SmartAmerica Challenge

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Presidential Innovation Fellows

The Vision of SmartAmerica

Unleash the true value of various testbeds by demonstrating the benefits of interconnected Cyber-Physical Systems including improved safety, sustainability, efficiency, healthcare, and travel

The "Arpanet" for CPS Innovation

The Challenge

- Based on convergence and cross-sectorial pre-competitive collaboration using open standards, participants will demonstrate ***measureable impacts*** of CPS on the following topics.
  - Fueling job creation - development, installation, maintenance of these new Cyber-physical system components, expansion of knowledge workers
  - Creating new business opportunities - design and development of CPS and the management and use of data
  - Improving the economy - drive growth in manufacturing, expansion of the digital economy
  - Saving lives - through improved health systems, deployment of city and community resiliency technology and better utilization of health data

Current Participants

- More than 100 organizations are currently participating in the Challenge
- Industry
  - IBM, GE, Intel, Qualcomm, AT&T, Schneider Electric, Boeing, TI…
- Research/Educational Institutions
  - MIT, Harvard, UC Berkeley, Vanderbilt, U Penn, UCLA, Internet2, US Ignite, Massachusetts General Hospital, MITRE Corporation…
- Government
  - NIST, DoT, DoD, DHS, HHS, Montgomery County…

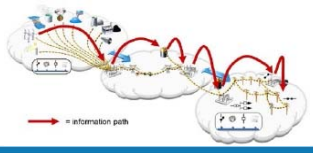
Teams

- 24 team projects are currently running. Examples include:
  - Closed Loop HealthCare
  - Transactive Energy
  - Public Safety for Smart Communities
  - Smart Emergency Response Systems
  - Smart Distributed Manufacturing
  - Autonomous Vehicles working with hospital system
  - Smart Vehicle Communication
  - Event Management for Smart Cities
  - Smart Manufacturing
  - Smart Building Rooftops

AT&T and IBM SmartAmerica Initiative

Transactive Energy Management

Transactive Energy Management (TEM) provides integration and management of Distributed Energy Resources (DER). TEM uses economic signals that incorporate the valuation of both business and operational objectives and constraints along the paths of electricity delivery to create a control signal that reflects the dynamically changing system requirements at a fine-grained nodal level.



The Offering

- Holistic Transactive Energy Management solution including:
  - IBM Internet-scale Control Systems (iCS)
  - IBM Transactive Agents
  - IBM Analytics
  - AT&T M2M services and communications
  - AT&T smart grid devices and end points
  - AT&T Data Platform
- Differentiated by combining AT&T and IBM assets and capabilities to create a distributed control overlay and end to end Transactive Energy Management solution

Solution Benefits

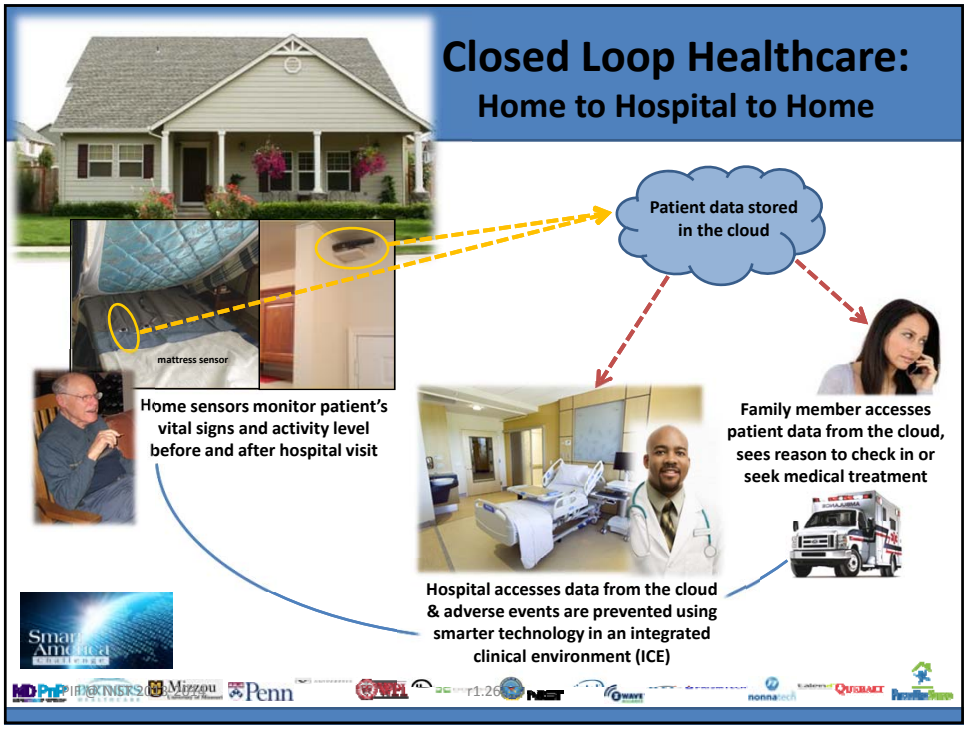
- Make optimal use of distributed energy resources (DER) to meet both business and operational objectives
- Improve the reliability and efficiency of the electric system
- Reduce requirement for spinning reserve to balance renewable intermittency
- Enable horizontal interoperability between highly heterogeneous devices and organizational entities along the electricity supply chain
- Management of the extremely heterogeneous energy assets in the system, and also create aggregations of assets such as microgrids
- Enable new business models and access to value streams throughout the supply chain (including for customers)

