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# Final Report

## Airport Cooperative Research Program (ACRP) Project 04-12—Integrating Web-Based Emergency Management Collaboration Tools into Airport Operations

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# EXECUTIVE SUMMARY

Numerous airports utilize emergency management software obtained through their city or county emergency management agency. These systems are often available at little to no cost to airport operators, thus maximizing the appeal of a employing a particular system. However, airport operators need to make a balanced decision between cost and functionality specific to their unique environments and needs. Web-based emergency management collaboration tools (WBEMCTs) have not yet evolved to a point where software vendors cater specifically to airport operations requirements, and only a handful of web-based emergency management software vendors have actually modified their emergency management software to support airport operations. Currently, in many cases, airports develop their own system or a piecemeal system of systems.

A primer was created to provide guidance for line managers responsible for selecting, implementing, and operating a WBEMCT. The primer provides the following information:

- Reasons why airports might choose WBEMCTs.
- Identification of key internal and external stakeholders who would benefit from the use of a web-based tool, and description of how airports communicate with those internal and external stakeholders.
- Identification of software criteria and desired features (best practices) to consider when evaluating web-based collaboration tools. These criteria were based on an extensive literature review, data collection, and numerous case studies. The team analyzed and evaluated functionality and best practices of WBEMCTs. The analysis:
  - Included the use of GIS tools that work with a dashboard to create a COP;
  - Reviewed communications tools within an airport system that help relay data to external emergency management systems;
  - Provided the ability to track resources and to document and preserve a historical record of actions taken; and
  - Recognized network design as an important characteristic in evaluating web-based systems.
- Implementation strategy, security considerations, and the requirements for maintenance and system administration based on detailed analysis of the data collected during the project. Examples include the following:
  - Data obtained from web-based collaboration tools can be used in a court of law.
  - Emergency management systems are proven to reliably share data among different types of software systems, including information at a data element level.
  - Many software vendors offer web-based training, while some offer computer-based tutorials. System administrator training is generally conducted on site, though provisions can be made to conduct training off site.

- Funding options and considerations vary from airport emergency managers obtaining an account on an existing system belonging to the city/county emergency management agency at little to no cost to a fully integrated system of servers and airport dashboards. Federal, state, or local government grant monies are available to fund the acquisition of web-based tools.

To understand and describe the aviation community's current use of web-based systems in preparation for developing the primer, the IEM team interviewed over 40 diverse airport operators and representatives of state, county, and city emergency management organizations. Additionally the IEM team interviewed nearly 20 software vendors to become more familiar with their capabilities and customer base. Case studies were performed to gain a greater depth of understanding of the requirements, processes, and restrictions that airport operators would like to see implemented in web-based systems.

This Final Report (Task 7) provides the results of Tasks 1 through 6. It also includes an outline of the primer. The primer incorporates the results of Tasks 1 through 7.

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# CHAPTER 1: INTRODUCTION AND BACKGROUND

The objective of the ACRP project 04-12 was to prepare a primer to help airport operators of all sizes and types integrate web-based emergency management collaboration tools into airport operations. This project was established to help airports recognize the value of web-based commercial off-the-shelf emergency management collaboration tools. Tools such as WebEOC, E Team, and others are used to share information and coordinate resources between operations centers (e.g., airport to county and county to state). While these web-based collaboration tools have proven useful in emergency management, they also have applicability at airports for other non-routine activities/operations such as weather events, diversions, and security incidents.

As airport communications and emergency response become more sophisticated and the use of technology increases, guidelines are needed to help airports evaluate the benefits and costs of implementing or expanding existing web-based communications and controls systems. This research has helped to identify the features and functions appropriate for the unique needs of airports and for implementing effective web-based collaboration tools.

The IEM team developed a functional primer based on this research to help airport operators gain a better understanding of the functions of these web-based emergency management systems. The primer aids airports in establishing requirements, procuring and installing systems, and implementing training. It provides lessons learned from both successful and less-than-successful experiences at airports in the case studies.

# CHAPTER 2: RESEARCH APPROACH

All research for this project was conducted in accordance with the request for proposal (RFP) (see Appendix C: Data Collection Plan), as well as guidance from the Transportation Research Board (TRB) and ACRP.

## Task 1: Conduct a Literature and Document Review

The literature review (Appendix J: Results of Literature and Document Review) was conducted from July 15, 2011, to August 26, 2011, and submitted to the ACRP 04-12 panel on August 30, 2011. Additional systems were evaluated as they became known to the team and were added in follow-on tasks.

