The Technology Innovation Program

Funding Innovative Research

Oregon BEST FEST '09

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TIP Purpose …

"Assisting United States businesses and institutions of higher education or other organizations, such as national laboratories and nonprofit research institutions, to support, promote, and accelerate innovation in the United States through high-risk, high-reward research in areas of critical national need."

America COMPETES Act
(PL 110-69)
August 9, 2007

TIP is Part of NIST

promotes U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

TIP draws upon NIST scientific and technical expertise

- Help identify and select areas of critical national need for TIP funding
- Evaluate proposals

NIST benefits from collaborating with TIP

- Apply understandings of critical national needs to NIST research programs
- Enhance knowledge, skills, abilities through TIP program development and proposal review

Key Features of TIP

- **Funding:** $65 million in FY 2009, including management of ongoing Advanced Technology Program awards
- **Novel Purpose:** address societal challenges not being addressed in areas of Critical National Need (CNN) with benefits that extend significantly beyond proposers
- **Rich Teaming:** businesses, academia, national labs, nonprofit research institutions and other organizations
- **Scientific & Technical Merit:** high-risk, high-reward research
- **Transformational Results:** strong potential for advancing state-of-the-art and contributing to U.S. science and technology base
- **Societal Challenges:** justifies government attention
- **Clear Government Need:** no other funding sources are reasonably available

Key Features of TIP (cont'd)

- **Allows institutions of higher education to lead a joint venture R&D project**
- **Intellectual property**
  - Reside with U.S. company or any joint venture member (including a university joint venture member)
- **Opportunities for state involvement with R&D planning**
- **Program assessment and annual reports from Program and Advisory Board to Congress required**

TIP Project Types

- **Funding**
  - **Single company projects up to $3M over a maximum of three years**
  - **Joint Venture (JV) projects may be funded up to $9M over a maximum of five years**
  - **Note: TIP funds direct project costs only**
- **Cost share**
  - **At least 50% of the yearly total project costs – direct plus indirect**
  - **Composed of both cash and in-kind**
- **Structure**
  - Single company projects led by a small or medium-sized U.S. company
  - Joint venture projects of either:

    1) at least ***two*** for-profit U.S. companies with the project lead being a small or medium-sized company, or

    2) at least ***one*** small or medium-sized company and ***one*** institute of higher education or other eligible organization with the lead being either the small or medium-sized company or the institute of higher education

TIP Funding Criteria

- Three award criteria explain the need for TIP support:
  - Why TIP support is needed
  - Reasonable efforts to secure alternate funding
  - Novelty of proposed research
- Three additional award and evaluation criteria:
  - Scientific and technical merit and may result in intellectual property vesting in a U.S. entity
  - Strong potential to advance the state-of-the-art and contribute to the U.S. science and technology knowledge base
  - Strong potential to address areas of critical national need
    - Transforming the Nation's capacity to deal with major societal challenges
    - Generate substantial benefits to the Nation that extend significantly beyond the proposer

Foreign Participation

- U.S.-incorporated company with a parent company incorporated in another country may participate
- Company's participation must be:
  - In the economic interest of the U.S.
- Home country of parent must afford U.S. companies:
  - Comparable opportunities to participate in government-funded programs similar to TIP
  - Comparable local investment opportunities
  - Adequate and effective protection of U.S.-owned intellectual property rights

The TIP Advisory Board

- Purpose
  - Provide advice to the Director on plans and policies
  - Review TIP's efforts in R&D acceleration
  - Report on the health and effectiveness of TIP in meeting its mission
- 10 members (at least 7 from industry)
- Meets twice per year
- Reports to Congress

The TIP Critical National Need Framework

- TIP uses a *Critical National Need* identification & selection process to shape its competitions and collaborative programs

- What is a *Critical National Need*?
  - *An area that justifies government attention because the magnitude of the problem is large and the societal challenges that need to be overcome are not being addressed, but could be addressed through high-risk, high-reward research*

TIP Societal Challenges

- What is a TIP Societal Challenge?
  - A problem or issue confronted by society that when not addressed could negatively affect the overall function and quality of life of the nation, and as such justify government attention
- A Societal Challenge
  - Represents a problem or issue, not a solution or answer
  - Requires a technical solution
  - Is sufficiently difficult to overcome that advancements across a multitude of areas is warranted

Competition topic areas are based on the <u>needs</u>, not technologies, for meeting societal challenges

A Pipeline of Critical National Need Topics

- Leverage nationally recognized science and technology reports and know-how
- Evaluate a large field of areas where transformative research could be expected to have large societal impact
- Use a TIP evaluation framework to assess a diversity of areas and challenges
  - Maps to Administration Guidance
  - Justifies Government Attention
  - Essentials for TIP Funding
- Identify interest areas

A Pipeline of Critical National Need Topics *(cont'd)*

- TIP seeks input from a host of external stakeholders and organizations
  - Government agencies and advisory bodies (such as the National Research Council, the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine)
  - Science and Technology Policy Institute
  - Industry organizations, leading researchers from academic institutions, and others
- TIP solicits white papers
- TIP conducts analysis of federal funding to determine unique role within a Critical National Need and Societal Challenge

