



Incident Management Software for Emergency Response

Focus Group Report

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FOREWORD

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 commercially available equipment and systems and develops knowledge products that provide relevant equipment information to the emergency responder community. The SAVER Program mission includes:

- Conducting impartial, practitioner-relevant, operationally oriented assessments and validations of emergency response equipment
- Providing information—in the form of knowledge products—that enables decision-makers and responders to better select, procure, use and maintain emergency response equipment.

SAVER Program knowledge products provide information on equipment that falls under the categories listed in the DHS Authorized Equipment List (AEL), focusing primarily on two main questions for the responder community: “What equipment is available?” and “How does it perform?” These knowledge products are shared nationally with the responder community, providing a cost-saving asset to DHS by ensuring federal, state and local responders are prepared to make operational and procurement decisions.

The SAVER Program is managed by the National Urban Security Technology Laboratory (NUSTL). NUSTL works with stakeholders to identify and prioritize project topics that address emergency responder needs, develops SAVER knowledge products and coordinates with other organizations to leverage appropriate subject matter expertise.

NUSTL provides expertise and analysis on a wide range of key subject areas, including chemical, biological, radiological, nuclear and explosive weapons detection; emergency response and recovery; and related equipment, instrumentation and technologies. Under its SAVER Program, NUSTL - in conjunction with Pacific Northwest National Laboratory - will conduct a comparative assessment of Incident Management Software to provide emergency responders with reference information on commercially available technologies. Incident Management Software for Emergency Response falls under the AEL reference numbers 04AP-05-CDSS, titled Systems and Tools, ICS; 04AP-05-SVIS, titled Software, Operational Space Visualization; and 04AP-03-GISS, titled System, Geospatial Information. As part of this project, recommendations for the assessment were gathered from a focus group and are documented in this report.

For more information on NUSTL’s SAVER Program and Incident Management Software for Emergency Response or to view additional reports on other technologies, visit: www.dhs.gov.science-and-technology/SAVER.



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EXECUTIVE SUMMARY

Incident management software (IMS) consists of a suite of mobile-ready tools that aggregate pre-planned or no-notice critical incident information in a real-time collaborative environment such that situational status, response priorities, and resource deployment are brought into a common operating picture. IMS brings together diverse types of data (e.g., map views, property information, sensor data, resource tracking, computer-aided dispatch) in a multilayered format, providing first responders and emergency managers access to the information they need to manage small and large scale no-notice incidents (e.g., house fire, earthquakes) and pre-planned events (e.g., parade, protest). Emergency management, fire service, law enforcement, and other emergency response agencies that have a role in the management of incidents and events use IMS to conduct pre-planning, multiagency coordination, resource allocation, asset tracking, and information collection and analysis to aid decision making and after action audits and reports.

The National Urban Security Technology Laboratory's (NUSTL) Systems Assessment and Validation for Emergency Responders (SAVER) Program, in cooperation with the Pacific Northwest National Laboratory (PNNL), will conduct a comparative assessment of IMS for emergency response to provide emergency responders with information to assist their making operational and procurement decisions.

As part of the assessment planning process, NUSTL convened a virtual focus group from September 16-23, 2020. The virtual focus group was conducted in three parts over the course of one week: an introductory video conference, individual participant follow-up interviews, and a final group discussion by video conference. Seven emergency responders from various jurisdictions who have experience using IMS for emergency response participated. The focus group generated recommendations on evaluation criteria, developed product selection specifications, and discussed possible scenarios for assessing IMS.

The focus group identified 31 evaluation criteria. "Capability" and "usability" were the most important of the five overarching SAVER categories. Eight additional criteria were identified by the focus group as being of utmost importance for IMS to be used in emergency responses:

- Ability to handle standard geographic information system (GIS) files
- Personnel tasking and accountability tracking
- Information sharing across personnel and agencies
- Interoperability with other software and sensors
- Intuitive user interface
- Reliability of software
- Technical support availability
- Scalability of users and data traffic

The focus group participants also recommended scenarios and products to be considered for inclusion in the assessment. These recommendations will be used create the *Incident Management Software for Emergency Response Assessment Plan*.