## Task 2: Develop a Data Collection Plan

The data collection plan (Appendix C: Data Collection Plan) was developed from September 1, 2011, to September 23, 2011, and submitted to the ACRP 04-12 panel on September 30, 2011. The panel approved the data collection plan on October 26, 2011.

## Task 3: Collect Data

Data were collected between October 26, 2011, and November 18, 2011, with results reported to the ACRP 04-12 panel as part of the Working Paper (Task 4).

## Task 4: Prepare Working Paper

The Working Paper was submitted to ACRP on November 30, 2011. The results from the data collection were reported as shown in Appendix D: Working Paper.

## Task 5: Develop a Taxonomy of Airports and Case Studies Plan

The Taxonomy of Airports and Case Study Plan (Appendix E: Taxonomy of Airports and Case Study Plan) were submitted to the ACRP Panel on December 30, 2011, and approved on January 26, 2012. There were 12 case studies approved by the panel. These case studies were conducted between January 26, 2012, and April 30, 2012. At the conclusion of each case study, the IEM team performed an analysis of the results, compared data and discussion points with the previous collection of data, updated the literature review, and fact-checked the details for inclusion in this Final Report.

The following criteria—which evolved over the course of the data collection and case study preparation—were used to determine software vendors identified in this case study:

- Is the software used at airports (preferred) or by EMAs?
- Does the software include a COP? (A COP is defined as a standard overview of an incident providing information that enables the Incident Commander/Unified Command and any supporting agencies and organizations to make effective, consistent, and timely decisions. By compiling data from multiple sources and

disseminating the collaborative information, a COP ensures that all responding entities have the same understanding and awareness of incident status and information when conducting operations.)

- Does it have a dashboard capable of tracking and monitoring status information?
- Is the dashboard capable of assigning and tracking resources?
- Does the vendor provide periodic updates through version releases (i.e. is the system configurable)?
- Does the vendor provide a maintenance plan and technical support?
- Does the vendor provide training support?
- Is the software web-based or web access only, with no stand-alone capability?
- Can the software integrate with other emergency management systems (Common Alerting Protocol)?
- Is the software secure, that is, does it support authentication and authorization?

## Task 6: Conduct Case Studies

The IEM team completed the case studies between January 26, 2012, and April 30, 2012. Results from these case studies were incorporated into this Final Report and included in the primer (Task 8).

# CHAPTER 3: FINDINGS AND RESULTS FROM TASKS 1 THROUGH 6

## Task 1: Conduct a Literature and Document Review

The literature review is attached to this Final Report as Appendix J: Results of Literature and Document Review. No additions were made to the literature review after the initial report in August 2011.

## Task 2: Develop a Data Collection Plan

Task 2 was a planning task and involved no results beyond the plan. The data collection plan is included in this Final Report as Appendix C: Data Collection Plan.

## Task 3: Collect Data

Data collection involved interviews with airports; airport organizations; state emergency and aviation offices; and county, state, and federal agencies. These results are shown in the Working Paper in Appendix D: Working Paper.

## Task 4: Prepare a Working Paper

Task 4 called for the IEM team to prepare a Working Paper. The Working Paper was a planning task and involved no results beyond the plan. The detailed Working Paper is included in this Final Report as Appendix D: Working Paper.

## Task 5: Prepare Taxonomy of Airports and Case Study Plan

The IEM team interviewed representatives from 47 airports during a six-week period. The team determined that the most useful basis for developing a taxonomy for these airports would be to use the National Plan of Integrated Airport Systems (NPIAS) size categories (as set forth in the *Preliminary Calendar Year 2010 Enplanements at Primary Airports* and modified to reflect changes to data pertaining to Northwest Florida Beaches International Airport). In addition, a category was added for general aviation (GA) airports. Key information relating to these airports, along with the IEM team's findings, is listed in Appendix E: Taxonomy of Airports and Case Study Plan.

### Case Study 1: Pittsburgh International and Allegheny County Airports

Appendix F: Case Study 1—Pittsburgh International and Allegheny County Airports provides results from case study 1.

## Case Study 2: Pennsylvania Emergency Management Agency

Appendix G: Case Study 2—Pennsylvania Emergency Management Agency provides results from case study 2.

## Case Study 3: Texas Coordination Projects

Appendix H: Case Study 3—Texas Coordination Projects provides results from case study 3.

