the House of Representatives appointed by the Speaker of the House of Representatives, three from the majority party and three from the minority party; and

(3) the Director, who shall not be a voting member.

Vacancies.

(b) Vacancies in the membership of the Board shall not affect the power of the remaining members to execute the functions of the Board and shall be filled in the same manner as in the case of the original appointment.

Chairman and vice chairman.

(c) The Board shall select a chairman and a vice chairman from among its members at the beginning of each Congress. The vice chairman shall act in the place and stead of the chairman in the absence of the chairman. The chairmanship and the vice chairmanship shall alternate between the Senate and the House of Representatives with each Congress. The chairman during each, even numbered Congress shall be selected by the Members of the House of Representatives on the Board from among their number. The vice chairman during each Congress shall be chosen in the same manner from that House of Congress other than the House of Congress of which the chairman is a Member.

Meetings.

Subpena.

(d) The Board is authorized to sit and act at such places and times during the sessions, recesses, and adjourned periods of Congress, and upon a vote of a majority of its members, to require by subpoena or otherwise the attendance of such witnesses and the production of such books, papers, and documents, to administer such oaths and affirmations, to take such testimony, to procure such printing and binding, and to make such expenditure, as it deems advisable. The Board may make such rules respecting its organization and procedures as it deems necessary, except that no recommendation shall be reported from the Board unless a majority of the Board assent. Subpoenas may be issued over the signature of the chairman of the Board or of any voting member designated by him or by the Board, and maybe served by such person or persons as may be designated by such chairman or member. The chairman of the Board or any voting member thereof may administer oaths or affirmations to witnesses.

Director and Deputy Director

Appointment.

Compensation.

SEC. 5. (a) The Director of the Office of Technology Assessment shall be appointed by the Board and shall serve for a term of six years unless sooner removed by the Board. He shall receive basic pay at the rate provided for level III of the Executive Schedule under section 5314 of title 5, United States Code.

83 Stat. 863.

(b) In addition to the powers and duties vested in him by this Act, the Director shall exercise such powers and duties as may be delegated to him by the Board.

(c) The Director may appoint with the approval of the Board, a Deputy Director who shall perform such functions as the Director may prescribe and who shall be Acting Director during the absence or incapacity of the Director or in the event of a vacancy in the office of Director. The Deputy Director shall receive basic pay at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code.

Employment restriction.

(d) Neither the Director nor the Deputy Director shall engage in any other business, vocation, or employment than that of serving as such Director or Deputy Director, as the case may be; nor shall the Director or Deputy Director, except with the approval of the Board, hold any office in, or act in any capacity for, any organization, agency, or institution with which the Office makes any contractor other arrangement under this Act.

Authority Office

SEC. 6. (a) The Office shall have the authority, within the limits of available appropriations, to do all things necessary to carry out the provisions of this Act, including, but without being limited to, the authority to-

(1) make full use of competent personnel and organizations outside the Office, public or private, and form special ad hoc task forces or make other arrangements when appropriate;

Contracts.

(2) enter into contracts or other arrangements as may be necessary for the conduct of the work of the Office with any agency or instrumentality of the United States, with any State, territory, or possession or any political subdivision thereof, or with any person, firm, assiciat ion, corporation, or educational institute ion, with or without reimbursement, without performance or other bonds, and without regard to section 3709 of the Revised Statutes (41 U.S.C. 5);

(3) make advance, progress, and other payments which relate to technology assessment without regard to the provisions of section 3648 of the Revised Statutes (31 U.S.C. 529);

80 stat. 499; 83 stat. 190.

(4) accept and utilize the services of voluntary and uncompensated personnel necessary for the conduct of the work of the Office and provide transportation and subsistence as authorized by section 5703 of title 5, United States Code, for persons serving without compensation;

(5) acquire by purchase, lease, loan, or gift, and hold and dispose of by sale, lease, or loan, real and personal property of all kinds necessary for or resulting from the exercise of authority granted by this Act; and

(6) prescribe such rules and regulations as it deems necessary governing the operation and organization of the Office.

Recordkeeping.

(b) Contractors and other parties entering into contracts and other arrangements under this section which involve costs to the Government shall maintain such books and related records as will facilitate an effective audit in such detail and in such manner as shall be

prescribed by the Office, and such books and records (and related documents and papers) shall be available to the Office and the Comptroller General of the United States, or any of their duly authorized representatives, for the purpose of audit and examination.

