# Machine-to-Machine Architectures to Improve First Responder Communications

Creating scalable architecture to connect devices

Machine-to-Machine (M2M) communications is all about network connectivity—the ability of wired and wireless technologies to communicate. M2M is not new, but was previously limited to wired devices. Today, due to the wireless revolution, M2M communications has expanded and user interface has become simpler including through apps that are available and accessible on a smart device. Technologies used in these connected networks will undoubtedly enhance first responder communications. Further, with the creation of the nationwide public safety broadband network, public safety agencies will have greater access to broadband net-works and the enhanced capabilities that come with them. The development of M2M wearable devices worn by first responders monitor their health, or those that provide access to on-site sensors in smart buildings such as motion detectors, cameras, access to structural floor plans and other sensors made available to incident commanders via ad-hoc net-works at the site of an emergency provide better situational awareness. For example, an incident commander may have the ability to secure a building's ventilation system, access floorplans or provide direct access to a building's video camera system anywhere within a building they are about to enter.
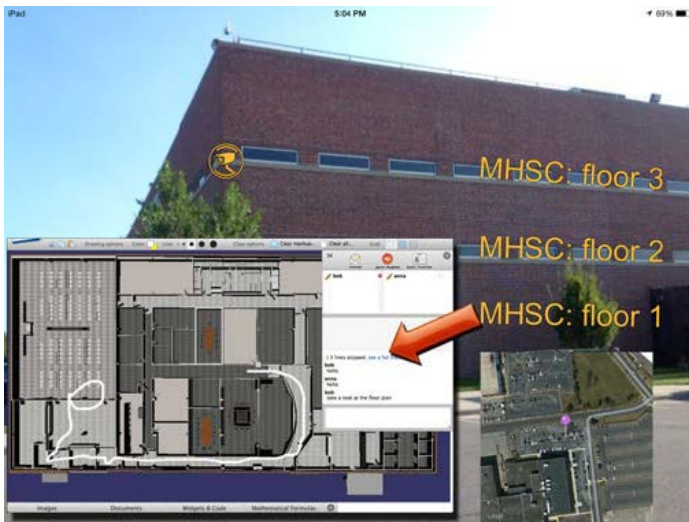
A screenshot shows building floor plans, accessible surveillance cameras, and GPS location from multiple sources

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T), through the Small Business Innovation Research program, funded an effort to identify a scalable technical approach using different networks (commercial cellular, public safety land mobile, etc.) to provide access to and improve M2M communications for first responders. Through a partnership with Balfour Technologies, S&T is pursuing a fully functional demonstration of a M2M system. If successful, the project would result in M2M machines inside smart buildings to securely communicate with first responders and provide information in real-time using secure mobile M2M applications. This solution will allow for networks and M2M devices to interoperate. In part, this is achieved by ensuring the architecture is not developed around a single network solution. Development of the M2M architecture will be based on one M2M standard and use a secure Software Defined Perimeters framework for communications and information exchange within the network.

Working with responders to determine needs and commercialization

Balfour worked extensively with first responders to identify their needs in a M2M network scenario, including what capabilities support mission requirements during an emergency. The M2M project addressed responder-specific needs and took into account the concept of operations. Additionally, the project's emphasis on standards based architecture development promotes future device interoperability, which will help avoid use of conflicting systems.

As part of the commercialization plans for the architecture, Balfour is working with the New York Institute of Technology to conduct real world M2M testing in a smart building environment. Further, Balfour continues to collaborate with healthcare providers, universities, manufacturers, telecom operators and other private sector groups to identify additional requirements and solutions for the technology. The goal is to lower the cost of M2M technologies, while offering responders a wide variety of applications.

Homeland Security
Science and Technology

To learn more about M2M, contact first.responder@hq.dhs.gov.

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