



Federal Networking and Information Technology R&D

HCSS-Sponsored National Workshop on Beyond SCADA – Networked Embedded Control for Cyber Physical Systems

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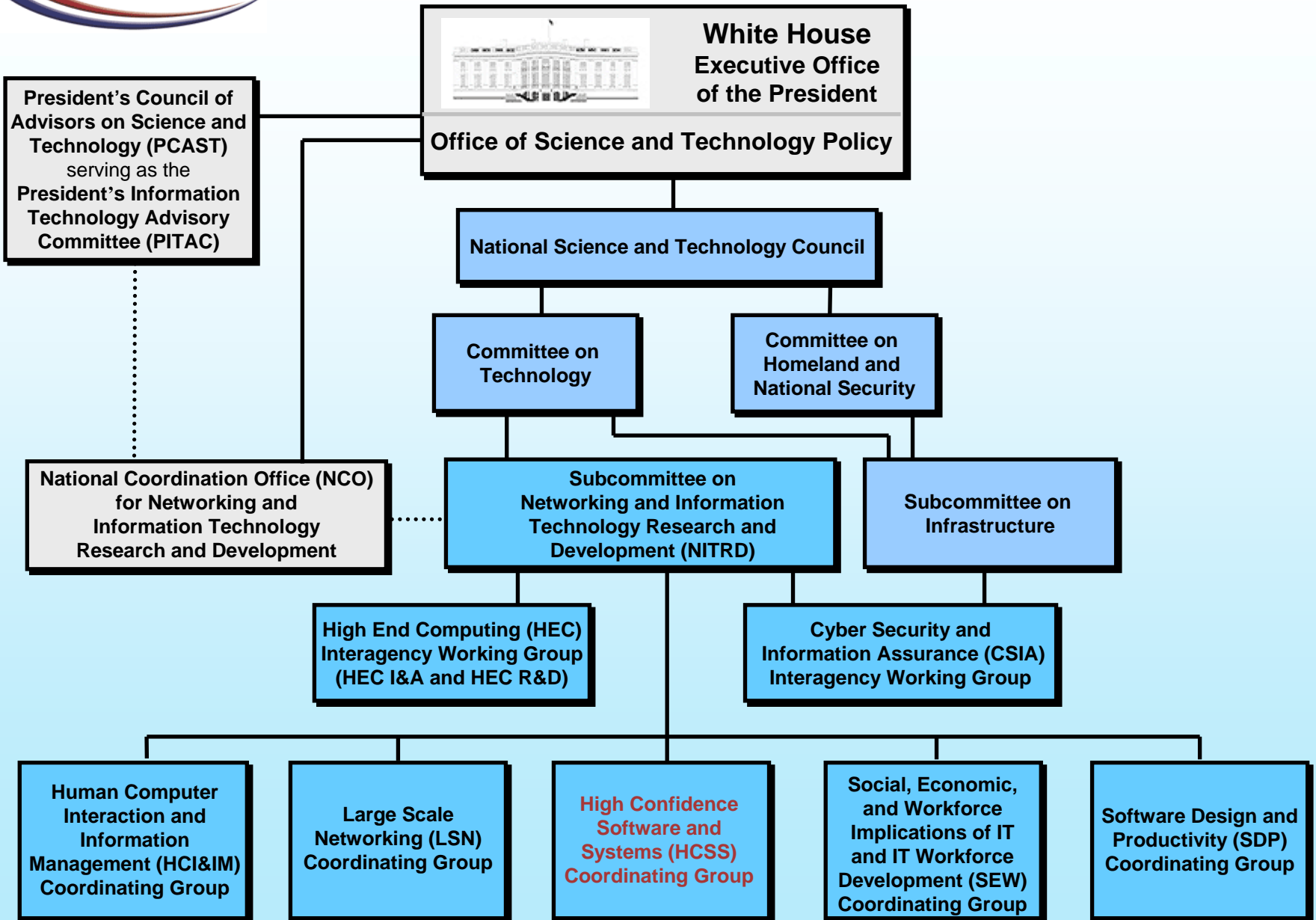


Overview of the NITRD Program

- **Program budget of \$3.1 billion proposed for FY 2007**
- **The NITRD Program is organized into technical domains called Program Component Areas (PCAs)**
- **The activities in the PCAs are coordinated through the NITRD Subcommittee of the National Science and Technology Council (NSTC)**
 - Has two Interagency Working Groups (IWGs) and five Coordinating Groups (CGs)
 - Representatives from
 - 14 program member agencies
 - White House Office of Management and Budget (OMB)
 - White House Office of Science and Technology Policy (OSTP)
 - NITRD National Coordination Office



