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 92-484. It describes the activities of the Office in Fiscal Year 1990 within the context of the legislative agenda of the 101st Congress and the events in the United States and the world during 1990.

CONTENTS

1 Chairman’s Statement
2 Vice Chairman’s and TAAC Chairman’s Statement
3 Director’s Statement
4 Organization and Operations
6 Energy, Materials, and International Security Division
8 Health and Life Sciences Division
10 Science, Information, and Natural Resources Division
12 Work in Progress
13 Technology Assessment Advisory Council (TAAC)
14 OTA Staff
16 Advisors and Panel Members
35 OTA Act

*Cover photo—Hall of Columns, U.S. Capitol
The past year has been characterized by enormous changes and challenges across the globe. But while public attention necessarily focuses on the crisis in the Persian Gulf and the extraordinary events unfolding in the Soviet Union, Eastern Europe, and Germany, other profound developments are occurring in less visible ways: in the tropical rain forests and the polar ice caps, in the micro-manipulation of genetic material and the microprocessing of optical impulses, and in innumerable other areas of environmental change and scientific and technological progress.

Congress perforce must focus on the immediate challenges inundating the Nation. But it also must be prepared to deal with the next wave of challenges and the ones coming after that. That was why we created OTA in 1972: to provide Congress with advance notice and analysis of the positive and negative aspects of impending technological developments—and to delineate the pros and cons of the policy options for responding to them.

OTA has been fulfilling this task in an exemplary fashion, as evidenced by this past, highly productive year. In fiscal year 1990, OTA released 15 major assessment reports, along with 45 more specialized reports, and presented testimony at 49 congressional hearings. The scope and significance of OTA's contributions may be illustrated by several examples.

OTA's report, Linking for Learning: A New Course for Education, provides Congress with valuable options for utilizing technology to chart a new course for American education. The report entitled Worker Training: Competing in the New International Economy depicts the connections between workplace technology, worker training, and international competitiveness. The report compares U.S. investment in training with that of its competitors, along with the relative skill levels of their respective workforces; and provides Congress with a range of policy options for improving U.S. performance. And the OTA report, Genetic Witness: Forensic Uses of DNA Tests, has become the leading text in that rapidly developing field of law enforcement.

These few examples illustrate the variety of high-quality OTA reports this year that have contributed to congressional understanding and decisionmaking on complex issues involving technology. As a founder and first Chairman of OTA, I can attest to the fact that the agency has indeed fulfilled the expectations we evinced at its establishment.
Vice Chairman's Statement

It has been my great pleasure to serve as Vice Chairman of the Technology Assessment Board.

More than ever, our Nation’s economic well-being depends on our technology policy. Historically, technology has always been one of the chief advantages that the United States has over its economic competitors. Our scientists and engineers gave us innovation, and in turn these innovations made our economy a thriving one.

This can still be the case. With a wise and well-designed technology policy, the United States can maintain a healthy economy, and meet the new century in a strong competitive position.

I believe that OTA can play a critical role in that process. More than ever, the Congress will need sound advice on science and technology. Over the past few years, OTA has matured as an institution. It gives the Congress a reasonable and sober evaluation of complicated issues, and helps point the way to wiser policymaking.

I look forward to the decade ahead, and to a continuing association with this fine agency.

Congressman Clarence E. Miller

Technology Assessment Advisory Council's Statement

It has been my distinct pleasure to assume the Chair of the Technology Assessment Advisory Council this year.

I believe this is an important and exciting crossroads in OTA’s history. Over the past decade, OTA has matured into an organization of impressive strength, one which is better able than ever to serve as an adviser to Congress. OTA has achieved this stature by avoiding any major mistakes, while developing an impressive reputation for quality and reliability despite the controversy and complexity surrounding the issues it has addressed.

It is my hope in the future that OTA will continue on this path, with particular attention to the major, overarching issues that face the Nation. The United States faces major choices and obstacles in such fields as health care, education, energy, economic competitiveness, and the environment, just to name a few. Because Congress had developed an agency with a rare ability to synthesize large complex public policy issues, OTA’s unique capabilities should be utilized by the Congress to look at the “big picture.” None of our policy dilemmas exist in a vacuum: education affects competitiveness, which impacts the cost of health care. While OTA should not expand in size, the size of its targets should.

I look forward to the coming year, the beginning of a critical decade for our Nation’s history. If that history is a guide, technology policy will be a critical factor in our future success or failure.

Chase N. Peterson
Years ago, as a bench physicist, I spent a lot of time tracking down clues about the elements that make up our solar system. It was a fascinating adventure that helped confirm the hypothesis that the earth’s material came from the very “heart” of a star. The star slowly evolved over hundreds of millions of years, but then ended its own life in a supernova—a massive explosion. The “natural” radioactivity that is around more than 4 billion years later is convincing evidence of that ancient, cataclysmic event.

Many lessons come from such scientific studies, but two are very appropriate for this brief essay. First, history—whether it be astronomical or human—does not unfold smoothly. It can be influenced profoundly and even dominated by rare, sudden and traumatic events. We find it easier to think and analyze things in terms of slow, incremental change but, however important that kind of change may be, it is insufficient when dealing with reality.

The second lesson is that it can be very difficult to anticipate sudden change. In astrophysics, we now understand the evolution and fate of stars. However, sudden physical events are vastly easier to predict than predicting sudden human events. Because human events are increasingly driven by technology change OTA must understand where technology is going. Knowing how technology interacts with human society is essential if one hopes to anticipate or affect the outcome of change, whether it be gradual or sudden.

In 1789, Madison wrote to Jefferson, “We are in a wilderness without a single footstep to guide us. Future generations will have an easier time.” Today, we have more footsteps to guide us than did our Founding Fathers—lessons of historical precedents, insights of knowledge, and power of analysis such as that which OTA strives to provide. The coming year will undoubtedly be filled with extraordinary events, including some that will try our national spirit and our commitments to future generations, so it is crucial to identify and evaluate options from which wise choices can be made.

OTA will continue to function as a shared analytical staff of diverse experts focusing our energies on understanding highly complex and controversial scientific and technological issues; we will contribute to resolving discrepancies and inconsistencies; and we will identify alternative ways to solve problems. OTA’s success evolves from insistence on fully understanding the issues—technical, economic, social, ethical, political. We identify and incorporate the perspectives of the stakeholders. We stipulate the issues that have reached consensus, and we delineate options for policymakers.

OTA is needed in the legislative branch because it fills a critical communication gap between specialists and policymakers. OTA reduces the shadow cast by technical uncertainty and disagreement among experts. OTA distills and translates technical information for laymen and then steps back to witness the exquisite process of debate, negotiation, and resolution within Congress.

JOHN H. GIBBONS
Created by the Technology Assessment Act of 1972 [86 Stat. 797], OTA is an agency of the legislative branch of the Federal Government (a copy of the Act is found on p. 35). OTA’s primary function is to provide congressional committees with assessments or studies that identify the range of likely positive and negative consequences, social as well as physical, of policy alternatives affecting the uses of technology.

In providing assistance to Congress, OTA identifies: existing or probable impacts of technology or technological programs; 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. Finally, we present findings of completed analyses to the appropriate legislative authorities and, whenever possible, undertake such additional associated activities as may be necessary.

The Act provides for a bipartisan Technology Assessment Board, a director, and such other employees and consultants as may be necessary to conduct the Office’s 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 1990, Sen. Edward H. Kennedy (D-Massachusetts) and Rep. Clarence Miller (R-Ohio) 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; communication and information technologies; oceans and environment; and science, education, and transportation.

Staff of the Operations Division supports the analytical work of the Office. These offices—Administrative Services, Contracts, Budget and Finance, Information Center, Personnel, Publishing, and Telecommunications and Information Systems—provide 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 Office within Publishing handles public dissemination of OTA reports. The Congressional and Public Affairs Office staff play a critical role in the Office by assisting in coordinating OTA's work with various committees of the House and Senate, providing effective communications between OTA management and staff and the Technology Assessment Board and Technology Assessment Advisory Council, and by assuring wide dissemination of OTA's publications on Capitol Hill and to the press. (General Information on OTA and availability of OTA publications is listed on the inside back cover.)

ACCOMPLISHMENTS IN FY1990

Fiscal year 1990 represented a time of great change in the world and in the United States. The fall of the Iron Curtain was followed by the extraordinary demise of centrally planned governments in the U.S.S.R. and Eastern Europe. This major world event was driven by the irresistible force of technology change, which has revolutionized the world's economy. Over the past 5 years OTA studies of the impacts of technology on the economy, environment and security have made it clear that this revolution was inevitable.

But OTA has also shown that, however unpleasant and unpopular it is to confront, our own economic system is in trouble. We are spelling out not only the challenge to stay competitive and successful in tomorrow's world, but also indentifying specific ways to success. That task consumes a major portion of our work. It ranges from START verification studies to ways to strengthen our workers to compete for jobs in a global economy.

The Iraqi invasion of Kuwait brought in a new conflict strongly linked to energy resources but complicated by the availability of Western arms and technology. While OTA did not predict these events, much of our work—completed and ongoing—is directly relevant to understanding what to do about it and how to avoid such situations in the future. Our studies of international defense technology cooperation and the flow of arms are directly relevant. Our detailed analyses of energy supply and demand have provided new insight into the murky world of energy strategic studies, inducing ways to wean ourselves from our overdependence on Middle East oil through diversification of energy sources and greatly increased efficiency of use, via advanced technology. However the present conflict plays out, these issues will be the heart of informed decision making about our Nation's future economy, environment and security.

During FY1990, OTA delivered 45 formal publications to Congress, including assessment reports, special reports, and several background papers. As of September 30, 1990, 36 approved studies were in progress. As an integral part of carrying out assessments, OTA also provided, during the course of projects as well as after delivery, expert advice, briefings, testimony, and results of OTA assessments to Committees matched to their specific needs and the congressional agenda.

OTA served over 50 different Committees and Subcommittees of both Houses, typically in response to bipartisan requests.
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 most assessments have considered employment impacts, and employment and training issues have 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.
ACCOMPLISHMENTS IN FY1990

The Division contributed considerably to the debate on major issues in the 101st Congress. Its work in energy-related issues affected the deliberations on alternative fuels provisions in the Clean Air Act, and work on automotive fuel economy directly affected legislative consideration of CAFE standards. The ongoing project updating a 1984 study on U.S. vulnerability of an oil import curtailment has provided critical background information for Congress during the current Middle East crisis.

Environmental work in the area of waste reduction and Superfund has continued to assist Congress in understanding hazardous waste and cleanup concerns. Work on manufacturing and the economy has provided critical information for Congress on the need for the development and diffusion of commercially important technologies, and OTA’s assessment of worker training has been used extensively by Committee staff in drafting legislation focusing on technological training and education for America’s workers to help them compete in the global economy.

Finally, the Division’s work in international security and space has broadened the debate in Congress. Studies directed at defense technology were essential to Committee staff in drafting the defense authorization bills and the Defense Production Act. OTA’s study on seismic verification of nuclear testing influenced the deliberations which finally ratified the 1974 Treaty with the U.S.S.R. on Limitation of Underground Nuclear Weapons Tests (the Threshold Test Ban Treaty). And studies on space technology have been critical in assisting Congress in evaluating future investment in space exploration.