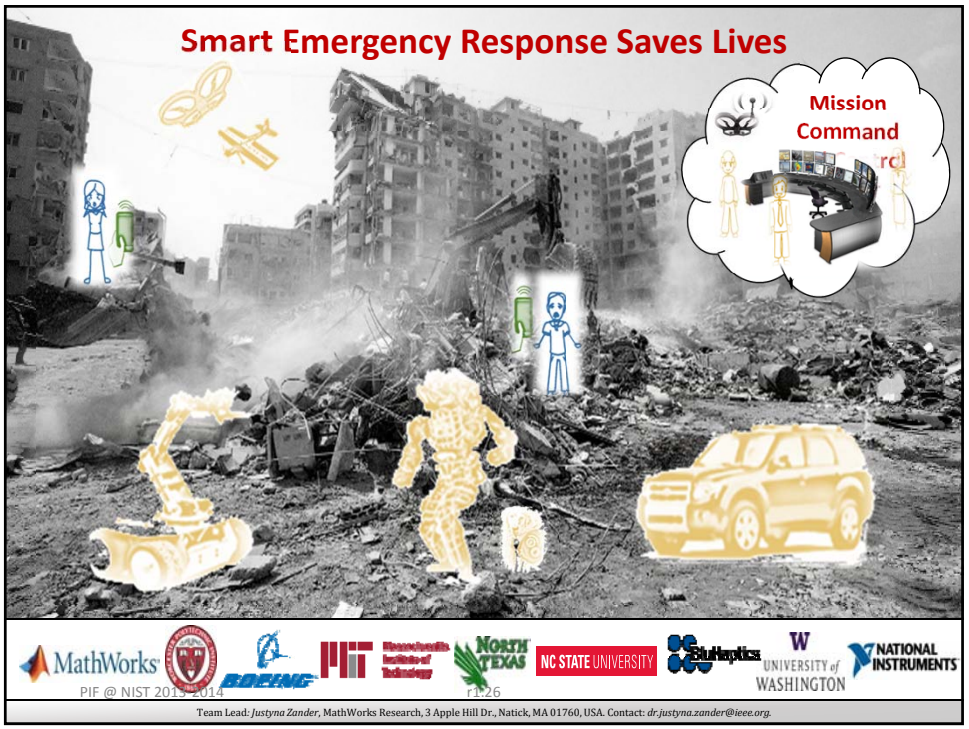
Target Audience

- Public or private sector organizations which are part of the electric supply chain – such as bulk generation producers, system operators, transmission operators, distribution utilities, services providers (such as aggregators)

Additional Impacts

- Energy Savings
- Empowered consumers
- Job creation associated with the innovation and production of TEM technologies


Closed Loop Healthcare:
Home to Hospital to Home
Patient data stored in the cloud
mattress sensor
Home sensors monitor patient's vital signs and activity level before and after hospital visit
Family member accesses patient data from the cloud, sees reason to check in or seek medical treatment
Hospital accesses data from the cloud & adverse events are prevented using smarter technology in an integrated clinical environment (ICE)
Smart America Challenge
PIF @ NIST 2013-2014
r1.26


Smart Emergency Response Saves Lives
Mission Command
MathWorks
BOEING
NORTH TEXAS
NC STATE UNIVERSITY
UNIVERSITY of WASHINGTON
NATIONAL INSTRUMENTS
PIF @ NIST 2013-2014
r1.26
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Vehicle-to-Pedestrian CPS Safety Concept

14% of U.S. traffic fatalities were incurred by pedestrians in 2011

Honda & Qualcomm collaborated to extend existing V2V development to the new area of vehicle-to-pedestrian (V2P) safety

Next Steps

- Smart America Summit (June, 2014)
  - Showcase projects and teams, demonstrate achievements, make announcements.
  - 3 days: June 10-12 (White House, Expo, NIST)
- Global Cities Challenge
  - Planned Launch Fall 2014
  - Move from demonstrations to deployment
  - City teams working with technology innovators to reduce the time and cost of smart cities deployments

NIST Smart Grid Program

NIST CPS Public Working Group

Gerald Castellucci
CPS PWG Manager

Chris Greer
Director

NIST National Institute of Standards and Technology U.S. Department of Commerce

engineering laboratory

Need for Consensus CPS Definition and Reference Architecture

- Provide a common lexicon and taxonomy that can apply across CPS
- Show a common architectural vision to help facilitate interoperability between components and systems
- Enable creation of reusable CPS components and tools to measure and evaluate their performance
- Promote communication across diverse stakeholder community

NIST CPS Public Working Group Deliverables

- Definitions & Taxonomies
- Requirements & Use Cases
- Security & Privacy
- Reference Architecture
- Technology Roadmap

NIST CPS Public Working Group Subgroups

Co-Chairs	Definition, Reference Architecture	Use Cases	Cyber Security	Timing (Coordinated Effort with Boulder Group)
NIST	Abdella Battou	Eric Simmon	Vicky Pillitteri	Marc Weiss
Academia	Janos Sztipanovits	John Baras	Bill Saunders	Hugh Melvin
Industry	Steven Mellor (IIC)	Steven Mellor (IIC)	CSRA	Sundeep Chandhoke

NIST CPS Public Working Group Anticipated Timeline

- Inaugural Virtual Meeting:
  - June 2014
- First Draft Documents from Subgroups:
  - Fall 2014
- Second Draft, Integrated Subgroup Inputs
  - Winter 2015
- Publication of Results
  - Spring 2015