DHS SCIENCE AND TECHNOLOGY

First Responder Support

Homeland Security
Science and Technology

Richard Legault, PhD
Senior Advisor, Social Science
U.S. Department of Homeland Security
February 2019

Background

- Beyond the ability of single state/local agency to address all capability needs
- DHS S&T mission provides support when:
  - Needs cannot be satisfied at the state and local level; and
  - Investments in science and technology can provide national advances to first responders

- Project Responder initially funded in April 2001
- Technology Adoption Studies started in 2014
- Evaluation of R&D Impact on first responders started in 2017

Project Responder Timeline

2001
- Project Responder
- *National Technology Plan for Emergency Response to Catastrophic Terrorism*

2008
- Project Responder 2
- *Review of Emergency Response Capability Needs*

2011
- Project Responder 3
- *Toward the First Responder of the Future*

2014
- Project Responder 4
- *2014 National Technology Plan for Emergency Response to Catastrophic Incidents*
- Evaluation Studies

2017
- Project Responder 5
- Evaluation Studies

2019
- ***Project Responder 6***

Evolving Response Environment

First Responders Face Diverse and *Evolving* Threats

Threats and Hazards

Increased frequency and severity of violent incidents and natural disasters

Human Behavior and Perception

Human activities and threat perceptions affect how people act during incidents

Media Coverage

Incident details are disseminated at an accelerated pace and distance, often in real time and from victims and bystanders

Advances in Technology

Ever greater access to new technologies that improve responder capabilities

Project Responder Capability Domains

Capability domains are broad operational categories where similar needs are consistently identified. Such categories provide an organizational construct for the discussion of response needs.

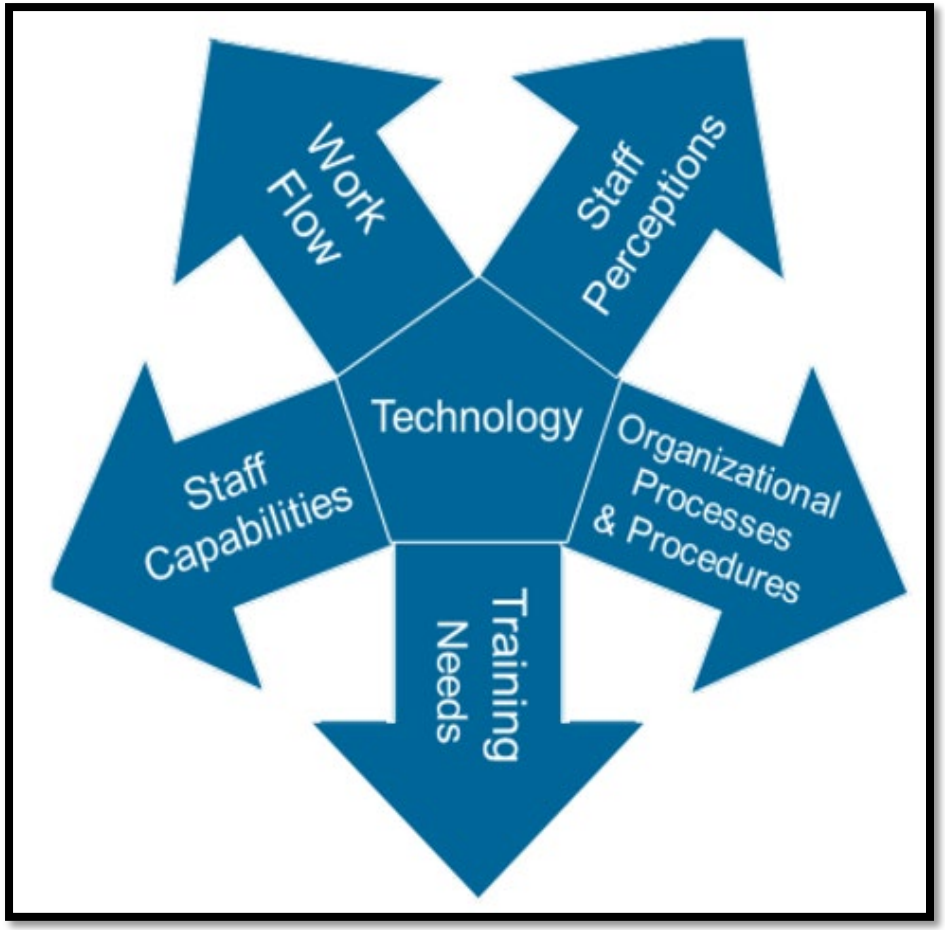
Project Responder Capability Domains
Situational Awareness
Communications & Information Sharing
Control, Command & Coordination
Responder Health & Safety
Logistics & Resource Management
Casualty Management
Training and Exercise
Risk Assessment & Planning
Intelligence & Investigation