TIP 2009 Competition
Area A: Civil Infrastructure

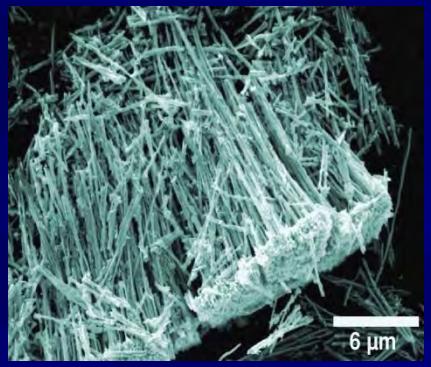
- Poor road conditions cost the U.S. $54 billion a year in repairs
- More than 27% of the nation's 600,000 bridges are rated structurally deficient or functionally obsolete
- Water main leakages and breaks consume 6 billion gallons of treated water each day

Failure to reverse a trend of increasing highway infrastructure deterioration
will lead to reductions in national and economic security,
lower worker productivity, and an overall reduction in the quality of life

2009 Competition Area A: Civil Infrastructure

- Critical National Need
  - Civil Infrastructure
- Societal Challenge
  - Managing the structural integrity of the United States' infrastructure
    - The absence of cost-effective means for establishing accurate assessments of the integrity and condition of civil infrastructure elements and for providing long-lived repairs to deteriorating infrastructure
- TIP's Response for 2009
  - "Advanced Sensing Technologies and Advanced Repair Materials for the Infrastructure: Water Systems, Dams, Levees, Bridges, Roads, and Highways"
  - *Two* elements:
    - Inspection and/or Monitoring Technologies
    - Repair/Retrofit Materials and Application Technologies

TIP 2009 Competition Area B: Manufacturing



- Manufacturing is a significant part of the U.S. economy
  - In 2007, represented 11.7% of U.S. GDP, 10.1% of U.S. employment
- Manufacturing sector struggling
  - In 2002, the U.S. manufacturing sector represented 5th largest economy in the world, by 2007 had fallen to 8th largest
  - Institute for Supply Management New Orders Index remains negative for 15 consecutive months

Failure to invest in technology advances that can be implemented by the manufacturing sector will result in continued reductions in economic security, and an overall reduction in the quality of life

2009 Competition Area B: Manufacturing

- Critical National Need
  - Manufacturing
- Societal Challenge
  - Providing manufacturers and end users
    - Improved access to adequate quantities of advanced materials at competitive costs
    - That allow evaluation and utilization of these materials in innovative ways
- TIP Response
  - *"Accelerating the Incorporation of Materials Advances into Manufacturing Processes"*
  - *Two* elements:
    - Process scale-up, integration, and design of advanced materials
    - Predictive modeling for advanced materials and materials processing

Potential Future Critical National Need (CNN) Topic Areas

- **Civil Infrastructure**
- **Energy**
- **Green Chemistry**
- **Manufacturing**
- **Water**
- **Networks**
- **Personalized Medicine**

These areas represent potential broad CNN topic areas that TIP has identified to date. This list is not exhaustive; TIP may select a different or more specific CNN for future competitions.

NIST Construction Grant Program

Background & History – FY 2008

- The Consolidated Appropriations Act, 2008 (Public Law 110-161) appropriated "$30,080,000 . . . for a competitive construction grant program for research buildings" to NIST.

- Additional information on the program was provided in an explanatory statement that under Section 4 of the Act had the same effect as a Conference Report: "The research buildings should span all the applicable sciences, as they relate to DOC. These grants shall be awarded to colleges, universities, and other non-profit science research organizations on a competitive basis." 153 Congressional Record H15790 (Dec. 17, 2007).

- On November 24, 2008, NIST announced $24M in grant funding http://www.nist.gov/public_affairs/releases/2008construction_grants.html.

NIST Construction Program Goals & Objectives

To provide competitively awarded grants for research science buildings ***through the construction of new buildings or expansion of existing buildings.***

Grants awarded to U. S. institutions of higher education and non-profit organizations for research facilities performing all applicable fields of science that complement NIST, NOAA, and/or NTIA programs.

Research science building means ***a building or facility whose purpose is to conduct scientific research, including laboratories, test facilities, measurement facilities, research computing facilities, and observatories.***

Recovery Act Funding

The American Recovery and Reinvestment Act of 2009 (Recovery Act) (Public Law 111-5) appropriated $180M to NIST "**. . . for a competitive construction grant program for research science buildings.**"

On May 27, 2009, NIST announced availability of @ $120M to fund 8-12 competitive grants and up to $60M for meritorious FY2008 applications. Deadline for proposals was August 10, 2009. (http://www.nist.gov/public_affairs/releases/research_con_grants_052609.html)

On July 20, 2009, NIST awarded grants totaling $55.5M to 4 universities (meritorious FY2008 applicants). (http://www.nist.gov/public_affairs/releases/20090720_cgp_awards.htm)

FY 2009 Additional Funding

- Omnibus Appropriations Act, 2009 (Public Law 111-8) appropriated $30 million for the NIST Construction Grant Program

For Info on TIP…

- Now accepting white papers to complement future critical national need identification
- TIP website: http://www.nist.gov/tip/
- Dr. Robert Sienkiewicz, Senior Advisor (301) 975-4969