



Technology Innovation Program

Critical National Need Webcast

7/14/08

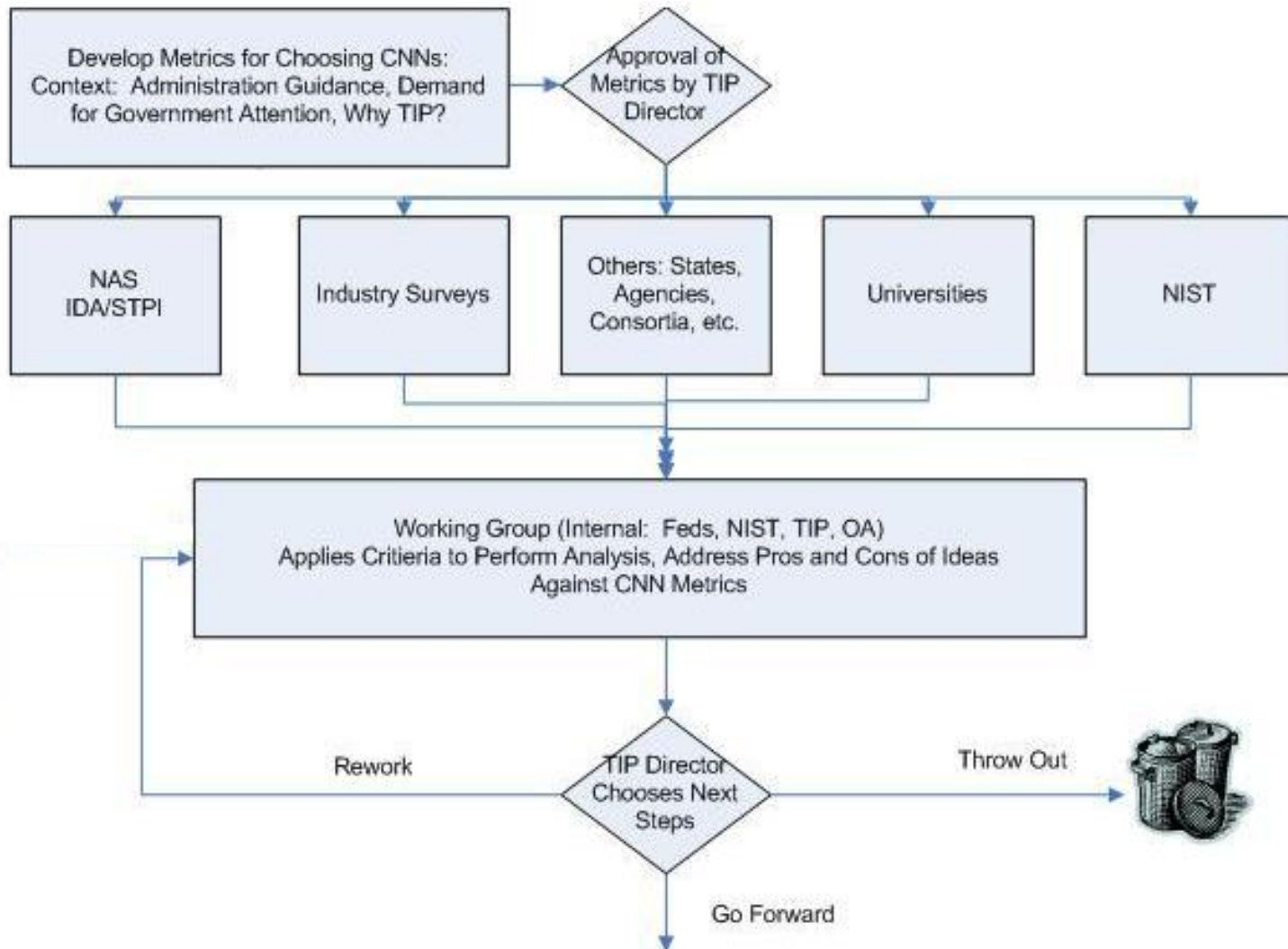
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Technology Innovation Program

- Critical National Need identification & selection process will shape TIP collaborative outreach and competitions
- Gap Analysis – Determine unique NIST role within Critical National Needs
 - NRC (National Research Council) of the National Academies of Science
 - STPI (Science & Technology Policy Institute)
 - Published Industry Roadmaps
 - Others
- Competition topic areas based on the *needs*, not *technologies*, for meeting societal challenges