(c) The Office, in carrying out the provisions of this Act, shall not, itself, operate any laboratories, pilot plants, or test facilities.

Agency cooperation.

(d) The Office is authorized to secure directly from any executive department or agency information, suggestions, estimates, statistics, and technical assistance for the purpose of carrying out its functions under this Act. Each such executive department or agency shall furnish the information, suggestions, estimates, statistics, and technical assistance directly to the Office upon its request.

Personnel detail.

(e) On request of the Office, the head of any executive department or agency may detail, with or without reimbursement, any of its personnel to assist the Office in carrying out its functions under this Act.

(f) The Director shall, in accordance with such policies as the Board shall prescribe, appoint and fix the compensation of such personnel as may be necessary to carry out the provisions of this Act.

Establishment of the Technology Assessment Advisory Council

Membership.

SEC. *7.* (a) The Office shall establish a Technology Assessment Advisory Council (hereinafter referred to as the "Council"). The Council shall be composed of the following twelve members:

(1) ten members from the public, to be appointed by the Board; who shall be persons eminent in one or more fields of the physical, biological, or social sciences or engineering or experienced in the administration of technological activities, or who may be judged qualified on the basis of contributions made to educational or public activities;

(2) the Comptroller General; and

(3) the Director of the Congressional Research Service of the Library of Congress.

Duties.

(b) The Council, upon request by the Board, shall—

(1) review and make recommendations to the Board on activities undertaken by the Office or on the initiation thereof in accordance with section 3(d);

(2) review and make recommendations to the Board on the findings of any assessment made by or for the Office; and

(3) undertake such additional related talcs as the Board may direct.

Chairman and Vice Chairman.

(c) The Council, by majority vote, shall elect from its members appointed under subsection (a)(1) of this section a Chairman and a Vice Chairman, who shall serve for

such time and under such conditions as the Council may prescribe. In the absence of the Chairman, or in the event of his incapacity, the Vice Chairman shall act as Chairman.

(d) The term of office of each member of the Council appointed under subsection(a)(1) shall be four years except that any such member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term. No person shall be appointed a member of the Council under subsection (a)(l) more than twice. Terms of the members appointed under subsection (a)(1) shall be staggered so as to establish a rotating membership according to such method as the Board may devise.

Term of office.

(c)(1) The members of the Council other than those appointed under subsection (a)(1) shall receive no pay for their services as members of the Council, but shall be allowed necessary travel expenses (or, in the alternative, mileage for use of privately owned vehicles and per diem in lieu of subsistence at not to exceed the rate prescribed in sections 5702 and 5704 of title 5, United State Code), and other necessary expenses incurred by them in the performance of duties vested in the Council, without regard to the provisions of subchapter 1 of chapter 57 and section 5731 of title 5, United States Code, and regulations promulgated thereunder.

Travel expense.

80 stat. 498: 83 stat. 190, 5 USC 5701.

(2) The members of the Council appointed under subjection (a)(1) shall receive compensation for each day engaged in the actual performance of duties vested in the Council at rates of pay not in excess of the daily equivalent of the highest rate of basic pay set forth in the General Schedule of section 5332(a) of title 5, United Statee Code, and in addition shall be reimbursed for travel, subsistence, and other necessary expenses in the manner provided for other members of the Council under paragraph (1) of this subsection.

Compensation.

SEC. 8. (a) To carry out the objectives of this Act. the Librarian of Congress is authorized to make available to the Office such services and assistance of the Congressional Research Service as may be appropriate and feasible.

(b) Such services and assistance made available to the Office shall include, but not be limited to, all of the services and assistance which the Congressional Reserch Service is otherwise authorized to provide to the Congress.

(c} Nothing in this section shall alter or modify any services or responsibilities, other than those Performed for the Office, which the Congressional Research Service under law peforms for or on behalf of the Congress. The Librarian is, however, authorized to establish within the Congressional Research Service such additional divisions, groups, or other organizational entities as may be necessary to carry out the purpose of this Act.

(d) Services and assistance made available to the Office by the Congressional Research Service in accordance with this section maybe provided with or without reimbursement from funds of the Office, as agreed upon by the Board and the Librarian of Congress,

Utilization of the General Accounting Office

SEC. 9. (a) Financial and administrative services (including those related to budgeting, accounting, financial reporting, personnel, and procurement) and such other services as may be appropriate shall be provided the Office by the General Accounting Office.