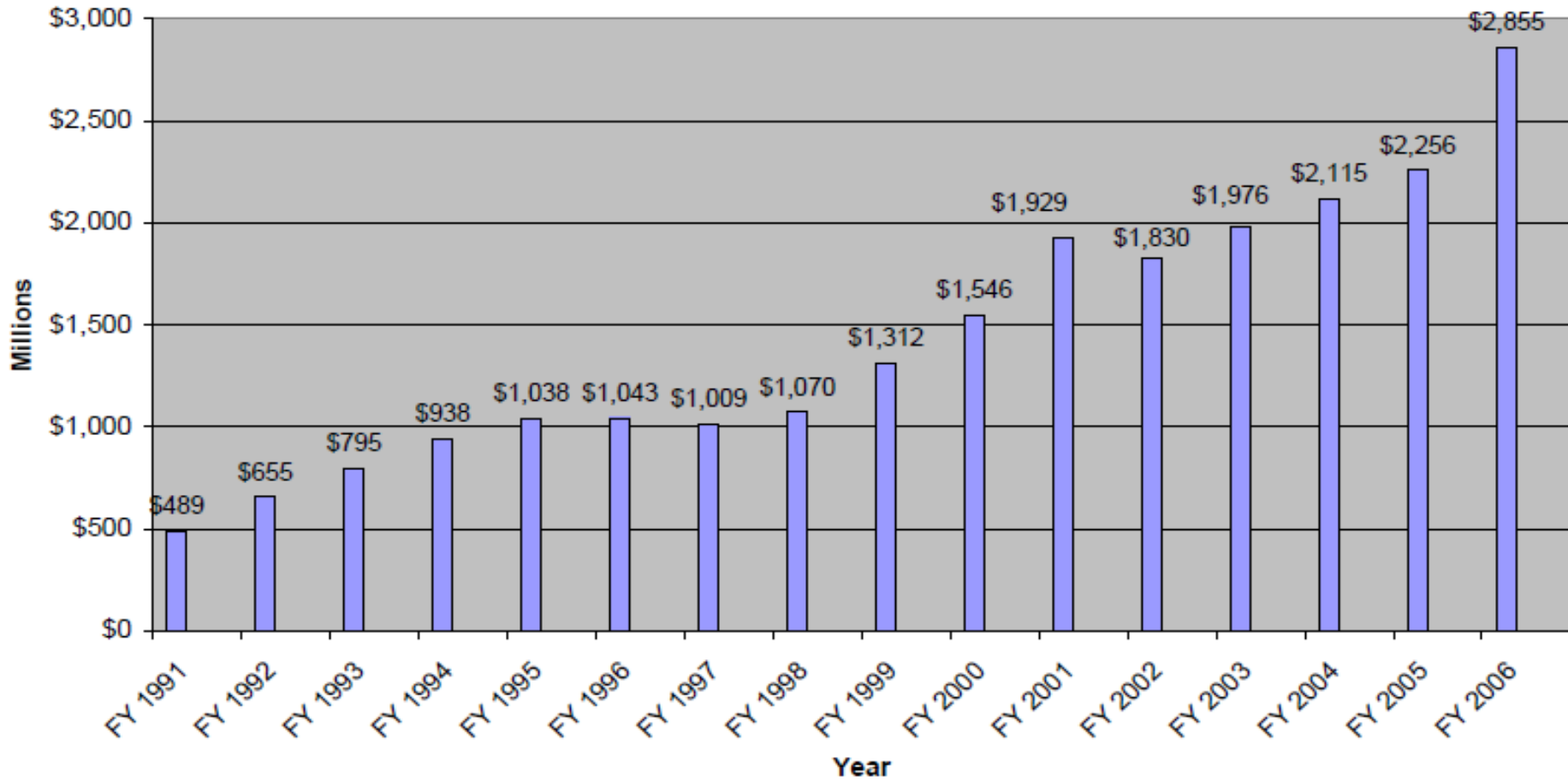
NITRD Program Coordination Structure



- **The National Coordination Office (NCO) for NITRD supports the Program's multi-agency technical activities.**
- **The NCO's objectives are:**
 - To support NITRD-related policy making in the White House Office of Science and Technology Policy (OSTP)
 - To serve as the Federal focal point for interagency technical planning, budget planning, and coordination for the Federal NITRD Program
 - To serve as a source of timely, high-quality, technically accurate, in-depth information on accomplishments, new directions, and critical challenges relevant to the NITRD Program