HIGH-TEMPERATURE SUPERCONDUCTIVITY IN PERSPECTIVE (R), MAY 1990
Requested by:
Senate Committee on Energy and Natural Resources
Senate Committee on Governmental Affairs
Senate Committee on Commerce, Science, and Transportation and the Subcommittee on Science, Space, and Technology
House Committee on Science, Space, and Technology

PHYSICAL VULNERABILITY OF ELECTRIC SYSTEMS TO NATURAL DISASTERS AND SABOTAGE (R), JUNE 1990
Requested by:
Senate Committee on Governmental Affairs

ENERGY USE AND THE U.S. ECONOMY (BP), JUNE 1990
Requested by:
House Committee on Energy and Commerce, Subcommittee on Energy and Power

THE ROYALTY MANAGEMENT PROGRAM’S AUDITING AND FINANCIAL SYSTEM (BP), JULY 1990
Requested by:
Senate Committee on Energy and Natural Resources

NONFERROUS METALS: INDUSTRY STRUCTURE (BP), SEPTEMBER 1990
Requested by:
Senate Committee on Energy and Natural Resources, Subcommittee on Mineral Resources Development and Production

REPLACING GASOLINE: ALTERNATIVE FUELS FOR LIGHT-DUTY VEHICLES (SR), SEPTEMBER 1990
Requested by:
House Committee on Energy and Commerce, Subcommittee on Energy and Natural Resources

COMING CLEAN: SUPERFUND PROBLEMS CAN BE SOLVED (R), OCTOBER 1989
Requested by:
House Committee on Public Works and Transportation and the Subcommittee on Investigations and Oversight
House Committee on Energy and Commerce and the Subcommittee on Transportation, Tourism, and Hazardous Materials
House Committee on Government Operations and the Subcommittee on Environment, Energy, and Natural Resources
Senate Committee on Environment and Public Works and the Subcommittee on Superfund and Environmental Oversight

MAKING THINGS BETTER: COMPETING IN MANUFACTURING (R), FEBRUARY 1990
Requested by:
Senate Committee on Finance and the Subcommittee on International Finance and Monetary Policy
Senate Committee on Banking, Housing, and Urban Affairs
House Committee on Banking, Finance, and Urban Affairs

WORKER TRAINING: COMPETING IN THE NEW INTERNATIONAL ECONOMY (R), SEPTEMBER 1990
Requested by:
House Committee on Education and Labor
Senate Committee on Labor and Human Resources
Senate Committee on Finance

THE CONTAINMENT OF UNDERGROUND NUCLEAR EXPLOSIONS (SR), OCTOBER 1989
Requested by:
House Committee on Interior and Insular Affairs
Senator Orrin G. Hatch, as a member of the Technology Assessment Board

AFFORDABLE SPACECRAFT: DESIGN AND LAUNCH ALTERNATIVES (BP), FEBRUARY 1990
Requested by:
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

ACCESS TO SPACE: THE FUTURE OF U.S. SPACE TRANSPORTATION SYSTEMS (R), APRIL 1990
Requested by:
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

ARMING OUR ALLIES: COOPERATION AND COMPETITION IN DEFENSE TECHNOLOGY (SR), MAY 1990
Requested by:
Senate Committee on Armed Services
House Committee on Government Operations

Prior to July 1, 1990, OTA produced several categories of documents (i.e., Reports, Special Reports, Technical Memoranda, Background Papers, Case Studies, Workshop Proceedings, and Staff Papers). This list is inclusive of the various types of documents.

page 7
The Division comprises three programs: Biological Applications; Food and Renewable Resources; and Health.

The Biological Applications Program assesses state-of-the-art technologies arising from the cutting edge of biological science. Within its broad responsibility to assist Congress in understanding biomedical technologies, the Program explores possible consequences of these 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. In addition, the Program has extensive experience in these fields as they relate to problems of developing countries.

The Health Program's charter is reflected in three primary types of efforts: 1) assessments of clinical and general health care technologies and related policy areas; 2) assessments in the area of environmental and occupational health; and 3) collaboration with, and assistance to, other OTA programs on health-related issues. The Program’s responsibilities also include mandated reviews of protocols for studies of Agent Orange and of health effects among military personnel exposed to atomic bomb tests.

ACCOMPLISHMENTS IN FY1990

The Health and Life Sciences Division, with its broad range of jurisdiction, contributed heavily to congressional consideration of issues in the 101st Congress. The new technologies involved in genetic forensics were evaluated, and the resulting report served as valuable background to Congress in developing legislation. OTA’s work on the needs of persons with dementia and Alzheimer’s disease has been essential in assisting Committees to draft legislation on long-term care.
The 1990 Farm Bill was one of the most heavily debated in the 101st Congress, and OTA's reports and ongoing assessments on the state of American agriculture played an integral part in educating legislators in the complex issues involved. Our work in international agricultural issues were critical in funding various U.S. Agency for International Development programs, especially in its Office of Foreign Disaster Assistance.

And the OTA Health Program broadened its scope this year with major assessments of rural health care and adolescent health care, two studies affecting the quality of medical care for millions of Americans. Its ongoing work on various aspects of the AIDS crisis have been essential in keeping legislators informed on this most critical of health care issues.

NEUROTOXICITY: IDENTIFYING AND CONTROLLING POISONS OF THE NERVOUS SYSTEM (R), APRIL 1990
Requested by:
House Committee on Appropriations
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation, Subcommittee on Science, Technology, and Space

GENETIC WITNESS: FORENSIC USES OF DNA TESTS (R), JULY 1990
Requested by:
Senate Committee on Labor and Human Resources

CONFUSED MINDS, BURDENED FAMILIES: FINDING HELP FOR PEOPLE WITH ALZHEIMER'S AND OTHER DEMENTIAS (R), JULY 1990
Requested by:
Senate Committee on Labor and Human Resources
House Committee on Energy and Commerce and the Subcommittee on Health and the Environment

AGRICULTURAL RESEARCH AND TECHNOLOGY TRANSFER POLICIES FOR THE 1990s (SR), MARCH 1990
Requested by:
Senate Committee on Agriculture, Nutrition, and Forestry
House Committee on Agriculture

BENEATH THE BOTTOM LINE: AGRICULTURAL APPROACHES TO REDUCE AGRICHEMICAL CONTAMINATION OF GROUNDWATER (R), MAY 1990
Requested by:
House Committee on Agriculture, Subcommittee on Department Operations, Research, and Foreign Agriculture
House Committee on Science, Space and Technology
House Committee on Public Works and Transportation
House Committee on Government Operations, Subcommittee on Environment, Energy, and Natural Resources
House Committee on Interior and Insular Affairs, Subcommittee on Water and Power Resources
Senate Committee on Agriculture, Nutrition, and Forestry

FOREST SERVICE PLANNING: SETTING STRATEGIC DIRECTION UNDER RPA (SR), JULY 1990
Requested by:
House Committee on Agriculture
House Committee on Interior and Insular Affairs, Subcommittee on National Parks and Public Lands
Senate Committee on Agriculture, Nutrition, and Forestry

A PLAGUE OF LOCUSTS (SR), JULY 1990
Requested by:
Senate Select Committee on Indian Affairs

RURAL EMERGENCY MEDICAL SERVICES (SR), NOVEMBER 1989
Requested by:
Senate Rural Health Caucus

INDIAN ADOLESCENT MENTAL HEALTH (SR), JANUARY 1990
Requested by:
Senate Select Committee on Indian Affairs

PREVENTATIVE SERVICES FOR MEDICARE BENEFICIARIES: POLICY & RESEARCH ISSUES (SR), FEBRUARY 1990
Requested by:
House Committee on Ways and Means
Senate Committee on Labor and Human Resources

THE COSTS AND EFFECTIVENESS OF CERVICAL CANCER SCREENING IN ELDERLY WOMEN (BP), FEBRUARY 1990
Requested by:
House Committee on Ways and Means
Senate Committee on Labor and Human Resources

RECOMBINANT ERYTHROPOIETIN: PAYMENT OPTIONS FOR MEDICARE (SR), MAY 1990
Requested by:
House Committee on Ways and Means, Subcommittee on Health

OTA REVIEW OF REPORT TO SECRETARY OF DEPARTMENT OF VETERANS AFFAIRS ON ASSOCIATION BETWEEN ADVERSE HEALTH EFFECTS AND EXPOSURE TO AGENT ORANGE (BP), JULY 1990
Requested by:
House Committee on Veterans Affairs
Senate Committee on Veterans Affairs

THE EFFECTIVENESS OF DRUG ABUSE TREATMENT: IMPLICATIONS FOR CONTROLLING AIDS/HIV INFECTION (BP), SEPTEMBER 1990
Requested by:
Technology Assessment Board
House Committee on Appropriations, Subcommittee on Legislative

COSTS AND EFFECTIVENESS OF COLONRECTAL CANCER SCREENING IN THE ELDERLY (BP), SEPTEMBER 1990
Requested by:
Senate Committee on Labor and Human Resources

HEALTH CARE IN RURAL AMERICA (R), SEPTEMBER 1990
Requested by:
Senate Rural Health Caucus

UNCONVENTIONAL CANCER TREATMENTS (R), SEPTEMBER 1990
Requested by:
House Committee on Energy and Commerce

Prior to July 1, 1990, OTA produced several categories of documents (i.e., Reports, Special Reports, Technical Memoranda, Background Papers, Case Studies, Workshop Proceedings, and Staff Papers). This list is inclusive of the various types of documents.
The Division comprises three programs: Communication and Information Technologies; Oceans and Environment; and Science, Education, and Transportation.

OTA's Communication and Information Technologies Program is responsible for assisting Congress in developing national policies related to telecommunications, information, microelectronics, software, and computer technologies. The core responsibilities of the Program require monitoring the research and development of new information technologies and assessing the technological state-of-the-art in these areas as well as trends in basic research and development.

The 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 the traditional technology assessment issue of transportation to the newer issues of science policy and education. Science policy considers the health of the U.S. scientific enterprise, as well as allocation and decision-methods available to the Congress to support and manage research. Education work concentrates on schools but includes non-school delivery systems as well, and normally focuses on the use of technology to enhance learning.
ACCOMPLISHMENTS IN FY1990

The diversified nature of the subjects which the Division covers made it particularly useful in the legislative process of the 101st Congress. Assessing such controversial topics as stock market information technologies and copyright and home copying ensured its place in the congressional debate.

The Division also tackled some of the most critical environmental issues facing America today, especially in its ongoing assessment of climate modification and global warming. Its studies on solid waste management and marine waste have been critical in development of legislation.

Finally, the Division has contributed heavily to the debate on the use of educational technology and the importance of science education at all levels. Its ongoing assessment of the public works infrastructure will have far-ranging impact on congressional consideration of transportation and public works issues in the 102d Congress.