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1.0 INTRODUCTION

Emergency management, fire service, law enforcement, and other emergency response agencies use incident management software (IMS) to conduct multiagency coordination, make resource allocation decisions, and collect and analyze information. By aggregating real-time and historic incident information in an intuitive, map-based environment, IMS assists first responders with the planning, management, and reporting of small- and large-scale events and incidents.

Mobile, map based, commercial IMS products incorporate real-time geospatial views of an operating area and have capabilities for pre-event planning as well as incident response and management. Operating on handheld devices, tablets, or mobile PCs, these software solutions enable first responders to execute various tasks including location sharing for fleet and asset tracking, assigning roles and creating checklists, and after-action reporting.

1.1 Participant Information

On September 16-23, 2020, the National Urban Security Technology Laboratory's (NUSTL) System Assessment and Validation for Emergency Responders (SAVER) Program conducted a virtual focus group on IMS in order to gather recommendations on evaluation criteria, product selection specifications, products and possible scenarios for the assessment of incident management software for emergency response. Conducted in three parts over the course of one week, the virtual focus group consisted of an introductory video conference, followed by individual participant interviews, and a group discussion video conference at the finish.

Seven emergency responders from various jurisdictions and with at least two years of experience using IMS were invited to participate in the focus group. Demographic information is listed below in Table 1-1.

Table 1-1 Focus Group Participant Demographics

Participant Discipline	Years of Experience (Discipline)	Years of Experience (IMS)	State
Emergency Communications	17	10	New Jersey
Emergency Management	4	3	Colorado
Emergency Management/Fire Service	1/20	6	Virginia
Fire Service	20	20	Minnesota
Fire Service/Emergency Medical Services	31	10	Maryland
Fire Service/Emergency Medical Services	40	25	Maryland
Information Technology (Fire Service)	25	15	Washington

2.0 FOCUS GROUP METHODOLOGY

Held via video conference, the first session of the virtual focus group opened with an overview of NUSTL, the SAVER Program, IMS, and the goals of the focus group. In this first session, a facilitator asked participants about their experiences using IMS. Focus group participants discussed the types of scenarios in which they use IMS, including pre-planned large, slow-moving events (e.g., a parade or marathon) as well as no-notice, small and faster-moving incidents (e.g., house fire, commercial building fire, or hazardous material spill). Participants pointed out that the scale of the event also impacted the types of personnel who respond and their respective IMS requirements.

Participants discussed the need for a single IMS that would either encompass all required functions or allow for seamless integration with other software and tools their organizations also use during emergencies. Participants noted that during a single incident their organizations currently use multiple solutions (including pencil and paper) for functions such as tracking resource requests, sharing information between the emergency operations center (EOC) and responders, personnel tracking, and asset tracking.

Finally, participants highlighted the need for scalability. Emergencies, especially those involving an EOC response, may require ad-hoc inclusion of personnel with different backgrounds from multiple units and agencies. Participants voiced the importance of having an IMS that can quickly accommodate the addition of new users with relatively little set-up or training. One focus group participant recalled an instance of switching to free software that is widely used by the public in non-emergency settings (e.g., Discord and Google Forms) in order to take advantage of its easy deployability and the familiarity to new users.

During the introductory video conference, the project lead outlined four sets of recommendations needed to plan an assessment that would be requested from the focus group participants:

1. Evaluation criteria recommendations—Product features that are important to consider when making operational or procurement decisions
2. Assessment scenario recommendations—Operational settings and activities that reflect responders' experiences and would provide evaluators with appropriate conditions to assess the products
3. Product specification recommendations—Features, attributes, or characteristics a product should possess to be considered for assessment
4. Product recommendations—Specific brands or models that are relevant to the emergency responder community and should be candidates for inclusion in the assessment

Figure 2-1 highlights the process followed to gather these recommendations.

