Homeland Security
Science and Technology

TechNote

U.S. Department of Homeland Security

SAVER

System Assessment and Validation for Emergency Responders

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions.

Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL).

The SAVER Program is supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

For more information on this and other technologies, contact the SAVER Program Support Office.

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SPAWAR Systems Center ATLANTIC

RFID Triage Tags

Radio frequency identification (RFID) technology can be used during mass-casualty incidents to improve the effectiveness of emergency responders in conducting triage, treatment, transportation, and tracking of casualties to nearby hospitals. Emergency responders use triage to determine the casualties who will receive treatment first, based upon the severity of their injuries. Triage entails making a rapid assessment of every casualty, assigning a severity category to each one, and visibly identifying each casualty with a triage tag, such as the paper triage tag shown in Figure 1. As medical personnel arrive on the scene they are directed to the casualties that have life-threatening injuries first.

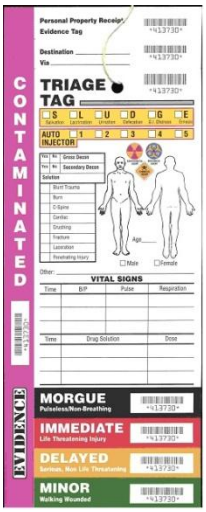

Figure 1. Standard Paper Triage Tag

Courtesy of the Wikimedia Commons

RFID Triage Tag Technology

RFID triage systems consist of RFID tags, RFID readers, system software, and an information network. RFID tags are small electronic devices that provide data when queried with the correct radio signal. RFID tags come in many varieties, but for triage they are almost always passive, electronic product code (EPC) tags. Passive tags only respond when queried by a reader, and usually have a response range of 10 feet or less. EPC tags are encoded with an identification number that is unique across all of North America. In addition, tags may have the ability to store data directly on the tag which means that data stays with the patient. However, this capability increases costs and requires that the user wait for the data upload to be complete, which may take up to a minute.

RFID readers use RF signals to scan nearby RFID tags, and are able to scan multiple tags very rapidly. The reader scans the EPC code from a tag and then uses the system software to match the EPC code to a database entry on its display screen. The user can then add or modify the data associated with the tag. Some readers can be wireless, or may have to dock with a portable computer, or other device to share information on the network. If the reader is wireless capable, it will automatically transmit any new information to the network and routinely check for updates from the network, which allows all connected readers to have data on all scanned tags in near real time. If the reader is not wireless, it will store data until it is connected to the network.

The system software can either be a stand alone database program, or a translation tool between the software on the RFID readers and an existing agency database. The translation tool implementation is more common, as most agencies are comfortable with their existing database systems and thus this approach protects their existing investments. However, most vendors will provide full software services if needed.

Finally, an information network is needed to get full use of an RFID triage system. The information network is usually Internet-based; however, there are other methods for exchanging data. The information network shares scanned information between the readers and other agencies necessary for incident response, including emergency medical services and area hospitals. The data collected can be shared directly, or can be concentrated on a remote server before being disseminated, depending on the design of the RFID triage system. The data is encrypted and only authorized readers and systems can access the data to provide medical record confidentiality. The need for an information network requires responder vehicles to be equipped with wireless network capability, or that responders be equipped with mobile devices capable of providing local access to the network. This is usually accomplished by the responders using cellular-based networks.

The RFID triage system is employed similiarily to traditional triage where victims are assessed into triage categories. Once at the scene of the incident, the responder affixes the RFID triage tag, scans the tag with the reader, and follows on-screen prompts to enter patient and injury information. Once this is complete, the responder moves to the next patient and repeats the process. The process for each triage takes 10-30 seconds on average, compared to standard triage methods that take up to 5 minutes per patient. Since the data is uploaded to the network and is visible to incident commanders, more efficient response to the incident can be achieved by allocating assets as they are needed based on the casualties being processed. In addition, local hospitals can better prepare for and understand the exact nature of injuries, which are en route.

Implementation of RFID Triage Tag Technology

The rapid development of RFID technology has been driven by the demand of large retailers and government agencies to increase the efficiency and visibility of material and information flows.

The Anaheim Fire Department in Orange County, CA, began looking for an alternative to paper triage tags in 2005 to improve efficiency during an incident. Partnering with VerdaSee Solutions Inc., an RFID solutions developer and integrator, the fire department developed RFIDs that would track incident casualties from initial check-in through hospital transport.

The Seattle Fire Department has tested the use of RFID triage tag solutions during incident test drills and found that with the RFID system, triage time was reduced to 10 seconds per patient, with no delay in providing this information back to incident command.

Resources

The following organizations have investigated RFID triage tag solutions:

Anaheim Fire Department, Anaheim, CA, *Anaheim Fire Department Deploys Multipronged RFID System*, http://www.rfidjournal.com/articles/view?4386, accessed September 2013.

Seattle Fire Department, Seattle, WA, *Seattle Fire Department Field Tests RFID Patient Tracking Technology*, http://www.intermec.com/learning/content_library/case_studies/cs1940.aspx, accessed September 2013.