HIGH PERFORMANCE COMPUTING AND NETWORKING FOR SCIENCE (BP), OCTOBER 1989
Requested by:
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

COPYRIGHT AND HOME COPYING: TECHNOLOGY CHALLENGES THE LAW (R), OCTOBER 1989
Requested by:
House Committee on the Judiciary and the Subcommittee on Courts, Civil Liberties, and Administration of Justice
Senate Committee on the Judiciary and the Subcommittee on Patents, Copyrights, and Trademarks

CRITICAL CONNECTIONS: COMMUNICATION FOR THE FUTURE (R), JANUARY 1990
Requested by:
House Committee on Energy and Commerce

COMPUTER SOFTWARE AND INTELLECTUAL PROPERTY (BP), MARCH 1990
Requested by:
House Committee on the Judiciary, Subcommittee on Courts, Intellectual Property, and the Administration of Justice

THE BIG PICTURE: HDTV AND HIGH-RESOLUTION SYSTEMS (BP), JUNE 1990
Requested by:
Rep. George E. Brown, as a member of the Technology Assessment Board

TRADING AROUND THE CLOCK: GLOBAL SECURITIES MARKETS AND INFORMATION TECHNOLOGY (BP), JULY 1990
Requested by:
House Committee on Government Operations and the Subcommittee on Commerce, Consumer, and Monetary Affairs
House Committee on Energy and Commerce

HELPING AMERICA COMPETE: THE ROLE OF FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION (SR), JULY 1990
Requested by:
House Committee on Science, Space, and Technology

ELECTRONIC BULLS AND BEARS: U.S. SECURITIES MARKETS AND INFORMATION TECHNOLOGY (R), SEPTEMBER 1990
Requested by:
House Committee on Government Operations and the Subcommittee on Commerce, Consumer, and Monetary Affairs
House Committee on Energy and Commerce

FACING AMERICA'S TRASH: WHAT NEXT FOR MUNICIPAL SOLID WASTE (R), OCTOBER 1989
Requested by:
House Committee on Energy and Commerce, Subcommittee on Transportation, Tourism, and Hazardous Materials
Senate Committee on Environment and Public Works, and the Subcommittee on Hazardous Wastes and Toxic Substances

PARTNERSHIPS UNDER PRESSURE: MANAGING LOW-LEVEL RADIOACTIVE WASTE (R), NOVEMBER 1989
Requested by:
Senate Committee on Environment and Public Works

COPYING WITH AN OILED SEA: AN ANALYSIS OF OIL SPILL RESPONSE TECHNOLOGIES (BP), MARCH 1990
Requested by:
Sen. Ted Stevens, as a member of the Technology Assessment Board
House Committee on Merchant Marine and Fisheries, Subcommittee on Coast Guard and Navigation

LINKING FOR LEARNING: A NEW COURSE FOR EDUCATION (SR), NOVEMBER 1989
Requested by:
Senate Committee on Labor and Human Resources
House Committee on Education and Labor

REBUILDING THE FOUNDATIONS: STATE AND LOCAL PUBLIC WORKS FINANCING AND MANAGEMENT (SR), MARCH 1990
Requested by:
Senate Committee on Environment and Public Works
House Committee on Public Works and Transportation

THE USE OF INTEGRITY TESTS FOR PRE-EMPLOYMENT SCREENING (BP), SEPTEMBER 1990
Requested by:
House Committee on Education and Labor

Prior to July 1, 1990, OTA produced several categories of documents (i.e., Reports, Special Reports, Technical Memoranda, Background Papers, Case Studies, Workshop Proceedings, and Staff Papers). This list is inclusive of the various types of documents.
More than 40 projects were in progress during fiscal year 1990, in addition 12 new studies were undertaken.

This section lists the titles of assessments underway or in press, as of September 30, 1990. For a full description of these projects, please refer to the current "Assessment Activities," OTA-PC-105. This pamphlet is available from OTA by calling the Publication's Request Line (202) 224-8996.

ENERGY, MATERIALS, AND INTERNATIONAL SECURITY DIVISION

Energy and Materials Program

- Technological risks and opportunities for future U.S. energy supply and demand
- New energy technologies and developing countries
- U.S. energy efficiency: past trends and future opportunities
- Materials technology: integrating environmental goals with product design

Industry, Technology, and Employment Program

- Europe 1992
- Technology opportunities for economic conversion

International Security and Commerce Program

- Technologies for START agreement
- International collaboration in defense technologies
- Use of technology in countering terrorism
- Managing the Nation’s defense industrial strength in a changing security environment

HEALTH AND LIFE SCIENCES DIVISION

Biological Applications Program

- New developments in neuroscience
- Genetic monitoring & screening in the workplace
- Biotechnology in a global economy
- Policy issues in the prevention and treatment of osteoporosis

Food and Renewable Resources Program

- Beneath the bottom line: agricultural approaches to reduce agrichemical contamination of groundwater
- U.S. universities and development assistance: technical support for agriculture, natural resources, and environment
- Emerging agricultural technology: issues for the 1990s
- Renewable resource planning technologies for public land use
- Agricultural alternatives to coca production

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

SCIENCE, INFORMATION, AND NATURAL RESOURCES DIVISION

Communication and Information Technologies Program

- Information technology and research
- Information age technology and rural economic development
- Computer software and intellectual property: meeting the challenges of technological change and global competition

Oceans and Environment Program

- Changing by degrees: steps to reduce greenhouse gases
- Complex cleanup: the environmental legacy of nuclear weapons production
- Medical waste and other "non-hazardous" solid waste issues

Science, Education, and Transportation Program

- Infrastructure technologies: rebuilding the foundations
- Basic research for the 1990s
- Schools, kids, and measurement: technologies of assessment
- New ways: tilt rotor aircraft and magnetically levitated trains
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 is President of 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 since 1983.

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 is President and 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.

SALLY RIDE
Dr. Ride is Director of the California Space Institute, University of California, San Diego, Scripps Institution of Oceanography. She was a fellow at the Stanford University Center for International Security and Arms Control. She is a former astronaut, and served as a member of the Presidential Commission on the Space Shuttle.

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.
Office of the Director

John H. Gibbons, Director
Susanne Bachtel, Executive Assistant
Holly Gwin, General Counsel
Barbara Murphy, Division Assistant
Gilda Squire, Secretary
Medical Services
Janet Hammond
Congressional and Public Affairs
James Jensen, Director, Congressional Affairs
Jean McDonald, Director, Press Affairs
Denise Crader, Assistant Press Officer
Barbara Ketchum, Secretary

Energy and Materials Program

Peter Blair, Program Manager
Samuel Baldwin, Senior Analyst
Tina Brumfield, Secretary
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, Analyst
Steven Plotkin, Senior Associate
Robin Roy, Senior Analyst

Industry, Technology, and Employment Program

Audrey Buyrn, Program Manager
John Alic, Senior Associate
Wendell Fletcher, Senior Analyst
Kitty Gillman, Senior Associate
Julie Gorte, Senior Analyst
Carol Guntow, Office Administrator
Gretchen Kolsrud, Senior Associate
Kirsten Oldenburg, Senior Analyst
Jennifer Robison, Senior Analyst
Robert Weissler, Senior Analyst
Diane White, Administrative Secretary

International Security and Commerce Program

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

Health and Life Sciences Division

Roger Herdman, Assistant Director
Barbara Murphy, Division Assistant
Kerry Kemp, Analyst

OTA is composed of 143 permanent staff members of which 75 percent are analytical and 25 percent are administrative.
Biological Applications Program
Michael Gough, Program Manager
Margaret Anderson, Analyst
Joyce Brentley, Analyst
Laura Lee Hall, Analyst
Kath Hama, Senior Analyst
Jacqueline Keller, Research Assistant
Jane Lewis, Secretary
David Liskowsky, Senior Analyst
Katie Maslow, 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
Nathan 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
Virginia Cwalina, Office Administrator
Denise Dougherty, Senior Analyst
Jill Eden, Analyst
Helen Gelband, Senior Associate
Michael Gluck, Senior Analyst
Maria Hewitt, Senior Analyst
Carolyn Martin, Secretary
Robert McDonough, Analyst
Eileen Murphy, PC Specialist
Elaine Power, Senior Analyst
Glenda Ruby, Senior Analyst
Pamela Simerly, Analyst
Jane Sisk, Senior Analyst
Judith Wagner, Senior Associate

Science, Information, and Natural Resources Division
John Andelin, Assistant Director
Doris Smith, Division Assistant

Communication and Information Technologies Program
James C. Gough, Program Manager
Karen Bandy, Analyst
Vary Coates, Senior Analyst

Elizabeth Emanuel, Office Administrator
Linda Garcia, Senior Analyst
Jo Anne Price, Secretary
Karolyn St. Clair, Secretary
Joan Winston, Senior Analyst
Fred Wood, Senior Associate

Oceans and Environment Program
Robert Niblock, Program Manager
Kathleen Beil, Office Administrator
Rosina Bierbaum, Senior Analyst
Robert Friedman, Senior Associate
Emilia Gove, Senior Analyst
Joan Harp, Analyst
Peter Johnson, Senior Associate
Howard Levenson, Senior Associate
Tara O'Toole, Senior Analyst
Richard Rapoport, Analyst
Sally Van Allen, Administrative Secretary
William Westernmeyer, Senior Analyst

Science, Education, and Transportation Program
Nancy Carson, Program Manager
Jonathan Atkin, Analyst
Daryl Chubin, Senior Analyst
Tamara Cymanski, Secretary
Kevin Doplan, Analyst
Marsha Perrin, Office Administrator
Michael Feuer, Senior Analyst
Kathleen Fulton, Analyst
Gay Jackson, Administrative Secretary
Edith Page, Senior Associate
Linda Roberts, Senior Associate
David Wye, Analyst

Operations Division
Bart McGarry, Operations Manager

Administrative Services
Thomas P. McGurn, Administrative Officer
Claus Bowen, Director of Contracts
Diann Hohenbauer, Contract Specialist

Operations Services
Catherine Singleton, Manager, and Budget and Finance Officer

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

Fiscal year '90 breakdown (in thousands)

Salaries and benefits

Rent, communications, equipment

Research contracts

Program support

Publications

Panel/work groups

Staff travel

Information Center

Martha Dexter, Manager, Information Services
Debra Datcher, Information Specialist
Gail Kouril, Assistant Manager, Information Services
Debra McCurry, Information Specialist
Amanda Stroud, Information Technician

Personnel Office

William Noller, Personnel Officer
Mary Beth Breithauch, Personnel Assistant
Lola Caw, Personnel Specialist
Denise DeSanctis, Personnel Specialist

Publishing Office

Kathie S. Boss, Publishing Officer
Dorinda Edmondson, Electronic Publishing Specialist
J. Christine Onrubia, Graphic Designer/ Illustrator

Telecommunications and Information Systems

Larry Bond, Senior Systems Analyst
Sylvestor Boyd, Senior Systems Integrator
Brenda Hahn, Software Systems Specialist
Philip Jackson, Senior Systems Analyst
SUPERFUND IMPLEMENTATION ADVISORY PANEL

David Marks, Chairman
Head, Civil Engineering
Massachusetts Institute of Technology

Kirk Brown
Head, Soil and Crop Sciences Department
Texas A&M University

Richard Brownell
Director
Malcolm Pirnie, Inc.

William Child
Manager
Division of Land Pollution Control
Illinois Environmental Protection Agency

Henry Cole
Science and Policy Director
Clean Water Action and National Campaign
Against Toxic Hazards

E. William Colglazier
Director, Waste Management Institute
University of Tennessee

William B. DeVille
Administrator
Inactive and Abandoned Sites Division
Louisiana Department of Environmental Quality

Deborah Hankins
Manager, Remedial Issues
Corporate Environmental Programs
General Electric Corp.

Bob Harris
Principal
ENVIRON Corp.

William N. Hedeman
Esquire
Beveridge & Diamond, P.C.

Robert G. Kissell
Senior Consultant
Engineering Service Division
E.I. du Pont de Nemours & Co., Inc.

Steve Lester
Science Director
Citizens Clearinghouse for Hazardous Waste

William Librizzi
Director, Operations
Hazardous Substance Management Research Center
New Jersey Institute of Technology

George Muhlebach
Director, Environmental Protection
Chiba-Geigy Corp.

Robert N. Ogg
Environmental Engineer
CH2M Hill

Robert B. Pojasek
President
ChemCycle Corp.

Frank J. Veale, Jr.
Manager, Environmental Engineering
Materials & Controls Group
Texas Instruments, Inc.

James N. Welsh
formerly with Shirco

TECHNOLOGY, INNOVATION, AND U.S. TRADE ADVISORY PANEL.

Lewis Branscomb, Chairman
Director
Science, Technology, and Public Policy Project

Kennedy School of Government
Harvard University

Michael Aho
Director, International Trade Project
Council on Foreign Relations

Ralph Gomory
President
The Sloan Foundation

Howard Greis
President
Kinefac Corp.