## Case Study 4: DisasterLAN

Appendix I provides a brief description of DisasterLAN.

## Case Study 5: E Team, E-SPONDER Express

Appendix I provides a brief description of E Team and E-SPONDER Express.

## Case Study 6: Knowledge Center

Appendix I provides a brief description of Knowledge Center.

## Case Study 7: Mission Mode

Appendix I provides a brief description of Mission Mode.

## Case Study 8: OpsCenter

Appendix I provides a brief description of OpsCenter.

## Case Study 9: RESPONSE Management Information System

Appendix I provides a brief description of RESPONSE Management Information System.

## Case Study 10: NICE Situator

Appendix I provides a brief description of Nice Situator.

## Case Study 11: Virtual Agility

Appendix I provides a brief description of Virgil Agility.

## Case Study 12: WebEOC

Appendix I provides a brief description of WebEOC.

# CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

This chapter discusses the preliminary conclusions and recommendations based on the literature review, data collection, case studies, analysis, and synthesis. They are grouped by the primary actor to implement the stated or implied recommendation, and are organized according to the same five groups found in Table 3 through Table 6.

## *Desired Characteristics of Web-Based Emergency Management Collaboration Tools*

### Basic Capabilities to Look for in Web-Based Collaboration Tools

- Tracks and manages multiple incidents generally well
- Operable at multiple locations simultaneously
- Incorporates networked video sensor systems
- Can be used to assign resources
- Tracks resources
- Tracks hours by individual against specified task or project
- Reminds operator to follow up on specified task based on time increment
- Tracks all incident responses and their history
- A dashboard is available for airport managers
- Allows a user to query by incident number, time, and event
- Allows for manual input regarding restricted areas

### Key Stakeholders at Airport

- Airport emergency managers or operations managers are generally the primary point of contact between airports and EMAs. The emergency manager must have knowledge of available emergency management tools and needs to be able to connect with EMAs when requesting additional assets or reporting the status of incidents affecting the airport.
- The aircraft rescue firefighting (ARFF) chief is generally the on-scene commander until the response activity is complete; then scene security will be completed by another agency/group. The ARFF chief provides key situational awareness to airport officials and EMAs. The ARFF chief should be familiar with available web-based emergency management collaboration tools.
- Airport directors and their deputies provide support and necessary resources, if there is an incident, while operations and ARFF (fire rescue) take the lead. Executives need to understand how to best use web-based systems to facilitate operations.

## Internal/External Communications

- Airports use a variety of communications protocols to share information. From hand held radio communications, cell phones, and text messages to mutual aid radio frequencies and text/Nextel communications, airport operations personnel are generally well informed when an incident occurs at an airport.
- Airports share information throughout the airport via the use of a dispatch center, communications center, or emergency operations center (EOC). There are a number of ways airports send information requests to airport officials, including numerous telephone calling systems or manual call down trees. Documenting and sharing daily updates with airport officials through web-based collaboration tools can streamline and improve the current process of manually entering information in a logbook.
- Airports certified under Federal Aviation Regulation (FAR) Part 139 are mandated to maintain an FAA-approved Airport Emergency Plan (AEP). Airports and EMAs generally have plans in place with guidelines on calling EMAs. These range from paper checklist items used by the dispatch center or airport emergency management personnel to web-based systems through which airport operators submit requests for support.
- EMAs often rely on airports after a disaster occurs. For example, the Port au Prince airport was a focal point for disaster relief efforts coming into Haiti in the aftermath of the devastating earthquake in 2010, and the New Orleans airport was used to help evacuate critical transportation needs individuals prior to Hurricane Gustav in 2008. Following a disaster, EMAs must be aware of the status of their local airport, and they need to be informed when an incident occurs at an airport in order to provide the appropriate level of support. Web-based collaboration tools can help ensure that this vital information is communicated to all stakeholders in a timely manner; updates can be sent automatically to multiple recipients.
- After an emergency event, airports can use their web-based tools to document and justify expenditures in an after-action report. They can also use their web-based tools to document resources used and obtain possible funding reimbursement if there is a Federal Emergency Management Agency (FEMA) declaration.
- Airports are increasingly using web-based systems to connect with passengers and community leaders through websites and social media such as Facebook and Twitter in order to update the community at large on issues such as airport status and irregular incidents.
- Research shows that airports that obtain web-based systems from city or county emergency management agencies tend to interface with those agencies more frequently. For example, the Pittsburgh airport emergency manager routinely participates in meetings, conference calls, and exercises with the Allegheny County EMA. Building this close working relationship adds even more value to the enhanced capabilities of their web-based system. Increased communication and collaboration helps the county better understand the needs and requirements of the airport, resulting in a more effective system for both parties.