NITRD Program Budget History



Source: Annual Supplements to the President's Budget



Collaborative Vision for the NITRD Program

- **Increased NITRD interagency R&D coordination and planning activities, including conferences, workshops, and meetings that aid in identifying NITRD needs in strategic areas that are aligned with and benefit Federal missions and national priorities**
- **Information dissemination takes place through published reports including:**
 - Annual Supplements to the President's Budget
 - Research needs reports
 - Conference and workshop reports
 - Reports of the PCAST



President's American Competitiveness Initiative (ACI)

- **Calls for a doubling over 10 years of the investment in three Federal agencies — NSF, DOE/SC, and NIST — that support basic research programs in the physical sciences and engineering**
- **All three are NITRD Program member agencies; received 2007 budget increases that exceed the percentage increase in the overall NITRD budget**
 - NSF: 12% increase
 - DOE/SC: 35% increase
 - NIST: 10% increase
 - Collective increase for ACI agencies is \$186 million (17% above 2006 estimates)
 - Increase in ACI agency budgets accounts for over 85% of the overall NITRD Program budget increase for 2007
- **These agencies' physical sciences and engineering R&D will play a key role in generating technical advances in IT systems**



President's Advisory Committee on Science and Technology (PCAST)

- **A body appointed by the President comprising the Director of the Office of Science and Technology Policy and up to 45 members from outside the Federal government with diverse expertise in S&T**
- **Assigned responsibilities of the President's Information Technology Advisory Committee (PITAC)**
 - Provides the Administration with expert independent advice on maintaining America's preeminence in advanced information technologies
 - Charged with assessing the NITRD Program. Expects to produce assessment in 2007



Federal Support for R&D for High Confidence Networked Embedded Systems that Support Critical Infrastructures

- **High confidence networked embedded software and systems, such as Supervisory Control and Data Acquisition (SCADA) and Digital Control Systems (DCS), are of strategic importance to Federal missions, the Nation's industries, and the U.S. economy**
- **Government interest in supporting R&D for technological advances in SCADA and DCS**
 - Safe, reliable, and effective operation of our critical infrastructures
 - Dependence on how these increasingly networked, distributed sensing, monitoring, and control devices are designed, deployed, and tested
 - Applications such as emergency response, transportation, oil and natural gas, water sanitation and purification, energy and electricity, etc.



NITRD and High Confidence Networked Embedded Systems that Support Critical Infrastructures

- **The technical challenges of designing and building very high assurances into increasingly complex IT components and systems such as SCADA and DCS are significant**
- **Today, high assurance is difficult to achieve, and arguably impossible to achieve**
- **HCSS agencies are focusing significant attention on identifying IT R&D needs and appropriate investments for building the next generation of high-confidence SCADA and DCS technologies**
 - **Emphasis on integrating necessary assurances (e.g., safety, dependability, reliability, and robustness) from the ground up**

- **Complements the work of other NITRD areas by focusing on the scientific foundations needed for building dependable systems. Related activities include:**
 - HEC: Advanced platforms and software for modeling/simulation of complex systems
 - CSIA: working toward a roadmap of R&D needs in cyber security and information assurance
 - HCI&IM: R&D in integration of large-scale science and engineering data; multimodal interfaces; cognitive systems
 - LSN: R&D in next-generation optical architectures to improve network reliability, security, and performance
 - SEW: Education and training of the next generation of IT researchers
 - SDP: Foundational R&D in the science of software design for improved cost-effectiveness and “producibility”