(b) Such services and assistance to the Office shall include, but not be limited to, all of the services and assistance which the General Accounting Office is otherwise authorized to provide to the Congress.

(c) Nothing in this section shall alter or modify any services or responsibilities, other than those performed for the Office, which the General Accounting Office under law performs for or on behalf of the Congress.

(d) Services and assistance made available to the Office by the General Accounting Office in accordance with this section maybe provided with or without reimbursement from funds of the Office, as agreed upon by the Board and the Comptroller General.

Coordination with the National Science Foundation

Scientific programs, financing.
92 Stat. 360.

SEC. 10. (a) The Office shall maintain a continuing liaison with the National Science Foundation with respect to-

(1) grants and contracts formulated or activated by the Foundation which are for purpose of technology assessment; and

(2) the promotion of coordination in areas of technology assessment, and the avoidance of unnecessary duplication or overlapping of research activities in the development of technology assessment techniques and programs.

(b) Section 3(b) of the National Science Foundation Act of 1950, as amended (42 U.S.C. 1862(b)), is amended to read as follows:

''(b) The Foundation is authorized to initiate and support specific scientific activities in connection with matters relating to international cooperation, national security, and the effects of scientific applications upon society by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such activities. When initiated or supported pursuant to requests made by any other Federal department or agency, including the Office of Technology Assessment, such activities shall be financed whenever feasible from funds transferred to the Foundation by the requesting official as provided in section 14(g), and any such activities shall be unclassified and shall be identified by the Foundation as being undertaken at the request of the appropriate official.

64 Stat. 156;
32 Stat. 365.
42 USC 1873.

Annual Report

SEC. 11. The Office shall submit to the Congress an annual report which shall include, but not be limited to an evaluation of technology assessment techniques and identification, insofar as may be feasible, of technological areas and programs requiring future analysis. Such report shall be submitted not later than March 15 of each year.

Appropriations

SEC. 12. (a) To enable the Office to carry out its powers and duties, there is hereby authorized to be appropriated to the Office, out of any money in the Treasury not otherwise appropriated, not to exceed $5,000,000 in the aggregate for the two fiscal years ending June 30, 1973, and June 30, 1974, and thereafter such sums as may be necessary.

(b) Appropriations made pursuant to the authority provided in subsection (a) shall remain available for obligation, for expenditure, or for obligation and expenditure for such period or periods as may be specified in the Act making such appropriations.

Approved October 13, 1972.

LEGISLATIVE HISTORY:

HOUSE REPORTS: NO. 92-469 (Comm. on Science and Astronautics) and
No. 92-1436 (Comm. of Conference).

SENATE REPORT No. 92-1123 (Comm. on Rules and Administration).

CONGRESSIONAL RECORD, Vol. 118 (1972):

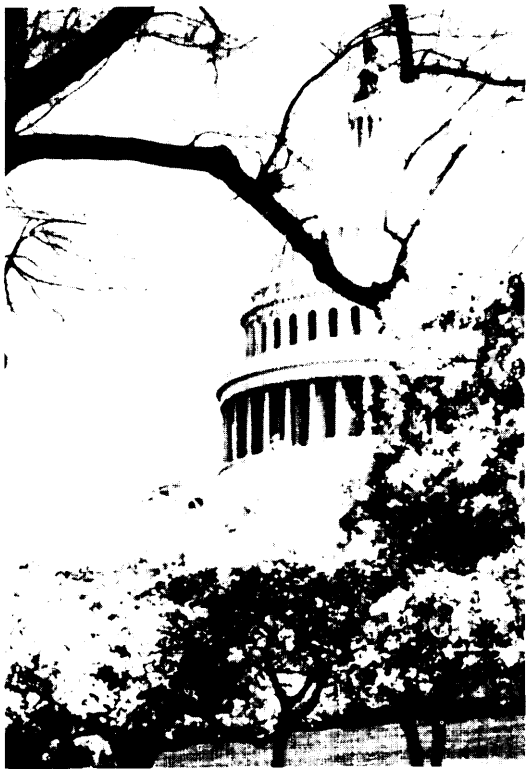
Feb. 8, considered and passed House.

Sept. 14, considered and passed Senate, amended.

Sept. 22, Senate agreed to conference report.

Oct. 4, House agreed to conference report.

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