Joseph Grunwald
Adjunct Professor, Department of Economics
University of California, San Diego

Thomas Hout
Vice President
Boston Consulting Group

Ramchandran Jaikumar
Associate Professor, Production Management
Harvard Business School

Franklin P. Johnson, Jr.
General Partner
Asset Management Co.

Lester C. Krogh
Vice President for Research and Development
Minnesota Mining and Manufacturing

Paul R. Krugman
Professor
National Bureau of Economic Research

Alvin P. Lehnerd
Vice President
Product Development
Steelcase, Inc.

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

Ray Marshall
Professor
L.B.J. School of Public Affairs
University of Texas, Austin

Regis McKenna
Chairman
Regis McKenna, Inc.

Richard S. Morse*
Corporate Director
Tracer Technology, Inc.

*Deceased.
TÉCHNOLOGY, INNOVATION AND U.S. TRADE—PART 3 ADVISORY PANEL

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

Alice Ansden
Professor of Urban Studies
New School of Social Research
Massachusetts Institute of Technology

Marietta L. Baba
Professor of Anthropology and
Associate Dean of the Graduate School
Wayne State University

Wolfgang Demisch
Managing Director
Director of Research
UBS Securities

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

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

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

Larry French
Corporate Vice President
Technology
N.A. Philips

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
Citcorp

Sanford Kane
President & CEO
U.S. Memories

Robert Kuttner
Economics Correspondent
The New Republic

Aleks M. Mikolajczak
Vice President
Technology and New Business
Rohr Industries

Susan Pharr
Professor of Government and Director
U.S.-Japan Relations Program
U.S. Japan Program—Harvard University

Margaret Sharp
Senior Research Fellow
Science Policy Research Unit
University of Sussex, East Sussex, England

Laura Tyson
Professor of Economics
Director of Research, BRIE
University of California, Berkeley

John D. Warner
Vice President
Engineering
Boeing Commercial Airplane Group

James Womack
Principal Research Associate
Center for Technology, Policy & Industrial
Development
Massachusetts Institute of Technology

Stephen Woolcock
Fellow

TRAINING IN THE WORKPLACE
ADVISORY PANEL

Donald N. Frey, Chairman
Professor, Industrial Engineering and Managerial
Sciences
The Technical Institute
Northwestern University

Paul Barton
Associate Director
ETS Policy Information Center
Educational Testing Service

John H. Bishop
Associate Professor
Department of Personnel & Human Resources
Studies
New York State School of Industrial & Labor
Relations
Cornell University, New York City

Walter H. Bruning
Partner
Process Management Institute, Inc.

Anthony P. Carnevale
Chief Economist & Vice President
National Affairs
American Society for Training & Development

Peter S. DiCicco
President, District 2
International Union of Electronics, Electrical,
Technical, Salaried and Machine Workers

Patricia M. Flynn
Professor of Economics
Institute for Research & Faculty Development
Bentley College, Waltham, MA

Badi G. Foster
President
Aetna Institute for Corporate Education

Major General Paul Funk
Commander
3rd Armored Division, New York
United States Army

Robert W. Glover
Senior Research Associate
Center for Study of Human Resources
University of Texas, Austin

Annie Hill
President
Local 7904
Communications Workers of America

Malcolm S. Knowles
Professor Emeritus
North Carolina State University

Harry Lasker
Vice President, New Product Development
Spectrum International

Ira Magaziner
President
SIJS, Inc.

Larry W. McMahan
Vice President, Human Resources Development
Federal Express

James R. Morris
Executive Director
South Carolina State Board for Technical & Comprehensive Education

William Peckstedt
President
Sanford-Lussier, Inc.

Ernest J. Savio
Director, Employee Development Office
Ford Motor Co.

Gail Spangenberg
Vice President, Programs and Operations
Business Council for Effective Literacy
INTERNATIONAL SECURITY AND COMMERCE PROGRAM

ADVANCED SPACE TRANSPORTATION TECHNOLOGIES ADVISORY PANEL

M. Granger Morgan, Chairman
Head, Department of Engineering and Public Policy Carnegie-Mellon University
I.M. Bernstein
Provost and Academic Vice President Illinois Institute of Technology
Michael A. Berta
Assistant Division Manager Government Electronics Systems Division Space and Communications Group Hughes Aircraft Co.
Richard E. Brackeen
President & CEO Matra Aero Space, Inc.
Preston S. Craig
Chief Scientist United Technologies Space Flight Systems
Edward T. Gerry
President W.J. Schafer Associates, Inc.
Jerry Grey
Director, Science and Technology Policy American Institute of Aeronautics and Astronautics
William H. Heiser
Visiting Professor of Aeronautics USAP Academy, Colorado
Otto W. Hoernig, Jr.
Vice President Contel/American Satellite Corp.
Donald B. Jacobs
Vice President, Space Systems Division Boeing Aerospace Co.
John Logsdon
Director Graduate Program in Science, Technology, & Public Policy George Washington University
Hugh F. Loweth
Consultant Annandale, VA
Anthony J. Macina
Program Manager, Onboard Software Systems IBM Federal Systems Division
George B. Merrick
Vice President Engineering & Mission Analysis North American Space Operations Rockwell International Corp.
Alan Parker
Consultant Washington, DC
Gerard Piel
Chairman emeritus Scientific American
Bryce Poe, II
General, USAF (retired) Alexandria, VA
Ben R. Rich
Vice President and General Manager Advanced Development Projects Lockheed Corp.
Sally Ride
Director, California Space Institute University of California, San Diego
Tom Rogers
President The Sopron Foundation
Richard Smith
Senior Vice President JLC Aerospace Corp.
William F.H. Zersen
Associate Program Manager Hughes Aircraft

INTERNATIONAL COLLABORATION IN DEFENSE TECHNOLOGY ADVISORY PANEL

John S. Toll, Chairman
President Universities Research Association, Inc.
David M. Abshire
Vice President, Business Development
John Rogers
President
The Sopron Foundation
Richard Smith
Senior Vice President
JLC Aerospace Corp.
William F.H. Zersen
Associate Program Manager
Hughes Aircraft

MANAGING THE NATION'S DEFENSE INDUSTRIAL STRENGTH IN A CHANGING SECURITY ENVIRONMENT ADVISORY PANEL

Walter B. Slocombe, Chairman
Partner Caplin & Drysdale, Chartered
Richard Bohlen
Senior Vice President Operations Rockwell International Corp.
Robert Calaway
President Resource Management International, Inc.
Gordon Corlew
Vice President Manufacturing All. Systems, Inc.
Jacques S. Gansler  
Senior Vice President  
The Analytic Sciences Corp.  

Julius Harwood  
Consultant  

Harwood Consultant  

William W. Kaufmann  
Professor  
Kennedy School of Government  

P.X. Kelley  
SMC (Re)  
Consultant  

James L. Kroontz  
President & CEO  
Kingsbury Machine Tool Corp.  

John Mearsheimer  
Professor  
Department of Political Science  
University of Chicago  

Thomas L. McNaugher  
Senior Fellow  
The Brookings Institution  

William McNeill  
Professor Emeritus  
University of Chicago  

Joseph Nye  
Director  
Center for International Affairs  
Harvard University  

Donald W. Putnam  
Corporate Director  
Contracts & Technical Analysis  
General Dynamics Corp.  

Jack Ruina  
Professor of Electrical Engineering  
Center for International Studies  
Massachusetts Institute of Technology  

Howard D. Samuel  
President  
Industrial Union Department AFL-CIO  

Wickham Skinner  
Professor Emeritus  
Business Administration  
Harvard University  

James Solberg  
Professor  
Engineering Research Center  
Purdue University  

Gen. William Y. Smith  
President  
Institute for Defense Analyses  

Leonard Sullivan  
Consultant  
System Planning Corp.  

Admiral Harry Train  
Division Manager  
Strategic Research & Management Services Division  
Science Applications International Corp.  

Gen. John W. Vessey, Jr.  
Consultant  

Albert D. Wheelon  
Consultant  

William J. Perry, Ex Officio  
Chairman & CEO  
Technology Strategies and Alliances  

TECHNOLOGIES FOR VERIFYING A STRATEGIC ARMS REDUCTION TREATY ADVISORY PANEL  

Rodney W. Nichols, Chairman  

James Blackwell  
Director, International Security Division  

Meridian Corp.  

Ashon Carter  
Director  
Center for Science & International Affairs  
J.F. Kennedy School of Government  

Harvard University  

Sidney D. Drell  
Professor and Deputy Director  
Stanford Linear ACC Center  

Richard L. Garwin  
IBM Fellow  

TJ. Watson Research Center  

James Goodby  
Distinguished Service Professor  
Carnegie-Mellon University  

Andrew Goodpaster  
Chairman  
The Atlantic Council  

Sidney Graybeal  
Chief Scientist  
Science Applications International Corp.  

Roger Hagengruber  
Vice President for Exploratory Systems  
Sandia National Laboratories  

William R. Harris  
International Lawyer  
The RAND Corp.  

Bobby Inman  
Chairman and Chief Executive Officer  
Westmark Systems, Inc.  

Michael Krepon  
President  

Henry L. Stimson Center  

Stephen Lukasik  
Vice President and Chief Scientist  
TRW/Space Defense Sector  

Raymond J. McCrosky  
Consultant  

Ernest Mettenet  
Consultant  

Stephen Meyer  
Associate Professor  
Center for International Studies  
Massachusetts Institute of Technology  

William E. Odom  
Director of National Security Studies  
Hudson Institute  

George Rueckert  
Senior Analyst  
Meridian Corp.  

Albert D. Wheelon  
Consultant  

Charles A. Zraket  
Trustee  
The MITRE Corp.  

THE USE OF TECHNOLOGY IN COUNTERING TERRORISM ADVISORY PANEL  

Marvin Goldberger, Chairman  
Director  
Institute for Advanced Study  

Terry Bearce  
Manager  
Program on Low Intensity Conflict  
Los Alamos National Laboratory  

Peter F. Bahrman  
Executive Vice President  
MLI International, Ltd.  

L. Paul Bremer  
Managing Director  
Kissinger Associates  

Chris Chicles  
Security Managing Consultant  
C.H. Chicles & Associates  

Arthur Donahue  
President  
Softworld, Inc.  

Lee Grodzins  
Director  
Physics Department  
Massachusetts Institute of Technology  

John (Chris) Hatcher  
Professor  
Department of Psychiatry  
University of California, San Francisco  

Carolyn Immamura  
Director of Planning & Programs  
Pacific Basin Development Council  

Jim Jacobs  
Director  
Nuclear Security Systems  
Sandia National Laboratory  

Wilfred (Bill) Jackson  
Director of International Affairs Securities  
Airport Operators Council International  

Brian Jenkins  
Managing Director  
Kroll Associates  

Michael K. Johns  
President  
Johns & Bhatia Engineering Consultants, Ltd.
BIORIGHTS APPLICATIONS PROGRAM

BIOTECHNOLOGY IN A GLOBAL ECONOMY ADVISORY PANEL

Robert Reich, Chairman
Lecturer in Public Policy
John F. Kennedy School of Government
Harvard University

Alberto Adam
Vice President, Agricultural Division
American Cyanamid Co.

Brian Ager
Director
European Center of Chemical Manufacturers’ Federation, Brussels

Robert H. Benson, Esq.
Genentech, Inc.

Stephen A. Bent, Esq.
Poley, Lardner, and Schwartz

Jerry Caulder
President and Chief Executive Officer
Mycogen Corp.

Peter Drake
Executive Vice President and Director of Equity Research
Vector Securities

Anne K. Hollander
Associate
The Conservation Foundation

Michael Hsu
President
Asia/Pacific Bioventures Co.

