Visiting Committee on Advanced Technology

February 6, 2014

NIST Resilience Initiative

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NIST Program to Develop Disaster Resilience Framework and Model Resilience Guidelines

- Natural and man-made disasters cause an estimated $57B in average annual costs.
- Large single events can cause losses exceeding $100B.
- Current approach of response and rebuilding is impractical and inefficient for dealing with natural disasters.
- A resilience-based approach will provide the framework and guidance needed to enable communities to resist, respond to, and recover from hazard events more rapidly and at lower cost.
- The NIST program will develop a Disaster Resilience Framework 1.0 and Model Resilience Guidelines for critical buildings and infrastructure lifelines.

EL Core Competencies Relating to Disaster Resilience

- Fire modeling and prediction at the building and community scale
- Firefighting strategy and tactics at the building and community scale
- Hazard analysis
- Structural modeling and prediction under wind, earthquake, and fire loads
- Wind/storm surge load characterization
- Service life prediction of materials

Statutory Authorities

- National Earthquake Hazard Reduction Program
  - Established by Public Law (PL) 95-124, the *Earthquake Hazards Reduction Act of 1977*
  - Reauthorized in 2004 (PL 108-360); NIST named lead agency
- Disaster and Failure Studies
  - NCST Act (2002): building failures, evacuation, and emergency response procedures
  - NIST Act (1985): structural investigations
  - Fire Prevention and Control Act (1974): fire investigations
  - NEHRP Reauthorization Act (1990): earthquakes
- National Windstorm Impact Reduction Program
  - Created by the National Windstorm Impact Reduction Act of 2004 (PL 108-360)
  - Support R&D to improve building codes and standards and practices for design and construction of buildings, structures, and lifelines

Community Needs Drive Functional Requirements for Buildings and Infrastructure

Community Resilience for the Built Environment

- Natural hazards
- Manmade hazards
- Degradation
- Climate change

- Performance Goals
- Mitigation
- Response
- Recovery

NIST Program on Resilience for Critical Buildings and Infrastructure Lifelines

Through the FY 2013 initiative, NIST will provide the measurement science and convener role to:

- Convene highly diverse stakeholder interests across all hazards to:
  - Develop a comprehensive Disaster Resilience Framework for achieving community resilience that considers the technical interdependence of the community's physical and human assets, operations, and policies/regulations
  - Develop Model Resilience Guidelines for critical buildings and infrastructure lifelines essential to community resilience based on *existing* model standards, codes, and best practices

Program included in President's Climate Action Plan

- Deliver Disaster Resilience Framework 1.0
- Convene Disaster Resilience Standards Panel

Disaster Resilience Framework 1.0

- The Disaster Resilience Framework 1.0 will focus on the role that buildings and infrastructure lifelines play in ensuring community resilience.
- The Framework will:
  - Establish overall performance goals
  - Identify existing standards, codes, and best practices to enhance resilience
  - Identify gaps that must be addressed to enhance resilience
  - Capture regional differences in perspective on resilience

NIST Technical Team

- Lean NIST program team
  - Resilience Lead/Program Manager
  - Research Engineer/Buildings and Infrastructure Lifelines
  - Social Scientist
  - Administrative Support
- Resilience “Tiger Team”
  - Access NIST expertise to provide advice
  - Provides for alignment of existing programs related to disaster resilience to achieve broader resilience goals
- Technical and Administrative Support Contractor
  - Applied Research Associates
  - Technical support to draft Disaster Resilience Framework and conduct regional workshops
  - Administrative and logistical support to organize and hold workshops

Federal Stakeholder Engagement is Critical

- Coordinate and collaborate with Federal agency partners
- Federal stakeholders include, but are not limited to:
  - Executive Office of the President (National Security Staff, OSTP, NSTC)
  - Department of Homeland Security
  - Department of Commerce
  - Department of Defense
  - Environmental Protection Agency
  - U.S. Army Corps of Engineers
  - Department of Energy
  - Department of Health and Human Services
  - Department of Housing and Urban Development
  - Department of Transportation
  - U.S. Geological Survey
  - National Science Foundation

… As is External Stakeholder Engagement

- Engage the external stakeholder community through a series of regional workshops
- External stakeholders include, but are not limited to:
  - Codes and standards organizations
  - State, local, and regional officials
  - Insurance/re-insurance industry
  - Architects
  - Engineers
  - Utility operators
  - Urban planners
  - Industry
  - Emergency managers
  - Relief organizations
  - Regulators

Technical Approach

- NIST will draft Disaster Resilience Framework 1.0
- Gather input for the Disaster Resilience Framework 1.0 through a series of quarterly regional workshops to gather input and refine Disaster Resilience Framework
- First workshop to be held in Washington, DC in March-April 2014
- Deliver Disaster Resilience Framework in 18 months
- Form a Disaster Resilience Standards Panel (DRSP) using the Disaster Resilience Framework 1.0 as a starting point

Disaster Resilience Standards Panel

- The Disaster Resilience Standards Panel (DRSP) will be modeled after the approach used for the Smart Grid Interoperability Panel
- The (DRSP) will be formed to represent:
  - The broad interests of the stakeholder community with respect to disaster resilience
  - The regional variations in perspectives on disaster resilience
- The DRSP will:
  - be open to all interested participants
  - have a governing board of 10-15 members
- The DRSP is intended be a self-governing entity
- The DRSP will lead development of:
  - Disaster Resilience Framework 2.0
  - Model Resilience Guidelines

Resilience Strategies for the Built Environment – Scale-Up

- With new funding in FY 2014, NIST will develop science-based tools for:
  - resilience assessment of critical buildings and infrastructure lifelines
  - evaluating options for enhancing resilience in the short, medium, and long term at the community scale

NIST Contacts

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Questions?