

SMART FIRE FIGHTING

WHERE BIG DATA AND FIRE SERVICE UNITE



Developing a Research Roadmap for Smart Fire Fighting

PROJECT SUMMARY

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Background: The fire service and other emergency first responders are currently benefiting from enhanced-existing and newly-developed electronic technologies. Fire fighters are now operating in an ever increasing sensor rich environment that is creating vast amounts of potentially useful data. The “smart” fire fighter of tomorrow is envisioned as being able to fully exploit select data to perform work tasks in a highly effective and efficient manner.

Behind the advances of the new sensor and tool enhanced fire fighter of tomorrow are profound questions of what to do with this deluge of valuable information that comes with much of this equipment. The enormous amount of available data in our ever increasing sensor rich environment is changing our way of life. A popular descriptive phrase used in today’s common lexicon is “big data”, and it is indicative of the systematic use of the information being leveraged in ways that were unimaginable a short time ago. This is an area that is informed by the field of “cyber-physical systems”.

Available data, the comprehensive ability to analyze and process this data, and an increasingly sensor rich environment are all opening new possibilities for the fire service to address unwanted fires. This involves all manner of their job performance duties, and includes during pre-fire, trans-fire (i.e. during the event) and post-fire stages. This project is focused on developing the research roadmap to clarify the research needed to most effectively use the immense quantity of available data, the computational power to compute and communicate that data, the knowledge base and algorithms to most effectively process the data, convert it into significant knowledge/beneficial decision tools, and effectively communicate the information to those who need it --- on the fire ground and elsewhere.

Research Goal: The goal of this project is to develop a research roadmap for smart fire fighting, which establishes the scientific and technical basis for achieving the vision for Smart Fire Fighting in the United States. Specifically, this roadmap will identify and address high-priority measurement science research challenges, technical barriers, and related research and development gaps that hinder widespread application of Smart Firefighting technologies and systems by the U.S. Fire Service.

The vision for smart firefighting is based on creating, storing, exchanging, analyzing, and integrating information from a wide range of databases and sensor networks. This project will seek to achieve

this vision by addressing all the applicable topic areas of the fire service emergency responder community, including (but not limited to):

- Fire Fighting PPE & Equipment – All equipment and gear on-board and directly attached to an individual when operational.
- Fire Fighting Apparatus & Equipment – All fire fighting apparatus and equipment used by emergency responders and their supporting infrastructure, not in physical contact with the individual when operational, including vehicles and robotic delivery systems.
- Building Systems – All monitoring, data and control systems integral to buildings, including but not limited to electrical, security, environmental, safety, inventory and property protection systems.
- Infrastructure and Community Data Systems – All data systems not included in the three aforementioned topic areas and intended to include data such as from public utilities, weather, vehicular traffic (e.g., passenger vehicle telematics, rail traffic, etc) and computer aided dispatch.

Project Tasks: This project will involve the following tasks:

- 1) Task 1: Initiate Project, and Appoint Project Technical Panel
- 2) Task 2: Plan 1½ day Roadmap Plenary Workshop
- 3) Task 3: Conduct 1½ day Roadmap Plenary Workshop
- 4) Task 4: Identify Chapter Authors
- 5) Task 5: Implement Chapter Author Invitations
- 6) Task 6: Generate Single Research Roadmap
- 7) Task 7: Conduct Roundtable with Chapter Authors
- 8) Task 8: Generate Final Draft of Roadmap for Review/Comment

Implementation and Schedule: This project is funded by NIST, and the research program will be conducted under the auspices of the Fire Protection Research Foundation in a collaborative agreement with NIST. The scheduled completion date for this project is the Fall of 2014.