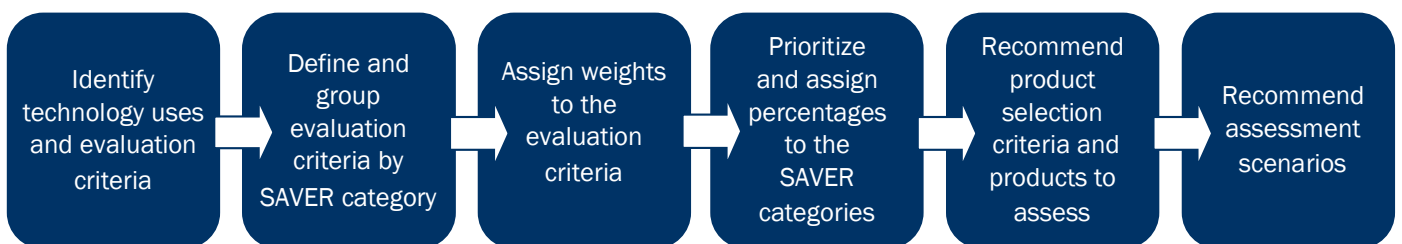


Figure 2-1 Focus Group Process

In this virtual focus group, technology usage was discussed during the introductory video conference. Over the course of the following three days, project team members contacted focus group participants for individual interviews to gather, define, and group evaluation criteria by SAVER category. The SAVER Program uses five criteria categories:

- **Affordability criteria** relate to the total cost of ownership over the life of the product. This includes purchase price, training costs, warranty costs, recurring costs, and maintenance costs.
- **Capability criteria** relate to product features or functions needed to perform responder relevant tasks.
- **Deployability criteria** relate to preparing to use the product, including transport, set up, training, and operational or deployment restrictions.
- **Maintainability criteria** relate to the routine maintenance, storage, calibration, and minor repairs performed by responders, as well as included warranty terms, duration, and coverage.
- **Usability criteria** relate to ergonomics and the relative ease of use when performing responder relevant tasks.

The focus group participants also recommended whether the criteria should be assessed operationally through hands-on experience or by reviewing manufacturer-provided specifications.

All individual feedback on evaluation criteria and categories was then consolidated and presented to the focus group during the second group videoconference. Focus group members reviewed, modified, and agreed upon the list of evaluation criteria and associated SAVER category. Next, focus group participants assigned a weight for each criterion’s level of importance on a 1 to 5 scale as a group, where “1” is of minor importance and “5” is of utmost importance. Table 2-1 highlights the evaluation criteria weighting scale.

Table 2-1 Evaluation Criteria Weighting Scale

Weight	Definition
5	This evaluation criterion is <i>of utmost importance</i> : “I would never consider purchasing a product that does not meet my expectations of this criterion or does not have this feature.”
4	This evaluation criterion is <i>very important</i> : “I would be hesitant to purchase a product that does not meet my expectations of this criterion or does not have this feature.”
3	This evaluation criterion is <i>important</i> : “Meeting my expectations of this criterion or having this feature would strongly influence my decision to purchase this product.”
2	This evaluation criterion is <i>somewhat important</i> : “Meeting my expectations of this criterion or having this feature would slightly influence my decision to purchase this product.”
1	This evaluation criterion is <i>of minor importance</i> : “Other things being equal, meeting my expectations of this criterion or having this feature may influence my decision to purchase this product.”

Next, the focus group ranked the SAVER categories in order of importance for the IMS assessment. Based on those rankings, a percentage was assigned to each category to represent its level of importance.

After ranking the SAVER categories, focus group participants identified product selection criteria and products that should be considered for the assessment and suggested operational scenarios for the assessment.

3.0 EVALUATION CRITERIA RECOMMENDATIONS

The focus group identified 31 evaluation criteria and concluded that “capability” was the most important SAVER category relevant to IMS used for emergency response, followed by “usability,” “deployability,” “maintainability,” then “affordability,” respectively. Table 3-1 presents the category weights, the evaluation criteria sorted into the SAVER categories, and evaluation criteria weights.