- In an example of how one group worked to improve interoperability and data sharing, the Southwest Texas Regional Advisory Council (STRAC) and the Texas WebEOC Interoperability Project (TWIRP) (an initiative that interconnects more than 35 jurisdictional servers across Texas and provides connectivity, information-sharing, and resource requests statewide) helped El Paso International Airport (ELP) set up WebEOC. The outcome was well-received, prompting San Antonio International Airport (SAT) to pursue implementing WebEOC as well.

## Staffing Issues: User, System Administration, and Training

- One of the benefits of using web-based systems is the ability to quickly share information between departments and agencies both at the airport and external to the airport. Utilizing web-based systems can result in reduced phone calls, e-mail messages, and greater efficiency between stakeholders.
- The Pittsburgh Airport emergency manager is one of the system administrators for their web-based system. Other airports use their information technology (IT) manager or their IT department to support this function. For those airports that use a web-based system that provides software as a service (SAAS), they rely on the vendor system administrator to provide this service.
- Several airports use web-based systems within their communications centers, dispatch centers, or airport command center. Often times, the ARFF chief and staff also have access to these capabilities.
- Software vendors often provide system administrator training for IT staff and can provide this capability for an airport. Those airports that connect through the city/county or state system often get very little training or support for their unique requirements.

## Reporting Capabilities of System: Daily and Annual Reports

- Nearly all software vendors claim their system provides the ability to produce daily/monthly or incident status reports. Most have the ability to recover data based on date/timestamp or incident number.
- Some web-based systems can track and assign resources and provide documented reports highlighting hours allocated to specific tasks.

## Costs, Funding Issues, and Potential Funding Sources

Large hub airports often use their own revenue streams to purchase emergency management software systems which are usually tied into the jurisdiction where the airport is located. All of the airports included in the case studies received funding for their systems through their city/county emergency management agencies. This chapter reviews a few other grant opportunities which exist for airports for which this type of funding stream is unavailable.

The Airport Improvement Program (AIP) is a federal capital improvement grant program. Guidelines exist that usually forbid an airport to access its entitlement or discretionary grant monies for ongoing (daily) or maintenance items for the airport. Items that are currently funded are the actual purchase of plant and equipment for operations (i.e., ARFF equipment). Personnel and training costs are not funded.1 Inquiries to two FAA Airport District Offices (ADOs) indicate there has been no funding for such systems to date. However, it would seem that if these systems were AIP-eligible, the smaller airports (non-hub and general aviation) would be able to link to their jurisdiction or state Emergency Operations Center (EOC).

The AIP Handbook states that special facilities and equipment directly necessary for dealing with emergencies during a major incident are AIP eligible along with the normal ARFF and security equipment required by FAR Part 139 and Title 49 CFR, Part 1542, included in the airport's approved security plan. However, discussions with FAA personnel indicated that the WBEMCTs would not be eligible for AIP funding. The AIP Handbook, FAA Order 5100.38C, provides guidelines for this grant program. For more information on these types of funds, see http://www.faa.gov/airports/aip/.

The Passenger Facility Charge (PFC) program is a federal airport funding program that generates its funds through fees imposed on enplaning passengers. Airports must receive authorization from the FAA to impose a PFC, and funded projects must meet certain eligibility criteria. Commercial service airports that enplane 2,500 or more passengers and receive scheduled passenger airline service may submit a PFC application to impose a PFC and use the revenue for airport improvements in accordance with the procedures described in 14 CFR Part 158. Unfortunately, the same eligibility requirements that apply to AIP also apply to PFC funding, so personnel and training for emergency management are not funded. Additional information on this funding source can be found at http://www.faa.gov/airports/pfc/.

Lastly, although none of the 47 airports surveyed noted receiving any funding from their representative state aeronautical agencies, these agencies are generally more flexible than federal agencies and may provide a source of funding for WBEMCTs. The flexibility of these agencies applies only to state appropriations that they control, not to federal pass-through funds or block grants.

