National Science Board Eyes Assessment of National S&E Infrastructure

Citing rapid changes in technology and the need to use information resources more efficiently, and responding to requests from the scientific community, the National Science Board (NSB) is considering a year-long assessment of the U.S. science and engineering (S&E) infrastructure. The goal is to identify areas that will need attention and possible funding in the coming years.

The new assessment was announced at the NSB's meeting in August by Joseph Bordogna, deputy director of the National Science Foundation. According to Bordogna, no formal mechanism now exists to conduct such an assessment or to coordinate and prioritize the federal government's infrastructure investments.

Because of the lack of precedent, none of the details for the assessment have been worked out as yet. However, the effort is expected to cover both traditional physical infrastructure—including facilities, instrumentation, equipment, and research platforms—and the new types of infrastructure that have been created or made possible by the Internet. These include advanced computing resources, digital libraries, shared databases, research and education networks, and distributed user facilities, as well as new standards and protocols.

The "cyber-infrastructure" component of the assessment may be even more important than the conventional side because it has never been examined comprehensively before. According to John Armstrong, NSB member and former vice president of science and technology at IBM, "Despite years on the Science and Engineering Indicators task force, we've never really focused on the data. We don't know how much there is or what state it's in."

"We're at the first step of a large effort here," Bordogna said, "but it needs to be undertaken to provide information and open up the discussion. It is something that we'll be talking about for a long time because the issue is rapidly growing in importance."

Bordogna gives four reasons for the need to assess the nation's S&E infrastructure. First, infrastructure assessment is already receiving serious attention in the other industrialized countries. During recent visits to South Africa and Korea, for example, Bordogna heard similar concerns expressed by each nation's officials. They worry about the impact of rapidly developing technologies on their research facilities and equipment.

Second, although no one knows just how much research data is available, it is understood that there is a large and growing gap between the amount of data being collected and the ability of researchers to process it. One prime example is the raw data available from experiments at the light sources of the national laboratories. "There are orders of magnitude more data collected versus what can be processed right now," Bordogna said.

Third, facilities costs are increasing so rapidly that public–private partnerships may be necessary to fund them in the future. Likewise, advancing technologies are enabling the sharing of more and more facilities, both in real time and in terms of their databases and digital libraries. An infrastructure assessment can help determine present capacity for sharing, future needs, and opportunities for expanding, and encourage these trends.

Fourth, there is a general awareness within the federal government that S&E progress is directly linked to the current strength of the national economy. "The capacity to continue good research requires a continuous upgrading of technology," Bordogna said.

Some of the key questions that the NSB is likely to consider in its assessment include:

- What are the size and quality of national physical infrastructure for science and engineering?
- What new infrastructure is needed to ensure U.S. leadership?
- How should the costs of this infrastructure be shared by public and private sectors?
- How do the government's indirect-cost and cost-sharing policies affect infrastructure development?
- What proportion of the infrastructure can be shared?
- What proportion produces knowledge that can be broadly used?

Although this new effort will be centered at the National Science Foundation, to which the NSB reports, Bordogna emphasizes that it will involve all the federal agencies responsible for S&E research programs. Some of the other agencies are also interested in infrastructure assessments—the National Science and Technology Council, for example—and the National Nanotechnology Initiative has an infrastructure component.

After an informal committee prepares a preliminary report, the NSB will conduct a series of interactive meetings and workshops with the research community. These gatherings will be opportunities to present comments to help shape the assessment. "We're only at the front end of getting our arms around this issue," Bordogna said.

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Party Platforms Presented on Science and Technology

Four years ago, the Republican and Democratic election-year platforms each contained a section on science and technology (S&T). This year, the platform on scientific research falls under a section on "Technology and the New Economy" for the Republicans and under a section called "Investing in Innovation" for the Democrats. Each party proposes ways to continue driving the U.S. technological progress.

The Republican platform proposes tax reforms to speed up research and innovation and a $20 billion increase in the research and development budget of the Department of Defense. The party's policy on "scientific advance, from biotechnology to chemistry...de-emphasiz[es] the direct role of government while strengthening private–public partnerships and the role of the private sector." The party platform also shows a commitment to leadership in space research and exploration.

The Democratic platform calls for doubling the current levels of government investment in long-term basic research in information technology and biomedical research. The platform supports "the use of creative public-private partnerships that will, when appropriate, help bring new products to market faster." To support start-up companies, small businesses, and entrepreneurs, the party advocates making the research and experimentation tax credit permanent and expanding it.

Both party platforms can be accessed in full on the Internet: www.rnc.org/2000/2000platformcontents (Republican) and www.democrats.org/hq/resources/platform/ (Democrat). □

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