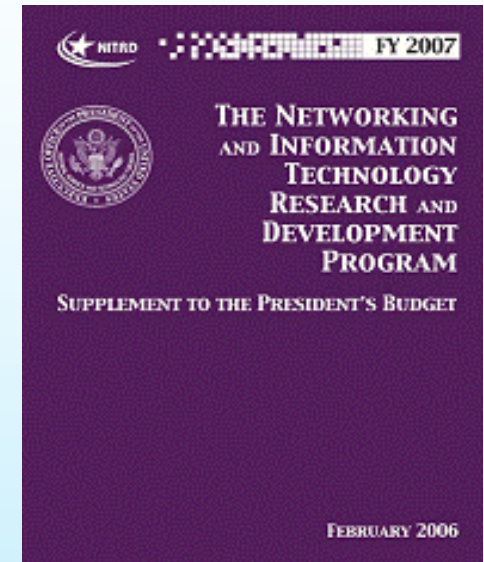


Beyond SCADA Workshop's Importance to the NITRD Program

- **The Beyond SCADA Workshop is an excellent example of NITRD coordination at work**
 - The HCSS CG is directing attention to the difficult, but important, R&D challenges facing infrastructure and industry
 - IT advances are required to realize high confidence and high integrity networked, distributed sensing, monitoring, and control systems
 - Facing these challenges could result in opportunities for integrating new technologies into these systems, such as wireless technologies
- **Your presence here today shows your commitment to contributing to a collaborative effort by the Federal, academic, and industry research communities to identify the IT technical challenges and to develop an R&D agenda for future research in this important area**

Comments or Questions?

- More detailed information on the NITRD Program is available in the *FY 2007 Supplement to the President's Budget for the NITRD Program*
- To download a copy of the Budget Supplement or any of our other publications, please visit:
<http://www.nitrd.gov/>





Backup Slides

NITRD Program Background and Overview



Overview of the NITRD Program

- **Statutory basis for the NITRD Program**
 - High-Performance Computing Act of 1991
 - Next Generation Internet Research Act of 1998
- **One of the few formal interagency R&D efforts – regarded as a successful model of Federal interagency coordination**



NITRD Member Agencies

- **Agency for Healthcare Research and Quality (AHRQ)**
- **Defense Advanced Research Projects Agency (DARPA)**
- **Department of Homeland Security (DHS)**
- **Department of Energy/National Nuclear Security Administration (DOE/NNSA)**
- **Department of Energy/Office of Science (DOE/SC)**
- **Environmental Protection Agency (EPA)**
- **National Archives and Records Administration (NARA)**
- **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)**
- **Office of the Secretary of Defense (OSD) and DoD Service Research Organizations**



NITRD Participating Agencies

- **Central Intelligence Agency (CIA)**
- **Department of Justice (DOJ)**
- **Department of State (DOS)**
- **Department of Transportation (DOT)**
- **Department of the Treasury (Treas)**
- **Department of Veterans Affairs (VA)**
- **Federal Aviation Administration (FAA)**
- **Food and Drug Administration (FDA)**
- **General Services Administration (GSA)**
- **Technical Support Working Group (TSWG)**
- **United States Geological Survey (USGS)**



Scope of NITRD Program

- **Eight major R&D areas, called Program Component Areas (PCAs):**
 - High End Computing Infrastructure and Applications (HEC I&A)
 - High End Computing Research and Development (HEC R&D)
 - Cyber Security and Information Assurance (CSIA)
 - Human-Computer Interaction and Information Management (HCI&IM)
 - Large Scale Networking (LSN)
 - High Confidence Software and Systems (HCSS)
 - Social, Economic and Workforce Implications of IT (SEW)
 - Software Design and Productivity (SDP)
- **Broad participation: R&D conducted by thousands of researchers spanning government laboratories, national laboratories, universities, and private-sector partnerships**
- **Technical Leadership: NITRD efforts shape national R&D agendas**



NITRD Coordination

HEC I&A

HEC R&D

CSIA

HCI&IM

LSN

HCSS

SEW

SDP

- **The NITRD Subcommittee coordinates broad goals, policies, and directions for the Program**
 - Subcommittee members are senior NITRD agency managers
 - Serves as liaison with White House officials
 - Oversees preparation of annual NITRD Supplement to the President's Budget

HEC I&A

HEC R&D

CSIA

HCI&IM

LSN

HCSS

SEW

SDP

- **In each PCA, agency managers participate in an Interagency Working Group (IWG) or a Coordinating Group (CG)**
 - IWGs and CGs, co-chaired by agency reps, meet monthly to:
 - Develop joint or multi-agency R&D efforts
 - Exchange information
 - Coordinate R&D plans across agencies to avoid duplication, leverage investments, maximize potential for widely useful results
 - Cooperate on multi-agency workshops, program and grant reviews, development of technical publications
 - Many Federal agencies, not just those in the NITRD Program, participate in IWG and CG activities
 - IWG, CG co-chairs meet as a group to discuss cross-cutting issues