NIMS Standards Case Study: Houston Regional Information Sharing

National Preparedness Directorate

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Promoting Interoperability between Emergency and Traffic Management Organizations

A traffic accident on a major freeway snarls traffic. While the cars involved in the accident appear to have sustained significant damage, the incident has not yet been reported to local police or emergency medical services and, consequently, no response vehicles are on the scene to reroute traffic or treat any potential injuries. However, traffic cameras monitored by the transportation department record the accident and personnel in the traffic management center fill out a traffic incident report. Once entered into the transportation department's database, accident location and status information is automatically transmitted to police and emergency medical services departments, alerting them to the accident and providing basic situational awareness for responders rushing to the scene.

Projects underway in the Houston metropolitan area aim to make the scenario described above standard operating procedure in the region. Led by Houston TranStar, these projects are using the **Institute of Electrical and Electronics Engineers (IEEE) 1512-2006: Standard for Common Incident Management Message Sets for Use by Emergency Management Centers** as the basis to create a common platform for information sharing between transportation management and emergency response organizations in the region.

ABOUT THIS CASE STUDY

While NIMS provides a common structure and terminology for responding to incidents and planned events, voluntary consensus standards support NIMS implementation by creating uniformity of use and practice. Such support is particularly important for interoperable communications and integrated information management systems. Standards also provide:

- Accepted and uniform criteria for measuring the adequacy of preparedness efforts and performance of emergency operations;
- Technical guidance; and
- Common resource descriptions to facilitate mutual aid—the sharing of resources among jurisdictions.

The National Preparedness Directorate (NPD), Federal Emergency Management Agency (FEMA) and the NIMS Support Center (NIMS SC) work in partnership with standards development organizations (SDOs) to identify existing industry standards that support NIMS implementation. These select standards are placed on the NIMS Recommended Standards List (RSL) and posted on the FEMA website for public information.

This article highlights two applications of the IEEE 1512 standard in the Houston metropolitan area. IEEE 1512 is the baseline document and is augmented by standards 1512.1, 1512.2, and 1512.3, which relate to traffic incidents, public safety, and hazardous cargo, respectively. As the baseline document, it establishes the messaging requirements for all types of centers, thereby contributing to a common operating picture above the field level for agencies and their centers involved in the management of transportation-related emergency incidents and events. This family of standards specifies a common framework for the exchange of data among transportation and emergency management centers, which can be fixed facilities such as Emergency Operations Centers (EOCs) or remote or mobile devices, such as an in-vehicle laptop.

The suite of standards establishes parameters that allow a wide variation in local implementation, while following concepts documented in the National Intelligent Transportation System (ITS) Architecture. This framework establishes special efficiencies for incident data exchange among public safety agencies, and between those agencies and Traffic Management Centers (TMCs). Each center is capable of sharing different types of information in different ways based on functional needs. The use of common message sets as a format or structure for communication between agencies that are involved in traffic incident management provides a means of overcoming obstacles that relate to infrastructure ownership, response duties, political boundaries, and jurisdictional responsibility.[1]

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OVERVIEW OF HOUSTON TRANSTAR PROJECTS

Houston TranStar is a consortium formed by the Texas Department of Transportation, Harris County, the City of Houston, and the Metropolitan Transit Authority of Harris County, responsible for providing transportation management and emergency management services to the greater Houston area. These agencies operate under an interlocal agreement which establishes the consortium's governance structure and resource contributions of each participating member. Houston TranStar maintains a system of over 600 closed circuit televisions to monitor traffic conditions and uses dynamic message signs to inform travelers of expected travel delays.

Wayne Gisler, Assistant Manager for Traffic Operations, Harris County, noted that, despite the co-location of transportation management and emergency response personnel at some Houston TranStar facilities, there is limited information sharing between staffs with coordination occurring largely through the word of mouth. Houston TranStar is currently participating in two applications of the IEEE 1512 family of standards to enhance information sharing in the greater Houston area: the first is a pilot effort with the Institute of Justice Information Systems (IJIS) to link the IEEE 1512 standard with the Global Justice XML Data Model (Global JXDM); the second is a larger effort led by a consortium of Federal, State, and local agencies to develop a common information sharing platform for agencies with responsibility for the Houston Ship Channel. An enhanced information sharing platform is necessary to augment the word of mouth exchanges currently used to exchange information within Houston TranStar and with other satellite centers that continue to develop within the greater Houston area. These efforts have the common goal of increasing information sharing between agencies responsible for transportation management and public safety.