Table 3-1 Evaluation Criteria

SAVER CATEGORIES				
Capability	Usability	Deployability	Maintainability	Affordability
Overall Weight 40%	Overall Weight 25%	Overall Weight 15%	Overall Weight 15%	Overall Weight 5%
Evaluation Criteria				
GIS Files Handling Weight: 5	Intuitiveness of User Interface Weight: 5	Scalability Weight: 5	Technical Support Availability Weight: 5	Cost to Scale Weight: 4
Personnel Tasking and Accountability Weight: 5	Reliability Weight: 5	Offline Usability Weight: 4	Forensics Logging Weight: 3	Ongoing Costs Weight: 4
Information Sharing Weight: 5	Customizability Weight: 4	User-level Access Control Weight: 4	Autosave Feature Weight: 3	Initial Cost Weight: 3
Interoperability Weight: 4	Training Resource Accessibility Weight: 4	Deployment Options Weight: 4	Data Synchronization Weight: 3	
Asset Tracking Weight: 4	Interface Readability Weight: 3	Client Cross-Platform Compatibility Weight: 4	Map Updating Weight: 3	
Location Tracking Weight: 4		Mobile Platforms Availability Weight: 3	Software Updates Weight: 3	



Record Keeping Weight: 4				
Incident Report Integration Weight: 3				
Messaging Feature Weight: 3				
Sensitive Information Handling Weight: 3				
Pre-planning tools Weight: 3				

3.1 Capability

The eleven capability criteria identified and defined by the focus group listed in order of importance are:

GIS Files Handling refers to a software’s ability to read standard geographic information system (GIS) file formats such as KML, GeoJSON, GeoPackage, ESRI shapefile, and geodatabase files.

Personnel Tasking and Accountability refers to the ability to manage staff tasks and assignments and provide alerts for staff rotations or reassignments.

Information Sharing is the ability to share incident-specific information with field personnel or other agencies, and—in certain situations—to collaborate across multiple counties (e.g., mutual aid).

Interoperability refers to the software’s ability to integrate with a variety of other software products or sensors with no manual data import required. Examples of software with which the IMS might integrate include computer-aided dispatch (CAD) systems, body-worn sensors, and data services (e.g., weather, traffic, location-based services, Global Positioning System (GPS) tracking).

Asset Tracking is the ability to view the status (i.e., “available” or “in use”) of physical assets.

Location Tracking is the ability to view and update a map-based location for dispatched and available resources. This includes automatic vehicle location tracking that broadcasts GPS locations of vehicles in real-time.

Record Keeping refers to the software’s ability to create an audit trail, (i.e., to capture and recall time-stamped records of the actions taken for real-time information and post-event assessment).

The software should also have the ability to generate reports using custom or integrated Incident Command System forms.

Incident Report Integration refers to the software's ability to integrate and view all local incident reports in one dashboard to avoid duplicate incident notifications.

Messaging Feature refers to the ability for real-time message exchange with other personnel who are in the field or an EOC.

Sensitive Information Handling refers to the software being appropriately secure and having protocols to handle information that is categorized as Classified, For Official Use Only, Law Enforcement Sensitive, Protected Critical Infrastructure Information, or other similar designations.

Pre-planning Tools refers to the capability to preload site-specific features into the software. Site features may include building maps, environmental features like ponds and streams, and locations of hydrants, building standpipes, and building emergency exits.

3.2 Usability

The five usability criteria identified and defined by the focus group listed in order of importance are:

Intuitiveness of User Interface refers to the relative ease or difficulty of using the software interface, particularly that use of its standard features is obvious and requires minimal training, searching, or number of steps to execute a function.

Reliability refers to the software's stability and functionality in the operating environments required by emergency responder missions.

Customizability is the modifiability of software features to a particular user's needs and the ease of making modifications within the software. Customizability includes having filterable items, editable user roles, modifiable rendering order of map data, adjustability of icons and other visual elements; and changeable map type and size.

Training Resource Accessibility is the availability of various formats for training such as quick start guides, video tutorials, and technical manuals and their ease of use.

Interface Readability refers to the clarity and legibility of the user interface including font size, screen colors, and notification visibility.

3.3 Deployability

The six deployability criteria identified and defined by the focus group listed in order of importance are:

Scalability is the ability to quickly add users on an ad-hoc basis, as well as to handle sudden or planned increase in the number of concurrent users or data being exchanged.

Offline Usability refers to the software's capability to operate when disconnected from a network. It includes the ability to access vital reference data that may reside on a local device when offline along with the ability to automatically update and synchronize any data logged in offline mode once the data connection is restored.