## UASI

The Urban Areas Security Initiative (UASI) is a component of the Homeland Security Grant Program (HSGP), which plays an important role in the implementation of Presidential Policy Directive-8 (PPD-8) by supporting the development and sustainment of core capabilities to fulfill the National Preparedness Goal (NPG).2

DHS programs that may fund the cost of emergency management software systems include the Urban Area Security Initiative (UASI) and the State Homeland Security

[1] Kendall Ball, personal communication, August 15, 2011.
[2] http://www.fema.gov/government/grant/hsgp/#2

Program (SHSP). These grant programs are administered by the Homeland Security Grant Program (HSGP). The El Paso City and County Emergency Management Agency purchased a system for the El Paso International Airport (ELP) with a UASI grant. The City of Indianapolis, Division of Homeland Security's WebEOC system was purchased using a combination of SHSP and UASI grants. Another grant program that may provide funding for these systems is the Operation Stonegarden (OPSG) program, which is also administered by the HSGP. Additional information on the HSGP can be found at http://www.fema.gov/fy-2012-homeland-security-grant-program.

## Implementation Strategy

As identified in the FAA's FY 2007 Security and Hazardous Materials (ASH) Business Plan3, under Crisis Response, the strategic initiative calls for developing web-based emergency operations information-sharing tools that create a common operational picture, maintain situational awareness, and support effective, rapid decision making.

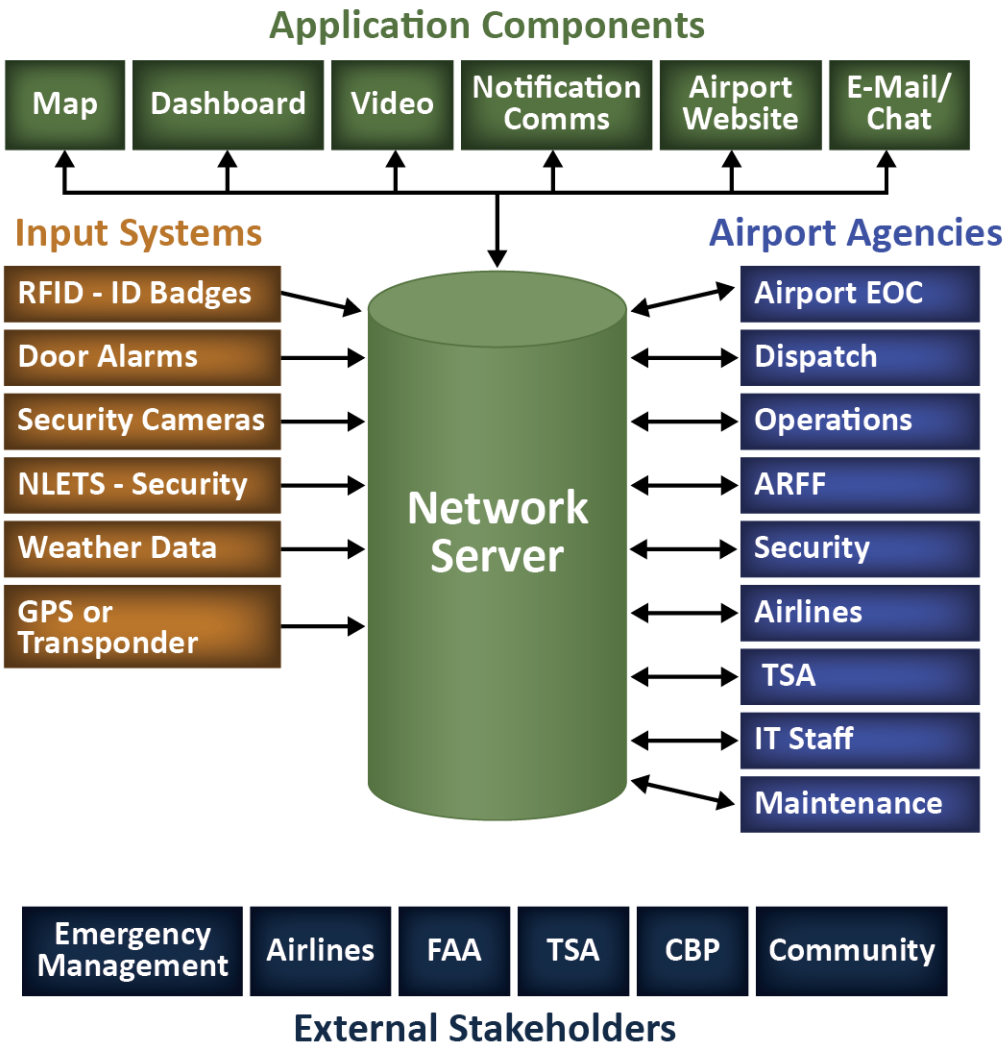
## Lessons Learned From Multi-Jurisdictional Application of Web-Based Collaboration Tools