Dennis Longstreet
President
Ortho Biotech

Kenneth J. Macck
President
TMS Management

David C. Mowery
Associate Professor of Business Administration
School of Business
University of California, Berkeley

Lita L. Nelsen
Technology Licensing Officer
Massachusetts Institute of Technology

Richard K. Quisenberry
Director of the Research Division
Central Research and Development Department
DuPont Experimental Station

James P. Sherbom
Chairman and Chief Executive Officer
Transgenic Sciences, Inc.

Sarah Shoaf Cabot
Director of Corporate Technology Affairs
Cenntocor, Inc.

William, Brinks, Olds, Hofer, Gilson & Lione

William J. Walsh
Executive Vice President and Chairman
Currents International, Inc.

Thomas C. Wiegle
Director, Program for Biosocial Research
Northern Illinois University

W. Wayne Withers, Esq.
Senior Vice President and General Counsel
Emerson Electric

CONFUSED MINDS, BURDENED FAMILIES—FINDING HELP FOR PEOPLE WITH ALZHEIMER’S AND OTHER DEMENTIAS

David F. Chavkin, Chairman
Visiting Assistant Professor
Washington College of Law
American University Practicing Law Center

Mary R. Barringer
Clinical Coordinator—Alzheimer’s Center
School of Medicine—Southern Illinois University

Robert H. Binstock
Henry R. Luce Professor of Aging, Health and Society
School of Medicine—Case-Western Reserve University

Gerald A. Borth
Assistant Administrator
Southern Wisconsin Center for Developmentally Disabled

Nancy Neveloff Dubler
Director
Division of Legal and Ethical Issues in Health Care
Montefiore Medical Center

Nancy J. Gustafson
Coordinator
Alzheimer’s Disease/Geriatric Program
Visiting Nurse & Home Care, Inc.

Rosalie A. Kane
Professor
School of Public Health & School of Social Work
University of Minnesota

Kathleen Ann Kelly
Executive Director
Family Survival Project

Glenn I. Kirkland
Consultant
Maryland Alzheimer’s Association

Dennis L. Kodner
Assistant Professor
Department of Community and Preventive Medicine
New York Medical College

Richard Ladd
Administrator, Senior Services Division
Oregon Department of Human Resources

Grace H. Lebow
Co-Director
Aging Network Services

Nancy E. Lombardo
Vice Chairman
Alzheimer’s Disease and Related Disorders Association

Marcie Parker
Senior Analyst
United Health Care Corp.

Diane S. Piktalias
Vice President and Chief Officer
Work/Family Elder Directions, Inc.

Raymond Raschko
Director of Elderly Services
Spokane Community Mental Health Center

Burton V. Reifler
Professor and Chairman
Department of Psychiatry and Behavioral Medicine
Bowman Gray School of Medicine
Wake Forest University

Lawrence Z. Rubenstein
Clinical Director
Geriatric Research Education and Clinical Center
Sepulveda Veterans Administration Medical Center

Barbara W. Schneider
Consultant

Mark E. Williams
Assistant Professor of Medicine
Division of General Medicine and Clinical Epidemiology
School of Medicine, University of North Carolina

Rick T. Zawadski
Consultant
GENETIC WITNESS: FORENSIC USES OF DNA TESTS ADVISORY PANEL

C. Thomas Caskey, Chairman
Professor and Director
Institute for Molecular Genetics
Baylor College of Medicine

Michael L. Baird
Director of Paternity and Forensics
Lifecodes Corp.

W. Gray Buckley
Inspector
Colorado Bureau of Investigation

Robert L. Dean
Senior Assistant State’s Attorney
Office of the State’s Attorney for Montgomery County

Henry A. Erlich
Director of Human Genetics
Cetus Corp.

Lisa Forman
Staff Scientist
Cellmark Diagnostics

Armando Garcia
Attorney-at-Law
Redwood City, California

Janlori Goldman
Staff Attorney
American Civil Liberties Union

Eric S. Lander
Associate Professor
Whitehead Institute for Biomedical Research

Henry C. Lee
Director, Forensic Science Laboratory
Connecticut State Police

Charles J. Ogletree
Professor of Law
Harvard Law School

Haskell M. Pitluck
Associate Judge
State of Illinois 19th Judicial Circuit
Woodstock, IL

Gloria H. Reynolds
Third Deputy Chief
Crime Laboratory Section
Detroit Department of Police, Michigan

Douglas P. Rutnik
Public Defender
Office of the Public Defender of Albany County, New York

Robert E. Stevenson
Director
American Type Culture Collection

William Carl Stauer
Supervisor of Serology
Metro-Dade Police Department Crime Laboratory, Florida

George B. Trubow
Professor
John Marshall Law School

GENETIC MONITORING AND SCREENING IN THE WORKPLACE ADVISORY PANEL

Elena O. Nightingale, Chairman
Special Advisor to the President
Carnegie Corp. of New York

Judy Hayes Bernhardt
Professor, School of Nursing
East Carolina University

Patricia A. Bufler
Professor
School of Public Health
University of Texas, Houston

Martin G. Cherniack
Director, Occupational Health Center
Lawrence and Memorial Hospital

Kurt R. Fenolio
Genetic Counselor

Maternal-Fetal Medical Associates

Theodore Friedman
Professor, School of Medicine
University of California, San Diego

Elizabeth Evans Gresch
Senior Occupational Health Physician
The Dow Chemical Co.

Bruce W. Karrh
Vice President

Safety, Health and Environmental Affairs
E.I. du Pont de Nemours & Co.

Marvin S. Legator
Professor

Division of Environmental Toxicology
UTMB—Galveston

Lewis L. Malby
Executive Vice President

Drexelbrook Engineering

Tony Mazzocchi
Secretary-Treasurer

Oil, Chemical, and Atomic Workers International Union

AFL/CIO

Anthony Robbins
Professor, Environmental Health Section
Boston University School of Public Health

Stanley Rose
Reagent Product Manager
Perkin-Elmer Corp.

Mark A. Rothstein
Director, Health Law Institute
University of Houston Law Center

Sheldon W. Samuels
Director, Health, Safety and Environment
Industrial Union Department

AFL/CIO

NEW DEVELOPMENTS IN NEUROSCIENCE ADVISORY PANEL

Peter S. Spencer, Chairman
Professor of Neuroscience
Center for Occupational Disease Research
Vellum Institute for Advanced Biomedical Research

Oregon Health Sciences University

Stanley H. Abramson
Counsel

King & Spalding

Roy A.E. Bakay
Assistant Professor

Section of Neurosurgery

The Emory Clinic

Robert H. Blank
Professor and Associate Director

Social Science Research Institute

Northern Illinois University

Nancy L. Buc
Partner

Weil, Gotshal & Manges

J. Robert Carr
Special Assistant to the Vice President for Administration

Howard University

Mary A. Carskadon
Director of Chronobiology

Emma P. Bradley Hospital

Louis W. Chang
Professor and Director, Experimental Pathology

Department of Pathology

University of Arkansas for Medical Sciences

James F. Childress
Commonwealth Professor of Religious Studies

Department of Religious Studies

University of Virginia

Charles A. Czeisler
Director

Center for Design of Industrial Schedules

Patricia J. DeCoursey
Professor

Department of Biology

University of South Carolina, Columbia
Richard M. Restak  
Physician—Private Practice  

Jerry Silver  
Professor  
Department of Developmental Genetics and Anatomy  
School of Medicine—Case-Western Reserve University  

John R. Sladek  
Professor and Chairman  
Department of Neurobiology and Anatomy  
University of Rochester Medical School  

Fred W. Turek  
Professor and Chairman  
Department of Neurobiology and Physiology  
Northwestern University  

H. Fred Voss  
Program Director  
Biotechnology, Inc.  

Bernard Weiss  
Professor of Toxicology  
School of Medicine  
University of Rochester  

Frank White  
Attorney  
Jones, Day, Reavis & Pogue  

POLICY ISSUES IN THE PREVENTION AND TREATMENT OF OSTEOPOROSIS ADVISORY PANEL  

Robert P. Heaney, Chairman  
John A. Creighton Professor  
Creighton University  

Steven R. Cummings  
Research Director  
Division of General Internal Medicine  
University of California, College of Medicine  

Barbara L. Drinkwater  
Research Physiologist  
Department of Medicine  
Pacific Medical Center  

Deborah T. Gold  
Assistant Professor of Medical Sociology  
Center for Study of Aging & Human Development  
Duke University Medical Center  

Caren Marie Gundberg  
Assistant Professor  
Department of Orthopedics  
Yale University School of Medicine  

Sylvia Houghland  
Associate Director  
Laboratory for Clinical Computing  

C. Conrad Johnston, Jr.  
Director  
Division of Endocrinology and Metabolism  
Indiana University School of Medicine  

Shiriki K. Kumanyika  
Associate Professor of Nutritional Epidemiology  
College of Health and Human Development  
Pennsylvania State University  

Edward O. Lanphier, II  
President & CEO  
BioGrowth, Inc.  

Donald R. Lee  
Vice President  
Norwich Eaton Pharmaceuticals, Inc.  

Robert Lindsay  
Chief  
Internal Medicine  
Helen Hayes Hospital  

Betsy Love  
Program Manager  
Center for Metabolic Bone Disorders  
Providence Medical Center  

Robert Marcus  
Director  
Aging Study Unit  
VA Medical Center, Palo Alto  

Lee Joseph Melton, III  
Head, Section of Epidemiology  
Department of Health Sciences Research  
Mayo Clinic  

Morris Notelovitz  
President and Medical Director  
Women’s Medical & Diagnostic Center and Climacteric Clinic, Inc.  

Anita L. Owen  
Senior Vice President  
Nutrition Education & Research  
National Dairy Council  

William Arno Peck  
Dean  
University of Washington School of Medicine  

Diana Petitti  
Associate Professor  
Department of Family and Community Medicine  
University of California, San Francisco  

Neil M. Resnick  
Chief, Geriatrics  
Brigham & Women’s Hospital  

Gideon A. Rodan  
Executive Director  
Department of Bone Biology  
Merck, Sharp & Dohme Research  

Mehraheed Sinaiki  
Professor, Physical Medicine and Rehabilitation  
Mayo Medical School  

Milton C. Weinstein  
Henry J. Kaiser Professor  
Health Policy and Management  
Harvard School of Public Health  

WORKSHOP ON FEDERAL INTERAGENCY COORDINATION OF NEUROTOXICITY RESEARCH AND REGULATORY PROGRAMS  

WORKSHOP ON NEW DEVELOPMENTS IN SPINAL CORD INJURY: ACUTE INTERVENTIONS AND NEURAL GRAFTS  

WORKSHOP ON NEURAL GRAFTING INTO THE BRAIN AND SPINAL CORD
FOOD AND RENEWABLE RESOURCES PROGRAM

AGRICULTURE INFORMATION TECHNOLOGY PANEL

Donald Holt
Director
Agriculture Experiment Director
University of Illinois

Gaines E. Miles
Professor
Department of Agricultural Engineering
Purdue University

Gerald Isacss
Chairman
Department of Agricultural Engineering
University of Florida

Jerry R. Lambert
Professor
Department of Agricultural Engineering
Clemson University

Lawrence D. Jones
Assistant Professor
Department of Animal Science
Cornell University

Nicholas D. Stone
Assistant Professor
Department of Entomology
Virginia Tech

Michael Tomaszweski
Professor
Department of Animal Science
Texas A&M University

Steve Sonka
Professor
Department of Agricultural Economics

Richard S. Fawcett
Associate Professor, Department of Agronomy
Iowa State University

Scott Ferguson
Vice President/General Counsel
National Agricultural Chemicals Association

Roger Gold
Coordinator, Environmental Programs
Institute of Agriculture and Natural Resources
University of Nebraska

George Hallberg
Chief, Geophysical Studies
Geological Survey Bureau

Joseph Harkins
Director, Water Office
State of Kansas

Roland Hauck
Senior Soil Scientist
Agriculture Research Department

Robert H. Miller
Director, Soil Science Department
North Carolina State University

Peter Nowak
Professor, Department of Rural Sociology
University of Wisconsin

Donna Pratt
Chairman, Natural Resources
Women Involved in Farm Economics

Carl Pulvermacher
Farmer

Richard Rominger
Farmer

Velma Smith
Project Director, Groundwater Protection

Ford West
Vice President for Government Relations

I. Garth Youngberg
Executive Director

U.S. FOREST SERVICE PLANNING TECHNOLOGIES ADVISORY PANEL

Hannah Cortner, Chairman
Associate Director
Watertown Research Center
University of Arizona

Clark Collins
Executive Director
Blue Ribbon Coalition

Richard Collins
Professor
School of Architecture
University of Virginia, Charlottesville

Dennis Dykstra
Professor of Forestry
School of Forestry
North Arizona University, Flagstaff

Paul Ellefson
Professor
Department of Forest Resources
University of Minnesota, St. Paul

Jerry Franklin
Bleedel Professor of Ecosystem Analysis
College of Forestry
University of Washington

George T. Hamilton
Consultant
Recreation Resources Management Co.