User-level Access Control refers to the capability for and ease of assigning different levels of access for different users depending on their role.

Deployment Options refers to the software delivery channels available, such as on-premises, Software as a Service or a hybrid solution.

Client Cross-Platform Compatibility refers to the software's ability to work across different computing platforms that may be used by different entities involved in a response. Interoperability with different systems from different agencies improves coordinated communication and response.

Mobile Platforms Availability is the ability to operate on mobile hardware (e.g., laptops, tablets).

3.4 Maintainability

The six maintainability criteria identified and defined by the focus group listed in order of importance are:

Technical Support Availability refers to the availability of expedited, 24/7 technical support offered by the software vendor at times when the software is in use (e.g. while responding to an emergency). One participant noted that the presence of a software user community is helpful and that agencies must select service level agreements that match their mission needs.

Forensics Logging refers to the software's audit trail and error logging capabilities that can be analyzed in case of software or hardware failure.

Autosave Feature refers to the software's ability to save data such that data is accurate in the event of a software or device failure.

Data Synchronization refers to how data is synchronized from a source; (i.e., whether synchronization is automated or requires a restart or action by the user).

Map Updating is the ease by which new map views and data can be added.

Software Updates refers to the frequency of and method by which updates are made to the software; for example, manual or automatic, mass or individual. One participant noted that updates should be transparent to the user.

3.5 Affordability

The three affordability criteria identified and defined by the focus group listed in order of importance are:

Cost to Scale refers to the cost of adding users, including costs of additional required equipment.

Ongoing Costs refers to costs associated with software maintenance fees, data storage, training, and professional services required to maintain use of the software.

Initial Cost refers to the initial price to buy or license the software and factors in the availability of General Services Administration pricing or state contracts and grants.

4.0 EVALUATION CRITERIA ASSESSMENT RECOMMENDATIONS

The focus group and SAVER team made recommendations on whether each evaluation criterion should be assessed operationally or according to manufacturer-provided specifications. In an operational assessment, evaluators assess criteria based on the hands-on experience using the product. In a specification assessment, evaluators assess criteria based on product information provided by the manufacturer. In some cases, criteria may be assessed both operationally and according to manufacturer-provided specifications.

Also, some evaluation criteria were categorized as “information only.” These criteria will not be scored by evaluators during the assessment, but will be included as relevant specifications (i.e., price, warranty information) in the assessment report. Table 4-1 presents the focus group’s assessment recommendations for the evaluation criteria.

Table 4-1 Evaluation Criteria Assessment Recommendations

Category	Criteria	Operational	Specification	Information Only
Capability	GIS Files Handling		✓	
	Personnel Tasking and Accountability	✓		
	Information Sharing	✓		
	Interoperability	✓	✓	✓
	Asset Tracking	✓		
	Location Tracking	✓		
	Record Keeping	✓	✓	
	Incident Report Integration	✓		
	Messaging Feature	✓		
	Sensitive Information Handling		✓	
	Pre-planning Tools	✓		
Usability	Intuitiveness of User Interface	✓		
	Reliability	✓		
	Customizability	✓		
	Training Resource Accessibility	✓		
	Interface Readability	✓		
Deployability	Scalability	✓		
	Offline Usability	✓		
	User-level Access Control		✓	
	Deployment Options	✓	✓	
	Client Cross-Platform Compatibility		✓	
	Mobile Platform Availability		✓	

Category	Criteria	Operational	Specification	Information Only
Maintainability	Technical Support Availability	✓		
	Forensics Logging	✓		
	Autosave Feature	✓		
	Data Synchronization	✓		
	Map Updating	✓		
	Software Updates			✓
Affordability	Cost to Scale			✓
	Ongoing Costs		✓	
	Initial Cost		✓	

5.0 ASSESSMENT SCENARIO RECOMMENDATIONS

The focus group participants identified use-cases for incident management software as pre-planned events such as protests, fast-moving no-notice incidents (e.g., flash floods, earthquakes, and wildfires), and small, no-notice incidents like house fires. Based on these use-cases, the focus group participants recommended scenarios in which products could be assessed using the evaluation criteria recommended for operational assessment. Participants suggested using exercises from the Federal Emergency Management Agency Emergency Management Institute All-Hazards Position Specific Training Program curriculum as models for each scenario. Focus group participants recommended that evaluators assess two products per day, in teams of two, and that SAVER conduct after-action activities following each operational scenario.