IJIS Pilot

Houston TranStar is participating in a pilot project to test message exchanges between the IEEE 1512 standard and the Global JXDM by identifying exchanges, or types of messages, which could be linked between the two standards. The Global JXDM is a framework for information sharing sponsored by the Department of Justice (DOJ) Office of Justice Programs (OJP) which is commonly used in the law enforcement and justice community. Global JXDM allows law enforcement and justice personal to share data across a variety of proprietary systems. The message exchanges being tested were developed through a cooperative effort between the Federal Highway Administration and DOJ and are focused on evaluating exchanges that are most likely to be shared between transportation and public safety systems. Working with critical data exchanges identified by IJIS, Houston TranStar is in the process of implementing and evaluating critical exchanges related to incident notification and incident status between the Regional Incident Management System (RIMS) and information systems at the Harris County Toll Road Authority's Incident Management Center. As an example, information on a traffic incident that is captured by network cameras is entered into the transportation department's software. Other computer-aided-dispatch (CAD) center systems operated by local response agencies are able to access this software and pass alerts through their systems. The data exchange includes incident location and incident status updates.

> The IJIS pilot represents a "marriage of the public safety side of the world and the transportation management side of the world… [to] try to establish the ability of the two standards to work together to provide system interoperability."
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> - Wayne Gisler, Traffic Operations, Harris County, TX

Development of an Information Sharing Platform for Houston Ship Channel Partners

Houston TranStar is also participating in a larger effort to establish a new information sharing platform for the agencies sharing responsibility for managing the Houston Ship Channel. Harris County, a member of the Houston TranStar consortium, is the primary landowner of property surrounding the Houston Ship Channel and is receiving DOJ funding for this effort, which also involves the United State Coast Guard (USCG), the Harris County Sheriff's Office, the Harris County and City of Houston Emergency Management Centers, and nearby military installations. The first project phase will identify the agencies and systems that would need to be involved in an information sharing system and then map the information sharing needs of each stakeholder. For example, it may be appropriate for some but not all of the USCG's incident information to be shared with Houston TranStar or other partners. Once the scope of the data sharing effort has been identified, the region will identify technology requirements and build the infrastructure necessary to support the information sharing system, with an overall timeline for project implementation of three to five years.

Central to this entire effort is a requirement for the use of the IEEE 1512 and National Incident Exchange Model (NIEM) data exchange architectures. Houston TranStar intends to build an information sharing model based a combination of these two standards, in order to ultimately provide a type of message switch that can support various systems that communicate information via these data exchange models. In this manner, a common information sharing platform will be established allowing the integration of both legacy systems and those systems procured in the future. Wayne Gisler noted that, rather than stifle technological development by the private sector, this approach should allow the consortium to "define interfaces for these portals…so that when new systems are deployed, we don't need to re-invent the wheel." By orienting the information sharing platform around a limited set of standards, Houston TranStar and its regional partners can ensure interoperability regardless of the proprietary systems employed, providing each participant with greater flexibility to pursue cost effective solutions for their information sharing needs.

CONCLUSION

Houston TranStar is in the process of implementing IEEE 1512-2006: Standard for Common Incident Management Messages Sets for Use by Emergency Management Centers through two projects: a pilot effort to link IEEE 1512 with the Global JXDM and an effort to develop a common information sharing platform for the agencies sharing responsibility for the Houston Ship Channel. Though both projects are in their initial phases, IEEE 1512 has been identified as a standard to meet regional information sharing needs among transportation and emergency management organizations at the Federal, State, regional, and local levels. Use of a common standard promotes interoperability between response organizations without mandating the use of a specific technology, allowing each participating agency to pursue individualized information sharing solutions.

In addition to Houston TranStar's use of IEEE 1512 in the ongoing projects mentioned above, projects integrating IEEE 1512 have been completed in New York City, Salt Lake City, and by the Washington State Department of Transportation. In New York City, the standard was utilized in the creation of the Integrated Incident Management System (IIMS), an information sharing platform to coordinate multi-agency emergency response among public safety, public works, and transportation agencies. A link to an IIMS project overview can be found in the "Resources" section of this document.

RESOURCES

National Incident Management System (NIMS) Standards
http://www.fema.gov/emergency/nims/nims_standards.shtm

IEEE 1512-2006: Standard for Common Incident Management Messages Sets for Use by Emergency Management
http://ieeexplore.ieee.org/xpls/abs_all.jsp?tp=&isnumber=35111&arnumber=1673309&punumber=11078

Houston TranStar
http://www.houstontranstar.org/

New York City IIMS
http://www.nymtc.org/project/its/080904IIMS%20overview.pdf

REFERENCE

NIMS SC staff obtained information for this case study through interviews with key personnel from the respective case study locations, as well as online research. Unless otherwise cited, all information presented in this study is drawn from these interviews.

[1] Michael A. Ogden. "Guide to the IEEE 1512™ Family of Standards." http://grouper.ieee.org/groups/scc32/imwg/guide.pdf Accessed August 6, 2008.