Willard Hamilton
Coordinator
Timber Resource Policy
Potlatch Corp.

Betty Huskins
Vice President
Ridgetop Associates

Lawrence R. Jahn
President
Wildlife Management Institute

Andy Kerr
Director
Conservation & Education
Oregon Natural Resource Council

Dennis LeMaster
Professor
Department of Forestry & Natural Resources
Purdue University

William S. Platt
Fisheries Consultant
Don Chapman Associates

Robert Ragon
Executive Vice President
Sun Stds, Inc.

Gerald Rose
Director/State Forester
Division of Forestry
Minnesota State Department of Natural Resources

R. Neil Sampson
Executive Vice President
American Forestry Association, Maitland

S. Sharpe
Conservation Director
Izaak Walton League of America

Maynard Smith
President
Smith 6-S Livestock

BENEATH THE BOTTOM LINE: AGRICULTURAL APPROACHES TO REDUCE AGRICHEMICAL CONTAMINATION OF GROUNDWATER ADVISORY PANEL

Sandra S. Batte, Chairman
Professor
Department of Agricultural Economics
Virginia Polytechnic Institute

John Abernathy
Resident Director of Research
Agricultural Research and Extension Center
Texas A & M University

Donald Duvick
Vice President of Research
Pioneer Hi-Bred International, Inc.
Gaylord L. Staveley  
President  
National Forest Recreation Association  

Louisa Willcox  
Policy Director  
Greater Yellowstone Coalition  

A. Milton Whiting  
Chairman & President  

**AGRICULTURAL RESEARCH AND TECHNOLOGY TRANSFER WORKSHOP**  

**ANIMAL TECHNOLOGY WORKSHOP**  

**CROP TECHNOLOGY WORKSHOP**  

**HEALTH PROGRAM**  

**ADOLESCENT HEALTH ADVISORY PANEL**  

Felton Earls, **Chairman**  
Professor  
Department of Behavioral Sciences  
Harvard School of Public Health  

Michael I. Cohen, **Vice Chairman**  
Chairman, Department of Pediatrics  
Montefiore Hospital  

Claire Brindis  
Co-Director  
Center for Population and Reproductive Health Policy  
Institute for Health Policy Studies  

Ann W. Burgess  
van Amerigen Professor of Psychiatric Mental Health Nursing  
University of Pennsylvania School of Nursing, Philadelphia  

Delores L. Delaney  
President  
State of Virginia Parent Teacher Association  

Abigail English  
Staff Attorney  
National Center for Youth Law  

Jewelle Taylor Gibbs  
Associate Professor, School of Social Welfare  
University of California, Berkeley  

Michel Graf  
Director, Mental Health  
Tanana Chiefs Conference, Inc.  
Fairbanks, AK  

David E. Hayes-Bautista  
Professor, School of Medicine  
Director, Chicoan Studies Research Center  
University of California, Los Angeles  

Karen Hein  
Associate Professor, Adolescent Medicine  
Division of Pediatrics  
Albert Einstein College of Medicine  

Charles E. Irwin, Jr.  
Director, Adolescent Medicine  
Department of Pediatrics  
University of California School of Medicine, San Francisco  

Robert Johnson  
Associate Professor, Adolescent Health  
Department of Pediatrics  
New Jersey Medical School, Newark  

Alan Kazdin  
Professor, Department of Psychology  
Yale University  

Teresa LaF romboise  
Assistant Professor, School of Education  
Stanford University  

Mary Neil Lanhard  
Vice President  
Office of Government Relations  
Blue Cross & Blue Shield Association  

Barbara D. Matula  
Director, Division of Medical Assistance  
State of North Carolina Department of Human Resources  

Robert B. Millman  
Director, Adolescent Development Program  
Cornell University Medical College  
New York Hospital  

Daniel Offer  
Director, Center for Study of Adolescence  
Michael Reese Hospital Medical Center, Chicago  

Leticia Paez  
Associate Director, Area Health Education Center  
Texas Technical University  
School of Medicine, El Paso  

Cheryl Perry  
Associate Professor, Division of Epidemiology  
School of Public Health  
University of Minnesota  

Anne C. Petersen  
Dean  
College of Health and Human Development  
Pennsylvania State University  

Lee Etta Powell  
Superintendent of Schools  
State of Ohio  

Roxanne Spillett  
Director, Program Services  
Boys Club of America  

Edward Tetelman  
Assistant Commissioner  
Intergovernmental Affairs  
New Jersey Department of Human Services  

Myron Thompson  
Trustee  
Bernice Pauahi Bishop Estate  

**GOVERNMENT POLICIES AND PHARMACEUTICAL RESEARCH AND DEVELOPMENT ADVISORY PANEL**  

Frederick M. Scherer, **Chairman**  
Professor of Economics  
John F. Kennedy School of Government  
Harvard University  

Jerome Avorn  
Associate Professor  
Program for Analysis of Clinical Strategies  
Harvard Medical School  

Martin Neil Baily  
Professor  
Department of Economics  
University of Maryland, College Park  

Nancy L. Buc  
Partner  
Weil, Gotshal & Manges  

William S. Comanor  
Professor  
Department of Economics  
University of California, Santa Barbara  

Charles Edwards  
President & CEO  
Scripps Clinic & Research Foundation  

Lewis A. Engman  
Partner  
Winston & Strawn  

Thomas Q. Garvey, III  
President  
Garvey Associates, Inc.  

Frederic Greenberg  
Partner  
EGS Partners  

Robert B. Helms  
Executive Director  
American Pharmaceutical Institute  

Gene Kimmelman  
Legislative Director  
Consumer Federation of America  

Judy C. Lewent  
Vice President and Treasurer  
Merck & Co. Inc.  

George B. Rathmann  
Chairman  
Amgen Inc.  

Jacob C. Stucki  
Vice President for Pharmaceutical Research (retired)  
Upjohn Co.  

Shyam Sunder  
Professor of Management and Economics  
Graduate School of Industrial Administration  
Carnegie-Mellon University  

W. Leigh Thompson  
Group Vice President  
Eli Lilly & Co.
MONITORING OF MANDATED VETERAN STUDIES ADVISORY PANEL

Richard Remington, Chairman
Vice President for Academic Affairs
University of Iowa

Margit Bleecker
Assistant Professor
Division of Occupational Medicine
School of Hygiene and Public Health
The Johns Hopkins Medical Institutes

George L. Carlo
Epidemiologist
George Carlo & Associates

Neal Castagnoli, Jr.
Professor, Department of Chemistry and Pharmaceutical Chemistry
University of California, San Francisco

Theodore Colton
Professor, School of Public Health
Boston University

William Eaton
Associate Professor
Department of Mental Hygiene
The Johns Hopkins University

Michael Gough
Senior Fellow
Center for Risk Management
Resources for the Future

Frederic Halpert
Agriculturalist
Delton, MI

Charles Henrekens
Physician, Associate in Medicine
Brigham & Women's Hospital

Lewis Kuller
Professor, Department of Epidemiology
Graduate School of Public Health
University of Pittsburgh

Claire O. Leonard
Assistant Professor, Department of Pediatrics
University of Utah School of Medicine

Robert O'Toole
Appeals Consultant
Veterans of Foreign Wars of the United States

John F. Sommer, Jr.
Assistant Director
National Veterans Affairs and Rehabilitation Commission

The American Legion

John F. Terzano
National Membership Director
Vietnam Veterans of America

H. Michael D. Utidjian
Corporate Medical Director
American Cyanamid Co.

Lynda M. Van Devanter
Consultant

PREVENTIVE HEALTH SERVICES FOR THE ELDERLY UNDER MEDICARE ADVISORY PANEL

Gordon De Friese, Chairman
Professor of Social Medicine
Director, Health Services Research Center
University of North Carolina, Chapel Hill

Marianne C. Fals
Assistant Professor for Health Economics
Mt. Sinai Medical Center

John Frank
Assistant Professor
Department of Preventive Medicine and Biostatistics
University of Toronto

Gary D. Friedman
Assistant Director, Epidemiology and Biostatistics
Division of Research
Permanente Medical Group

Lawrence Gottlieb
Director, Clinical Guidelines Program
Harvard Community Health Plan

Mary Knapp
Vice President Clinical Services
John Whitman & Associates

Risa Lavizzo-Mourey
Assistant Professor of Medicine
Geriatrics Program
University of Pennsylvania

M. Cristina Leske
Head, Division of Epidemiology
Department of Preventive Medicine
SUNY at Stony Brook

Donald Logsdon
Director
INSURE Project

Mildred B. McCauley
Board Member
National Activities
American Association of Retired Persons

Peter McMenamin
Consultant

Meredith Minkler
Director, Center on Aging
University of California, Berkeley

Marilyn Moon
Director, Public Policy Institute
American Association of Retired Persons

George Morley
Norman F. Miller Professor of Medicine
Department of Obstetrics/Gynecology
University of Michigan Medical Center

Gilbert Omenn
Dean
School of Public Health and Community Medicine
University of Washington, Seattle

George Pickett
Professor, Department of Public Health Policy
School of Public Health
University of Michigan, Ann Arbor

Donald Shepherd
Associate Professor
Department of Health Policy and Management
Harvard School of Public Health

Barry Stults
Associate Professor
Division of General Internal Medicine
University of Utah Medical Center

RURAL HEALTH ADVISORY PANEL

James Bernstein, Chairman
Director
Office of Health Resources Development
North Carolina Department of Human Resources

Robert Bergland
Executive Vice President and General Manager
National Rural Electric Cooperative Association

James Coleman
Executive Director
West Alabama Health Services, Inc.