5.1 Pre-planned Event - Protest

IMS will be used in a scenario simulating the planning and response to a protest. The software will be used to generate action and resource plans, identify and deploy resources based on assessment of threats and vulnerabilities, track and manage equipment and personnel, and to share information with other entities.

Evaluation criteria assessed during this scenario will include information sharing, interoperability, asset tracking, location tracking, record keeping, messaging features, incident report integration, pre-planning tools, reliability, training resources, deployment options, and cross-platform compatibility. After-action capabilities such as report generation will also be evaluated.

5.2 Fast-moving No-notice Incident – Scenario TBD

IMS will be used in a scenario simulating a response to an incident that evolves quickly, is resource-intensive, and takes place over multiple operational periods. The software will be used to quickly deploy and track numerous resources, track assets over multiple operational periods, incorporate tactical dispatch, communicate with field personnel both on and offline, and establish mutual aid agreements with other agencies and jurisdictions.

Evaluation criteria assessed during this scenario will include personnel tasking and accountability, information sharing, asset tracking, location tracking, record keeping, messaging feature, incident report integration, pre-planning tools, reliability, scalability, offline usability, deployment options, and cross-platform compatibility.

5.3 Small No-notice Incident – House Fire

Incident management software will be used in a simulated response to a house fire. The software will be used to quickly assess the types of resources needed, deploy and track necessary resources, communicate with field personnel and share and handle sensitive information with various agencies and utility companies.

Evaluation criteria assessed during this scenario will include personnel tasking and accountability, information sharing, asset tracking, location tracking, record keeping, incident report integration, sensitive information handling, reliability, and deployment options.

6.0 PRODUCT SELECTION RECOMMENDATIONS

During product selection discussions, focus group participants stated they would be interested in software that covered multiple aspects of incident response and management, rather than products meant for narrow applications. Participants requested products that can be used on laptops, tablets, and cellphones, as well as across operating platforms.

The focus group participants recommended selecting from the following manufacturers and their products for inclusion in the assessment:

- ESI Acquisition Inc: WebEOC
- Grey Wall Software: Veoci Emergency Management
- CORVENA: COR
- Dynamis Inc: COBRA
- Intterra Group: Intterra
- ESRI: ArcGIS Suite (Survey123, Workforce, and Collector)
- Adashi Systems: C&C Incident Command Software
- Noggin IT Inc: Noggin 2.0 Integrated Safety and Security Platform
- Hangar 14 Solutions: StreetWise CADLink
- Incident Response Technologies: Rhodium
- Tablet Command Inc: Tablet Command

Vendors responding to a request for information posted on SAMS.gov in July 2020 will also have their products considered for assessment.

7.0 SUMMARY

The focus group, consisting of seven emergency responders with at least two years of experience, identified 31 evaluation criteria for incident management software. “Capability” and “usability” were deemed the most important SAVER categories. These eight focus group-generated criteria were identified as being of utmost importance to first responders:

- Ability to handle standard GIS files
- Tracking personnel tasking and accountability
- Information sharing capability across personnel and other agencies
- Interoperability with other software and sensors
- Intuitive interface for users
- Software reliability
- Technical support availability
- Scalability of users and data traffic

The focus group participants recommended several scenarios and products to be considered for inclusion in the assessment. These recommendations will be used to plan the IMS for emergency response assessment.

8.0 FUTURE ACTIONS

The focus group's recommendations will be used to guide the development of the *Incident Management Software for Emergency Response Assessment Plan*, as well as the selection of products to evaluate in the assessment.

Once the assessment is complete, the results will be published to the SAVER document library, www.dhs.gov/science-and-technology/saver-documents-library.

9.0 ACKNOWLEDGEMENTS

NUSTL thanks the IMS focus group participants for their valuable time and expertise. Their insights and recommendations will guide the planning and execution of the assessment as well as future SAVER projects. Appreciation is also extended to the participants' agencies for allowing them to participate in the SAVER Program.