The NITRD Agencies

Agency for Healthcare Research and Quality
(AHRQ)

Defense Advanced Research Projects Agency
(DARPA)

Defense Information Systems Agency
(DISA)

Department of Defense, Office of the Director,
Defense Research & Engineering
(ODDR&E)

Department of Energy
National Nuclear Security Administration
(DOE/NNSA)

Department of Energy
Office of Science
(DOE/SC)

Environmental Protection Agency
(EPA)

National Aeronautics and
Space Administration
(NASA)

National Institutes of Health
(NIH)

National Institute of
Standards and Technology
(NIST)

National Oceanic and
Atmospheric Administration
(NOAA)

National Security Agency
(NSA)

National Science Foundation
(NSF)

NITRD

THE NITRD PROGRAM: E PLURIBUS UNUM

Chartered by Congress under the High-Performance Computing Act of 1991 (P.L. 102-194) and the Next Generation Internet Act of 1998 (P.L. 105-305), the NITRD Program is the collaborative framework of Federal agencies that conduct fundamental R&D in advanced networks, computing systems, software, and information-management technologies, as well as in the socioeconomic and workforce implications of these new technologies. One of the few formal interagency enterprises in the Federal government, the successful NITRD effort enables the major IT research agencies to coordinate their plans and activities to leverage strengths, avoid duplication, and increase the interoperability of research accomplishments to maximize the utility of Federal R&D investments.

The NITRD agencies' balanced, diversified portfolio of R&D efforts across Federal laboratories, universities, research institutions, and partnerships with industry helps meet critical Federal requirements for leading-edge IT capabilities, which are rarely available in the commercial marketplace. The multiagency push toward highest-performance and next-generation technologies yields not only advances for national defense, national security, and scientific research but broader applications that directly contribute to overall U.S. preeminence in the sciences, in engineering, and in advanced industrial technologies.

Flow of results to private sector

The Federal emphasis on long-range IT progress complements the private sector's necessary competitive focus on short-term research and rapid product development. IT industry leaders point out that NITRD activities serve the essential purpose of filling the American research pipeline with revolutionary ideas and technological concepts that can be turned downstream into new generations of commercial innovations. Moreover, NITRD research dollars constitute the principal source of support for the advanced education and training of the Nation's leading IT researchers, entrepreneurs, inventors, and technical professionals.

The flow of ideas from Federal R&D into the larger economy is cited by the President's Council of Advisors on Science and Technology (PCAST) in a 2002 study assessing the role of Federally funded research. The PCAST notes that "activities emanating from R&D investments that produced new economic growth have never been higher, including increasing numbers of patents and discovery disclosures." Fully 40 percent of all patents, the PCAST reports, cite Federal research as their source even though Federal R&D constitutes only 30 percent of total U.S. R&D investment.

FY 2004 Administration R&D priority

The President's Budget for FY 2004 highlights the strategic national significance of Federal R&D, proposing a record $123 billion for R&D activities over all, up 7 percent from FY 2003. The NITRD Program is a top Administration R&D priority that is critical to achieving the President's goals of winning the war on terrorism, protecting the homeland, and strengthening the U.S. economy. The FY 2004 plan provides $2,147 million for the NITRD Program, a $171 million increase over the FY 2003 appropriations of $1,976 million. For more information on the NITRD agencies' research plans for FY 2004, please see pages 36-39. Details of the NITRD budget appear on page 39.

Coordinated management

NITRD activities are coordinated by an Interagency Working Group (IWG) of the Committee on Technology, National Science and Technology Council (NSTC). The IWG members include representatives from each of the participating agencies and from OSTP, NSTC, the Office of Management and Budget (OMB), and the National Coordination Office (NCO) for IT R&D. The IWG is co-chaired by one agency representative (currently NSF's Assistant Director for the Computer and Information Science and Engineering Directorate) and the Director of the NCO. Participating agencies, working with OMB and the Congress, fund their NITRD research through standard agency budgeting processes and appropriations measures that are signed into law by the President.

The NCO provides overall support for the NITRD Program, including extensive technical and administrative activities on behalf of the IWG and planning, budget, and assessment activities for the Program. The NCO also supports the President's Information Technology Advisory Committee (PITAC), a private-sector panel appointed by the President to provide independent reviews and guidance on IT research and development questions.

Copies of NCO publications, including this report, information about NITRD activities, and links to participating agency and related Web sites can be found at: http://www.nitrd.gov/

PCA R&D Structure

The collaborative research agenda of the NITRD agencies is carried out in Program Component Areas (PCAs), which focus on particular aspects of fundamental, long-term research in computing and networking technologies. In each PCA, a Coordinating Group made up of agency program managers in the relevant research fields meets monthly to exchange information and support multiagency activities in their areas.

The PCAs and their major research interests are:

• **High End Computing (HEC)** has two PCAs – Infrastructure & Applications (I&A) and R&D – which together include advances in hardware, software, architecture, and application systems; advanced concepts in quantum, biological, and optical computing; algorithms for modeling and simulation of complex physical, chemical, and biological systems and processes; and information-intensive science and engineering applications.

• **Human Computer Interaction & Information Management (HCI & IM)** – R&D in advanced technologies that expand modes and methods of human-computer interaction, improve human ability to manage and make use of information resources, and enable preservation and utility of electronic information archives

• **Large Scale Networking (LSN)** – R&D in wireless, optical, and mobile communications; networking software for distributed applications and for information dissemination; measuring, modeling, and scaling the Internet; improving end-to-end performance; and testbeds and R&D infrastructure. LSN also fields three special teams: **Joint Engineering Team (JET), Middleware and Grid Infrastructure Coordination (MAGIC),** and **Networking Research Team (NRT).**

• **Software Design and Productivity (SDP)** – R&D to improve software development and software quality, including understanding the trade-offs between cost and quality; software engineering of complex systems; end-user programming (such as domain-specific languages and programming by example); component-based software development; embedded and autonomous software; middleware for distributed systems

• **High Confidence Software and Systems (HCSS)** – R&D in critical technologies needed to enable computer systems to achieve high levels of availability, reliability, safety, security, survivability, protection and restorability of information services

• **Social, Economic, and Workforce Implications of IT and IT Workforce Development (SEW)** – Multidisciplinary R&D in complex interactions of information technologies with people and society, such as IT impacts on organizations, economic markets, and communications processes; privacy and intellectual property rights; and participation in digital