Sam Cordes
Professor & Head
Department of Agricultural Economics
University of Wyoming

Elizabeth Dichter
Vice President, Strategic Planning
Lutheran Health Systems

Mary Ellis
Director
Iowa Department of Public Health

Kevin Pickenscher
Assistant Dean and Executive Director
Center for Medical Studies
Michigan State University

Roland Gardner
President
Beaufort-Jasper Comprehensive Health Center

Robert Graham
Executive Vice President
American Academy of Family Physicians

Alice Hersh
Executive Director
Foundation for Health Services Research

David Kindig
Director, Programs in Health Management
University of Wisconsin—Madison

T. Carter Melton, Jr.
President
Rockingham Memorial Hospital

Jeffrey Merrill
Vice President
Robert Wood Johnson Foundation

Myrna Pickard
Dean, School of Nursing
University of Texas—Arlington

Carolyn Roberts
President
Copley Health Systems, Inc.
UNCONVENTIONAL CANCER TREATMENTS ADVISORY PANEL

Rosemary Stevens, Chairman
Professor and Chairman
University of Pennsylvania

Jeanne Achterberg
Director of Research
Institute of Transpersonal Psychology

Keith Block
Medical Director
Cancer Treatment Program
University of Illinois School of Medicine

Barrie R. Cassileth
Director
Cancer Control Program
University of Pennsylvania Hospital

Jonathan Collin
Editor
Townsend Letter

John H. Edmonson
Professor
Division of Medical Oncology
Mayo Clinic

Robert C. Eyerly
Associate
Department of General Surgery
Geisinger Medical Center

John Fink
President
International Association of Cancer Visitors and Friends

Stephen L. George
Director
Cancer Center Biostatistics
Duke University Medical Center

Gar-Hildenbrand
Executive Director
Gerson Institute

Michael Lerner (special consultant)
President
Commonweal

Brian J. Lewis
Oncologist
Kaiser Permanente Medical Center

Robert W. McDivitt
Director
Division of Anatomic Pathology
Barnes Hospital

Grace Powers Monaco
President
Emprise Inc.

Herbert F. Oetgen
Chief
Clinical Immunology Service
Memorial Sloan-Kettering Cancer Center

Brendan O’Regan
Vice President for Research
Institute of Noetic Sciences

Richard K. Riegelman
Professor
George Washington University School of Medicine

C. Norman Shealy
Director
Shealy Institute for Comprehensive Health Care

Andrew T. Weil
Lecturer
University of Arizona Health Sciences Center

ADOLESCENT HEALTH SERVICES DELIVERY WORKSHOP

DRUG LABELING WORKGROUP

RURAL EMERGENCY MEDICAL SERVICES WORKSHOP

WORKSHOP TO IDENTIFY BARRIERS TO DENTAL SERVICES EXPERIENCED BY CHILDREN UNDER MEDICAID

FEDERAL ROLE IN ADOLESCENT HEALTH WORKSHOP

SOCIOECONOMIC AND CULTURAL/ETHNIC ISSUES IN THE DELIVERY OF HEALTH SERVICES TO ADOLESCENTS WORKSHOP

GOVERNMENT POLICIES AND PHARMACEUTICAL RESEARCH AND DEVELOPMENT METHODOLOGY WORKSHOP

RECOMBINANT ERYTHROPOIETIN: PAYMENT OPTIONS FOR MEDICARE WORKSHOP

DRUG ABUSE TREATMENT AND SPREAD OF HIV WORKSHOP

COMMUNICATION AND INFORMATION TECHNOLOGIES PROGRAM

COPYRIGHT AND HOME COPYING ADVISORY PANEL

Robert Crandall, Chairman
Senior Fellow, Economic Studies Program
The Brookings Institution

Jason S. Berman
President
Recording Industry Association of America

Brenda Dervin
Chairman
Department of Communications
Ohio State University

David Fishman
Senior Staff Consultant
Arthur D. Little, Inc.

Jack Goldner
Executive Director
Department of Professional Employees AFL-CIO

Michael H. Hammer
Director
Communications Policy Development
Time Inc.

Glen H. Hopman
Editor-in-Chief, Optical Publishing
National Museum of Natural History
Smithsonian Institution

Judith Larsen
Director of Primary Research
Dataquest

Judith Lichtenberg
Research Scholar
Center for Philosophy and Public Policy
University of Maryland, College Park

William Livingstone
Editor
Stereo Review Magazine

Peter Menell
Associate Professor of Law
Georgetown University Law Center

David Moulton
Chairman
Music Production and Engineering
Berklee College of Music

Peter Rothbart
Professor, School of Music
Ithaca College—New York

Gary J. Shapiro
Staff Vice President
Government and Legal Affairs
Consumer Electronics Group
Electronic Industries Association

Mark Silbergeld
Director, Washington Office
Consumers Union
Karen Merrick  
Mayor  
Guttenberg, Iowa

Roger G. Noll  
Professor  
Department of Economics  
Stanford University

Edwin Parker  
President  
Parker Telecommunications

Joseph Pelton  
Director  
Graduate Telecommunications Program  
University of Colorado, Boulder

Richard Plunkett  
President  
Fairmont Cable Television

Everett Rogers  
Annenberg School of Communications  
University of Southern California

William Schaphorst  
General Attorney  
U.S. West Communications

Gail Garfield Schwartz  
Commissioner  
State of New York Public Services Commission

Sharon Strover  
Assistant Professor  
Department of Radio/TV/Film  
University of Texas, Austin

Margaret Trevathan  
Director  
Calloway County Library

Arthur Tweeten  
Anderson Chair for Agricultural Trade  
Department of Agricultural Economics & Rural Sociology  
Ohio State University

Dave Waldron  
President  
Electronic Marketing Resource Group

Keith N. Ware  
Manager  
Energy County Telephone Co.

---

William Brodky  
President and Chief Executive Officer  
Chicago Mercantile Exchange

Eric C. Clemons  
Professor of Decision Sciences and Computer and Information Science  
Wharton School—University of Pennsylvania

James B. Cloonan  
President  
American Association of Individual Investors

Janine Craane  
Financial Consultant  
Merrill Lynch, Pierce, Fenner & Smith, Inc.

Gene L. Finn  
Chief Economist  
National Association of Securities Dealers

John Kenneth Galbraith  
Professor Emeritus  
Department of Economics  
Harvard University

Richard Grasso  
President and Chief Operating Officer  
New York Stock Exchange

William Haraf  
Vice President  
Citicorp

Robert E. Litan  
Senior Fellow and Director of Center for Economic Progress and Employment  
The Brookings Institution

James Martin  
Executive Vice President  
Teachers Insurance Annuity Association College Retirement Equities Fund

Martin Mayer  
Consultant  
Robert McEwen  
President  
Conference of Consumer Organization

Charles B. McQuade  
President  
Securities Industry Automation Corp.

Susan Phillips  
Vice President  
University of Iowa

Peter Schwartz  
President  
Global Business Network

Howard Sherman  
Department of Economics  
University of California—Riverside

Robert Shiller  
Professor, Yale University  
Cowles Foundation

Hans R. Stoll  
Director, Financial Markets Research Center  
Owen Graduate School of Management  
Vanderbilt University

Alan Strudler  
Research Scholar  
Institute for Philosophy and Public Policy  
University of Maryland—College Park

---

THE CHALLENGES OF TECHNOLOGICAL CHANGE AND GLOBAL COMPETITION IN PROTECTING INTELLECTUAL PROPERTY ADVISORY PANEL

Michael S. Mahoney, Chairman  
Professor  
Department of History  
Princeton University

F. Christian Byrnes  
Vice President, Product Planning  
Landmark Systems Corp.

Dana E. Cartwright, III  
Director  
Academic Computing Service  
Syracuse University

Bill Curtis  
Director  
Human Interface Laboratory  
Microelectronics & Computer Technology Corp.

Randall Davis  
Associate Director  
Artificial Intelligence Laboratory  
Massachusetts Institute of Technology

Walter J. Doherty  
Computing Systems Department  
IBM T.J. Watson Research Center

Carol Edwards  
Project Director  
Southern Coalition for Educational Equity

Nicholas A. Farmer  
Director of Information Systems  
Chemical Abstracts Service

John Gage  
Director of Science Office  
Sun Research Labs

Morton David Goldberg  
Partner  
Schwab, Goldberg, Price, & Dannay

Robbie Hardy  
Senior Principal  
American Management Systems, Inc.

Mitchell D. Kapor  
Chairman  
ON Technology, Inc.

Ronald S. Laurie  
Litigation Partner  
Irell & Manella

Clifford A. Lynch  
Director  
Library Automation  
University of California, Oakland
OCEANS AND ENVIRONMENT PROGRAM

DEFENSE WASTE ADVISORY PANEL

Roger H. Davidson, Chairman
Professor
University of Maryland, College Park

Jackie L. Braitman
Professor & Director
Environmental Management and Information Systems Division
Roy F. Weston, Inc.

William A. Brewer
Consulting Geologist & Engineer

Norman Cohen
Professor
Laboratory for Radiological Studies
New York University Medical Center

Gary A. Davis
Senior Fellow
Waste Management Institute
University of Tennessee

Patrick D. Eagan
Program Director
Department of Engineering Professional Development
University of Wisconsin, Madison

George M. Hornberger
Professor
Department of Environmental Sciences
University of Virginia

Joseph Hugbart
Senior Assistant Sanitarian
U.S. Public Health Service

George R. Jasny
Director
Martin Marietta Energy System, Inc.

Bernard Kahn
Director
Environmental Resources Center
Georgia Institute of Technology

Ellen J. Mangione
Director
Disease Control & Environmental Epidemiology
Colorado Department of Health

Robert H. Neill
Director
Environmental Evaluation Group
State of New Mexico

Glenn Paulson
Research Professor, Prizerker
Department of Environmental Engineering
Illinois Institute of Technology

Dan W. Reicher
Senior Attorneys
Natural Resources Defense Council

Jacqueline C. Sales
President
Hazardous and Medical Waste Services, Inc.

R. Lewis Shaw
Deputy Commissioner
Office of Environmental Quality Control
South Carolina Department of Health & Environment Quality Control

LOW-LEVEL WASTE RADIOACTIVE WASTE REVIEW PANEL

Mary R. English, Chairperson
Professor
Energy, Environment, and Resources Center
University of Tennessee, Knoxville

Ruben Alvarado
Chief Engineer
Texas LLRW Disposal Authority

Tom Baer
Senior Vice President
U.S. Ecology Inc.

Leland Cooley
Radiation Safety Officer
University of Maryland, Baltimore

Robert H. Neill
President & General Manager
Quadrex Recycling Center

David Ebenhack
Vice President of Regulatory Affairs
Chem-Nuclear Systems, Inc.

Lynne Fairbient
Project Director
Operations, Management Support Services
Nuclear Management Resource Council

Brian Farrell
Program Manager
Edison Electric Institute

John Hsu
Supervisor, Environmental Engineering Section
Dupont NEN

Carolyn Kobryn
Member
New York Committee on LLW Management

Dan Reicher
Senior Attorney
Natural Resources Defense Council

Jay Ringenberg
LLW Program Manager
State of Nebraska Department of Environmental Control

John Tekin
President
Radiac Research Corp.

REVIEW PANEL FOR MEDICAL WASTE SPECIAL REPORT

Barry Rabe, Chairman
Assistant Professor of Health Politics
Department of Health Policy & Administration
School of Public Health, University of Michigan

Richard Bernstein
Chairman
General Medical Corp.