PR Priorities Across Time

Capability Priorities Across Time				
2004 Priorities	2008 Priorities	2011 Priorities	2014 Priorities	2016 Priorities
Body protection from all hazards	Command & management	Virtual simulation training	All-environment communications	Joint command
On-scene detection	Communications (3)	Responder geolocation	Responder geolocation	Responder geolocation
Remote & standoff detection	Seamless data integration	All-environment communications	Threat detection & monitoring	Integration of digital information
Point location & identification	Full-body personal protection	Remote tactical monitoring	Hazard identification	Integration of social media feed data
Seamless connectivity & integration	Logistics support (2)	Body protection from all hazards	Remote tactical monitoring	Information sharing
Mass victim decontamination	Mass prophylaxis distribution	PPE-integrated communications	Body protection from all hazards	Integration of disparate data sources
Risk awareness & assessment	Training & exercise programs	Threat detection & monitoring	PPE-integrated communications	Creation of actionable intelligence
Mass medical prophylaxis	Mass victim decontamination	Resource availability	Resource availability	Integration of images and video
Mass casualty medical care management	Responder respiratory protection	Trend & pattern identification	Casualty location	
Individual & collective protection	Point location & identification	Hazard identification	Trend & pattern identification	
Surveillance & information integration	Prioritization & dissemination of threat info	On-scene resource status	On-scene resource status	
Logistics information systems	Credentialing	Casualty location	Virtual simulation training	
Threat assessment/data collection/analysis			All-source information integration	
			Software application assessment	

Identifying Organizational Barriers to Tech Adoption

- DHS new technologies can only be successful if our customers – first responders – purchase and use them to improve their missions
- For some new technologies, there are organizational barriers to adoption beyond available funding – training requirements, staff reluctance, union policy, and privacy issues
- To identify and mitigate these barriers, DHS aims to identify organization specific technology adoption issues and solutions

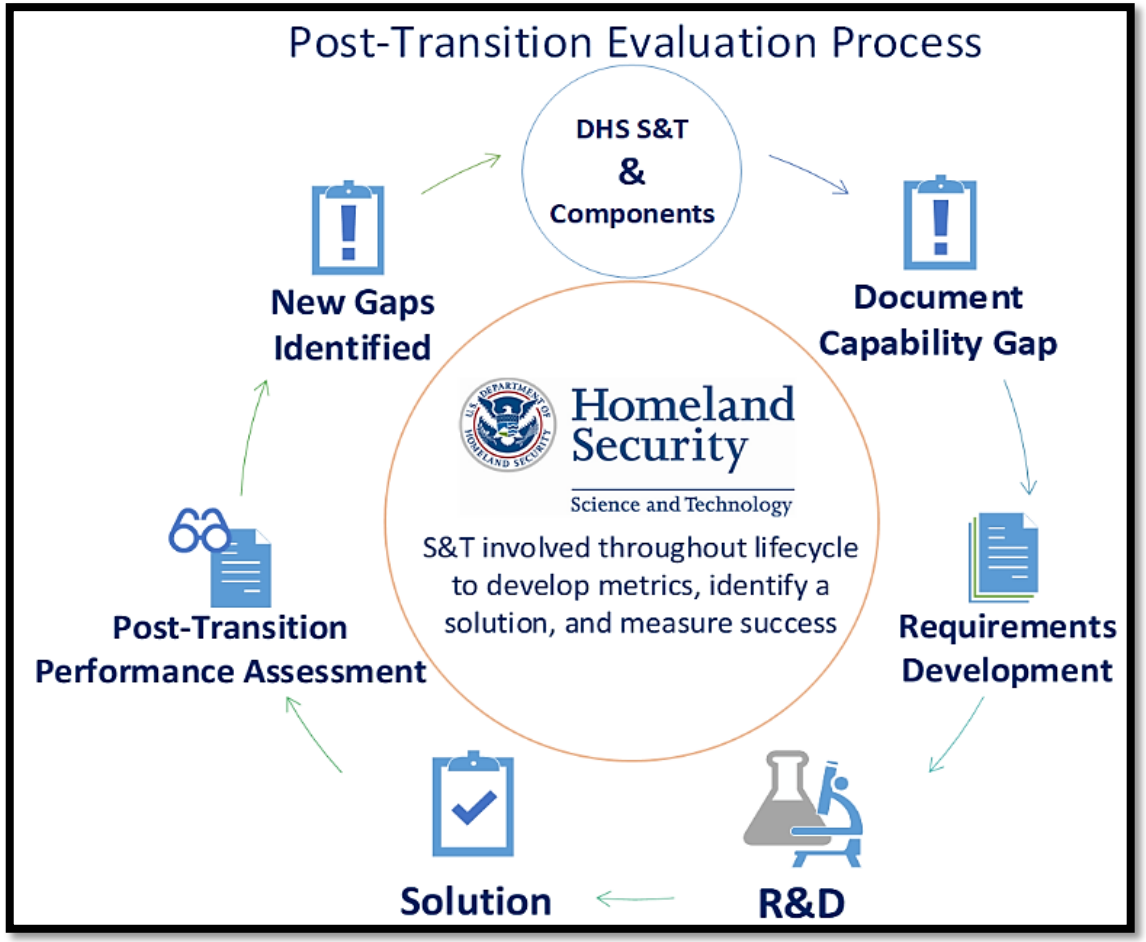


Evaluation Research and Impact

Example:

