President's Information Technology Advisory Committee

New Federal Research Initiatives: Support and Implementation

February 17, 1999

Recommendation #1: Diversify the modes of research support to include more projects of broader scope and longer duration, placing a renewed emphasis on research carried out in teams

- Researchers should be given enough resources and time so they could concentrate on the problem rather than worry about their next proposal
- Team research in information technology should be at least as important as single-investigator research, even at the National Science Foundation

Recommendation #2: Fund collaborations with applications to drive information technology research, but take measures to ensure that research remains a primary goal

- Continue to fund collaborations between information technology researchers and applications developers - however, the funding programs must be carefully structured to ensure that the research remains a principal focus
- If we are to reemphasize long-term fundamental research, we must acknowledge that the time to applicability will be too long in many cases to directly affect an application project that is driving the research
- Funding programs be designed to give equal value to the information technology research as to progress on the application

Recommendation #3: Fund centers for Expeditions into the 21st Century (1)

- Expeditions Centers should bring together scientists, engineers, and computer scientists from academia, government, and industry to "live in the technological future"
- Expeditions Centers should create "time machines" to enable the early exploration of technologies that would otherwise be beyond reach for many years
- Fund several Expeditions, each with a different focus - either a discipline-based theme, such as bioinformatics or multi-scale engineering, or on an infrastructure-based theme, such as distributed databases or tele-immersion

Recommendation #3: Fund centers for Expeditions into the 21st Century (2)

- Each Expedition should carry out several activities, including:
  - Technology testbeds
  - Economic and societal impact studies
  - Education
  - Outreach

Recommendation #3: Fund centers for Expeditions into the 21st Century (3)

- Create up to five Expeditions, to be selected by a competition to establish a core activity, with a standard process to allow additional researchers to participate
- Competitions should be held at regular intervals, e.g., every three years, to ensure a continual flow of new ideas
- Centers should include investigators from many research institutions
- Funding:
  - Initial five-year funding agreement, renewable for five years; for a full term of 10 years
  - To encourage truly aggressive efforts, very high annual funding levels should be possible, say up to $40 million per center

Recommendation#4: Establish a program of Enabling Technology Centers (1)

- Establish centers of excellence in computer science and engineering research applied to particular applications of information and communications technology
- Centers should be focused on applied technology and development
- Researchers at the centers should:
  - Conduct R&D on information technology problems arising from the center's application domain
  - Develop new curricula for students and mid-curricula for both students mid-career professionals
  - Participate in testbeds
  - Identify barriers to more widespread adoption of information technology in the application domain of concern

Recommendation #4: Establish a program of Enabling Technology Centers (2)

- In addition to research and development, Enabling Tchnology Centers should perform several functions, including:
  - Education and training
  - Testbeds
  - Research on factors inhibiting deployment of information technology in the application domain
  - Community building

Recommendation#4: Establish a program of Enabling Technology Centers (3)

- Funding should be shared between mission-oriented agencies with an interest in a particular applications domain and an agency with a broad mandate to support information technology research (e.g. the National Science Foundation)
- Centers should be funded on the Science and Technology Center funding model:
  - Full term should be 10 years
  - Annual funding of up to $10M per center is recommended, with up to 15 centers simultaneously in operation
  - Competitions should be held every three years