Leland Cooley
Director
Radiation Safety/Biosafety Officer
University of Maryland, Baltimore
Wayne Turnberg  
Infectious Waste Project Manager  
Department of Ecology  
State of Washington  
Michelle Wilson  
Section Chief  
Special Projects Characteristics Section

MUNICIPAL SOLID WASTE MANAGEMENT ADVISORY PANEL

Joseph Sax, Chair  
Professor, School of Law  
University of California—Berkeley  
John Bazin  
Manager, State Legislative Affairs  
Anheuser-Busch Co., Inc.  
Gordon Boyd  
President  
Schilling, Salerni, & Boyd  
Paul Connett  
Professor, Chemistry Department  
Saint Lawrence University  
Randall Curlee  
Group Leader, Technology and Information Assessment Group  
Oak Ridge National Laboratory  
Dana Duxbury  
Senior Environmental Research Analyst  
Center for Environmental Management  
Tufts University  
Rodney Edwards  
Vice President, Paperboard Group  
American Paper Institute  
Jeffrey Hahn  
Vice President, Environmental Engineering  
Ogden Projects, Inc.  
Michael Herz  
Senior Attorney  
Environmental Defense Fund  
Walter Johnson  
Director of Planning  
Metropolitan Waste Control Commission  
St. Paul, MN  
Richard Kattar  
President  
New England CRInc.  
Raymond Naar  
Patent and Technology Development Manager  
General Electric Plastics  
Lorie Parker  
Waste Reduction Project Manager  
Seattle Solid Waste Utility  
Glenrose Pitt  
Consultant  
Barry Scher  
Vice President, Public Affairs  
Giant Food, Inc.  
Neil Seldman  
Co-Director  
Institute for Local Self-Reliance

Peter Vardy  
Vice President, Environmental Management  
Waste Management, Inc.  
Irvin White  
President  
New York State Energy Research and Development Authority

ENERGY USE IN BUILDINGS ADVISORY GROUP

William U. Chandler, Chairman  
Senior Scientist  
Battelle, Pacific Northwest Laboratories  
Edward Bailey  
Vice President  
Government and Industry Relations  
Carrier Corp.  
Douglas C. Bauer  
Senior Vice President  
Boston Edison  
G.Z. Brown  
Professor, Department of Architecture  
University of Oregon, Eugene  
Armond Cohen  
Senior Attorney  
Conservative Law Foundation  
Drury Crawley  
Senior Research Scientist  
Pacific Northwest Laboratories  
Charles Field  
Staff Vice President  
National Association of Home Builders  
Howard Geller  
Associate Director  
American Council for an Energy-Efficient Economy  
Erik Haites  
Vice President  
The DPA Group  
Cheryl Herrington  
Commissioner  
Maine Public Utilities Commission  
Alan Miller  
Professor of Law  
University of Maryland, College Park  
Arthur Rosenfeld  
Director, Center for Building Sciences  
Lawrence Berkeley Laboratory  
John Slattery  
Director, Research and Engineering  
The Ryland Group  
Bill Staubitz  
Manager, Marketing Development  
Sylvania Corporation/GTE  
Mary Tucker  
Acting Manager, Energy Program  
City of San Jose, CA
RECOVERABILITY OF LOW-LEVEL RADIOACTIVE WASTE IN SALT LAKE CITY, UTAH WORKSHOP

PLANNING WORKSHOP ON DEFENSE WASTE MANAGEMENT

WORKSHOP ON ANTARCTIC OIL AND GAS DEVELOPMENT POTENTIAL

WORKSHOP ON ENERGY USE IN INDUSTRY

WORKSHOP ON INNOVATION IN U.S. BUILDING CONSTRUCTION INDUSTRY

WORKSHOP ON OIL SPILL COUNTERMEASURES TECHNOLOGY

WORKSHOP ON TECHNOLOGIES FOR REDUCING DIOXIN IN THE MANUFACTURE OF BLEACHED WOOD PULP

WORKSHOP ON ENERGY SUPPLY AND THE GREENHOUSE EFFECT

WORKSHOP ON TRANSPORTATION SECTOR ENERGY USE AND THE GREENHOUSE EFFECT

WORKSHOP ON THE U.S., DEVELOPING COUNTRIES, AND GLOBAL WARMING

DOE WEAPONS SITES HEALTH EFFECTS WORKSHOP

QUALITY AND SAFETY OF BOTTLED WATER WORKSHOP

WORKSHOP ON SOILS AND GROUNDWATER REMEDIATION TECHNOLOGIES

INDUSTRIAL NON-HAZARDOUS WASTE WORKSHOP

SCIENCE, EDUCATION, AND TRANSPORTATION PROGRAM

BASIC RESEARCH FOR THE 1990'S ADVISORY PANEL

Bernadine P. Healy, Chairman
The Research Institute
The Cleveland Clinic Foundation

William Carey
Consultant to the President
Carnegie Corp.
Carnegie Commission on Science, Technology & Government

Purnell Choppin
President
Howard Hughes Medical Institute

Herbert Doan
Consultant

Gertrude Elion
Scientist Emeritus
Burroughs Wellcome
Robert Fossum
Dean
School of Engineering and Applied Sciences
Southern Methodist University
S. Allen Heiniger
Corporate Vice President
Resource Planning
Monsanto Co.
Donald Holt
Director
Agricultural Experiment Station
University of Illinois, Urbana
Todd LaPorte
Professor of Political Science
University of California, Berkeley
Leon M. Lederman
Director Emeritus of Fermilab
Professor of Physics
University of Chicago
Cora Marrett
Professor
Department of Sociology
University of Wisconsin
William Massy
Vice President for Finance
Professor of Business Administration & Education
Stanford University
Alan McGowan
President
Scientists' Institute for Public Information
Robert Myers
Assistant Professor of Agronomy
University of Missouri, Columbia
Herman Postma
Senior Vice President
Martin Marietta Energy Systems
Larry Smarr
Director
National Center/Supercomputer Applications
University of Illinois, Urbana
Amy L. Walton
Manager
Science Data Analysis and Computing Systems
Jet Propulsion Laboratory
Sheila Widnall
Abby Mauze Rockefeller Professor of Aeronautics and Astronautics
Massachusetts Institute of Technology
George Wise
Specialist-Communications
Corporate Research and Development
General Electric

Ex-officio Members
Ted G. Berlin court
Director
Research and Laboratory Management
Office of the Secretary of Defense

Ruth L. Kirchstein
Director
National Institute of General Medical Sciences
National Institutes of Health
F. Karl Willenbrock
Assistant Director
Scientific, Technological and International Affairs
National Science Foundation
Luther Williams
Senior Science Advisor
National Science Foundation

Sister Agency Member
Richard Rowberg
Director
Science Policy Research Division
Congressional Research Service

INFRASTRUCTURE TECHNOLOGIES: REBUILDING THE FOUNDATIONS ADVISORY PANEL

Carol Bellamy, Chairman
Principal
Morgan Stanley & Co., Inc.

Jon Craig
Chief of Wastewater Construction Grants
Oklahoma State Department of Health

Dave Davis
Executive Director
Massport

Siro DeGasperis
Vice President, Public Affairs
United Parcel Service

Daniel Dudek
Senior Economist
Environmental Defense Fund

Hazel Gluck
President
Public Policy Advisors, Inc.

Anthony Hall, Jr.
Law Office of Peter Williamson
Houston City Council

Austin V. Koenen
Managing Director, Public Finance
Morgan Stanley & Co., Inc.

Jerome Kruger
Department of Materials Science & Engineering
The Johns Hopkins University

Fred Moavenzadeh
Director
Center for Construction Research & Education
Massachusetts Institute of Technology

James Poirot
Chairman
CH2M Hill

Harry Reed
Planning Director
Arizona Department of Transportation

Burton Stallwood
Town Administrator
Lincoln, Rhode Island
Michael Uremovich  
Vice President of Marketing  
American President Companies  

Theodore G. Weigle, Jr.  
Executive Director  
Chicago Regional Transportation Authority  

SCHOOLS, KIDS, AND MEASUREMENT: TECHNOLOGIES OF ASSESSMENT ADVISORY PANEL  
Sheldon H. White, Chairman  
Professor of Psychology  
Harvard University  
Joan Boykoff Baron  
Project Director  
Connecticut Assessment of Educational Progress Programs  
Office of Research and Evaluation  
Connecticut State Department of Education  

Winston Brown  
Dean of Admissions  
Xavier University  
Alan K. Campbell  
Professor  
Department of Public Policy and Management  
The Wharton School  
University of Pennsylvania  
Matthew Caulfield  
Deputy Commander for Warfighting  
Marine Corps Combat Development Command  
James Fallows  
Consultant  
Bert Green  
Professor of Psychology  
The Johns Hopkins University  
H.D. Hoover  
Professor  
College of Education  
University of Iowa  
Sharon Johnson-Lewis  
Director, Office of Planning, Research and Evaluation  
Detroit Public Schools  
Henry Levin  
Professor  
School of Education and Economics  
Stanford University  
Harold Miller  
Chairman of the Board  
Houghton Mifflin Co.  
Richard J. Noeth  
Vice President  
Field Services  
Educational Testing Service  
Edward D. Roeber  
Supervisor  
Michigan Educational Assessment Program  
Michigan Department of Education  

Nancy Rus  
Director  
Human Resources Planning and Research  
Motorola, Inc.  
Cynthia Schuman  
Executive Director  
National Center for Fair & Open Testing  
Ria J. Sherbenou  
Head  
The Winston School  
Jack Webber  
Teacher  
Samantha Smith Elementary School  
Redmond, WA  

TECHNOLOGIES FOR LEARNING AT A DISTANCE ADVISORY GROUP  
Rich Gross, Chairman  
Dean of Telecommunications  
Kirkwood Community College, IA  
Lionel Baldwin  
President  
National Technological University  
Gregory Benson, Jr.  
Director  
Center for Learning Technologies, Policies, Research and Development  
New York State Department of Education  
Lou Braford  
President  
Public Service Satellite Consortium  
Dee Brock  
Senior Vice President, Education Services  
Public Broadcasting Service  
Ron Hartman  
Vice President  
Continental Cablevision  
Harry R. Miller  
Associate Director, External Affairs  
New England Telephone  
Kurt Moses  
Vice President  
Academy for Educational Development  
Robert Pearlman  
National Consultant on Educational Technology  
American Federation of Teachers  
Charles Terrett  
Superintendent  
Fulton County Schools, KY  
Robert Tinker  
Executive Director  
Technical Education Research Centers  
Joan Wallin  
Supervisor, Media and Technology Unit  
Minnesota Department of Education  
Debra Willson  
Teacher  
Satellite Telecommunications Educational Programming Network  

FEDERAL WORKSHOP ON TECHNOLOGIES FOR LEARNING AT A DISTANCE  
CHANGING TELECOMMUNICATIONS TECHNOLOGY AND POLICY WORKSHOP  
WORKSHOP ON GETTING COLLISION AVOIDANCE AIRBORNE: TCAS INSTALLATION AND FEDERAL DEADLINES  
WORKSHOP ON MINORITIES IN SCIENCE AND SCIENCE POLICY  
WORKSHOP ON PERFORMANCE MEASURES FOR HIGH SCHOOL VOCATIONAL EDUCATION  
WORKSHOP ON ENVIRONMENTAL INFRASTRUCTURE TECHNOLOGIES: FINDING THE BALANCE BETWEEN PERFORMANCE AND REGULATION  
WORKSHOP ON STATE AND LOCAL INFRASTRUCTURE MANAGEMENT AND FINANCING  
WORKSHOP ON TRANSPORTATION INFRASTRUCTURE TECHNOLOGIES: SLOW MOTION PROGRESS IN A FAST FORWARD WORLD  
COSTS OF RESEARCH AND FEDERAL DECISIONMAKING WORKSHOP  
WORKSHOP ON EDUCATION AND TRAINING TECHNOLOGY: LEARNING FROM THE MILITARY MATERIALS TECHNOLOGIES AND INFRASTRUCTURE DECISION MAKING WORKSHOP
Public Law 92-484  
92nd 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.

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.
Technology Assessment Board.

Duties.

(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.

(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:

(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 associated 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 thereto, 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—

(1) to do so would violate security statutes; or
(2) the Board considers it necessary or advisable to withhold such information in accordance with one or more of the numbered paragraphs in section 552(b) of title 5, United States Code.

TECHNOLOGY ASSESSMENT BOARD

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 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.

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.

(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 may be 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**

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.

(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.

(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 contract or other arrangement under this Act.
**AUTHORITY OF THE 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;

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, association, corporation, or educational institution, 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);

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.

(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.

(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.

(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

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.

(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 tasks as the Board may direct.

(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)(1) 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.

(e)(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 States 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.

(2) The members of the Council appointed under subsection (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 States 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.
UTILIZATION OF THE LIBRARY OF CONGRESS
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 Research 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 performs 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 may be 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 may be 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
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."

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.


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.