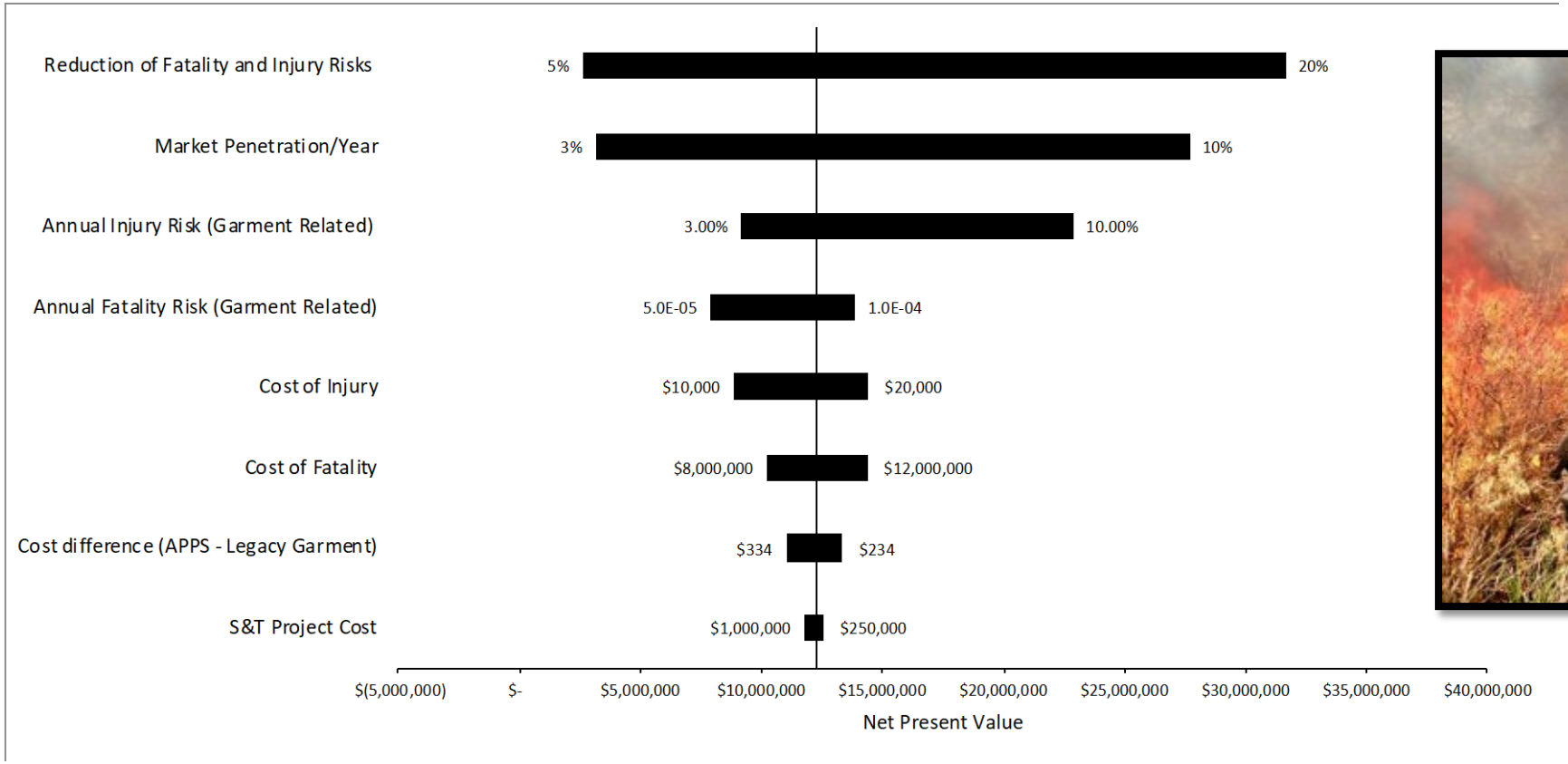
Wildland Firefighter Personal Protection

- Develop and evaluate improved (single layer) garments for wildland firefighters
- Intended to improve:
  - Heat absorption
  - Thermal protection
  - Comfort
  - ID Problem
  - Assist with Integration
- Evaluate impact
- Objective & Subjective Measures



Evaluation of Impact Results

Wildland Firefighter Advanced Personal Protection System



Future Planning

- Project Responder 6
  - Estimated start date: late Autumn 2019
  - Will be used by DHS S&T to identify R&D funding opportunities
- Tech Adoption – Support and Research Program
- Formalized Impact Evaluation
  - Social Science Leadership
- Additional Input – National of Survey First Responder Organizations