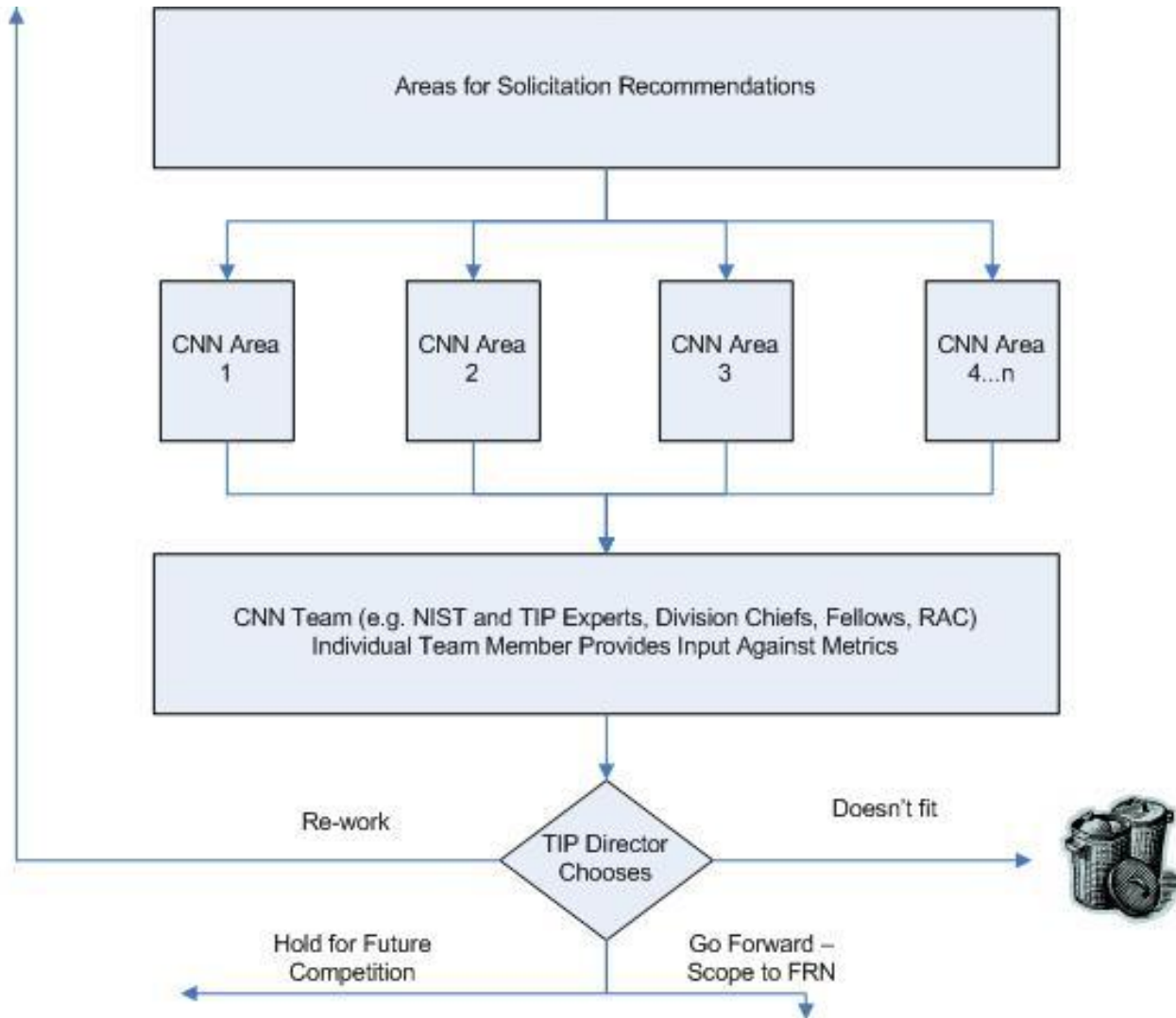
Critical National Needs - The Selection Process



- **Civil Infrastructure**
- **Energy**
- **Manufacturing**
- **Water**
- **Communications**
- **Complex Networks**
- **Personalized Medicine**

These seven areas represent the potential broad CNN topic areas that TIP had identified. This list is not exhaustive.

Critical National Needs - The Selection Process (cont'd)





- Poor road conditions cost U.S. motorists \$54 billion a year in repairs and operating costs.
- More than 33% of the nation's 600,000 bridges are rated structurally deficient or functionally obsolete.

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.

Energy Impacts:

The Economy

The United States economy is dependent on foreign sources of energy. Disruptions in oil supply from foreign countries and/or rise in price impacts all sectors of U.S. economy.



Sky Factory from Flickr by Taras Kalapun

The Environment

Energy-related carbon dioxide emissions causes environmental damage and reduces the quality of life in United States. Carbon dioxide, nitrous oxide and other greenhouse gases are significant contributors to global warming.

Manufacturing generates a large share of American prosperity. Yet...

At 14.3 million workers, employment in manufacturing today is at its lowest point since 1950. Virtually every state lost manufacturing jobs between 2001 and 2004, average loss 11.5%.

Rapidly changing market demands necessitate:

- shorter innovation cycles
- more flexible and rapidly re-configurable manufacturing systems
- integrated and streamlined communications and supply chains
- reduced environmental impacts and improved energy efficiencies



Glowing Steel from Flickr by crowbert

Six billion gallons per day of clean, treated drinking water disappears, mostly due to old, leaking pipes and water mains... Enough to serve the population of California!



Pharmaceutical agents (i.e. mood stabilizers, antibiotics, sex hormones, anti-convulsants) are in drinking water supplies of 41 million Americans.

**Advanced Sensing Technologies for
Infrastructure: Roads, Highways,
Bridges, and Water System**

- Proposals are being sought to create and validate new advanced, robust, network capable, nondestructive evaluation and test sensing systems, or system components, to cost effectively and quantitatively inspect and evaluate the structural integrity of the civil infrastructure.

- The targeted system should be capable of, but not limited to, detection of corrosion, cracking, and delamination or failure of critical infrastructure elements and the materials of which they are made.

- real-time understanding of the integrity, health and service life through the use of portable, mobile or remote sensing capability.
- all aspects of the system to provide an advanced, cost effective, networked system
- either fixed or mobile, that is easily deployable, self powered, and self monitoring.

- Systems that provide new and advance methodologies for the detection of fluid leaks from water piping systems; and
- Single components of a system solution that include a demonstration of the component in a system setting

- Advancements in a system component without a prototype demonstrating that the component is functional within a system solution, as part of the proposed technical plan;
- Integration projects using only existing state-of-the-art components;
- Straightforward improvements to existing components without the potential for a transformational increase in performance to the technical requirements; and
- Software development that is predominantly straightforward, routine data gathering using applications of standard software development practices.