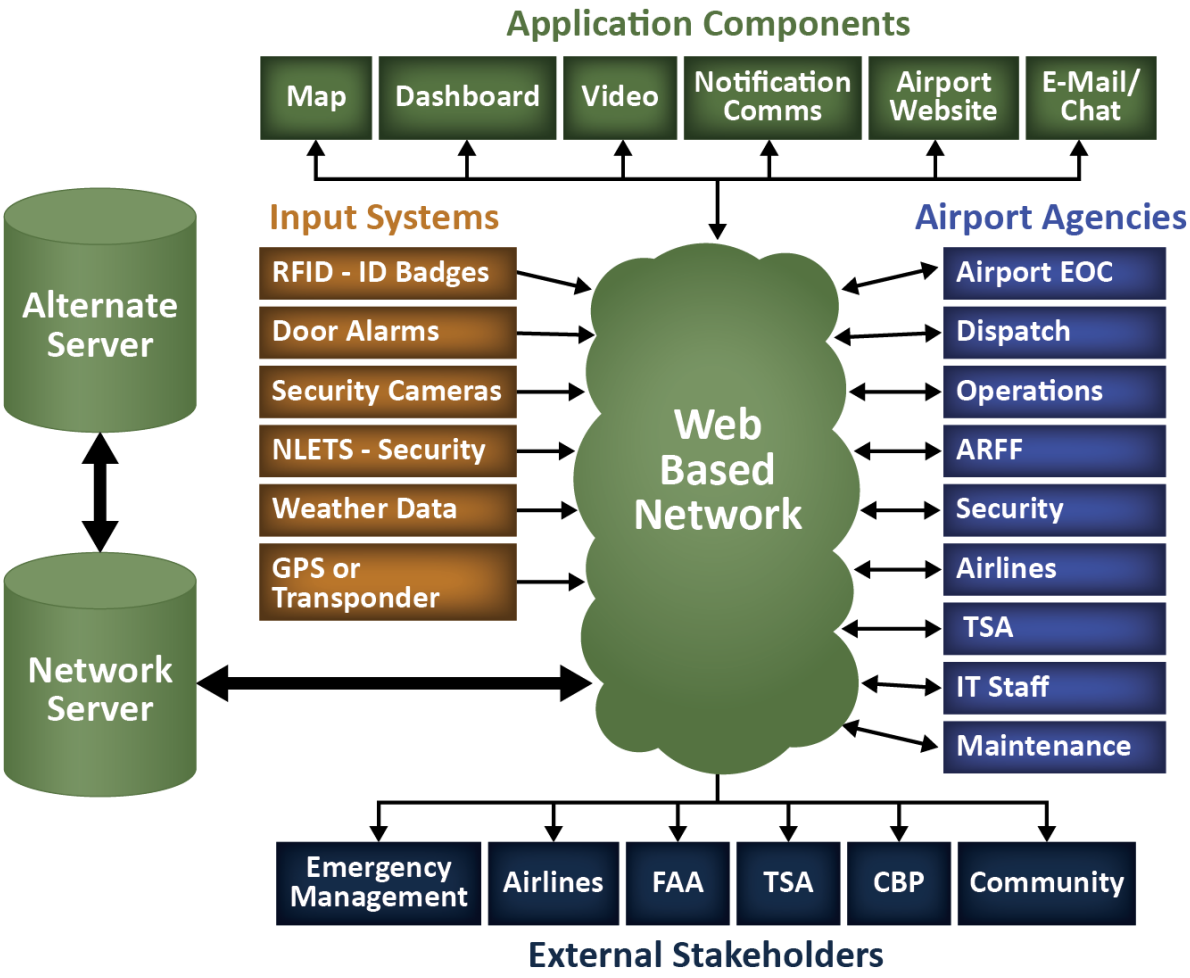
- The FAA's Aviation Safety Information Analysis and Sharing (ASIAS) System is an example of a web-based collaboration tool. The website[4] provides a lessons learned section, a database of statistics on aviation matters, NTSB recommendations, and studies on aviation safety. Although this website provides a great deal of detailed data, it does not address the use of multi-jurisdictional web-based collaboration tools. Further investigation of the FAA's root website on airport safety[5] also provides a wealth of information pertaining to safety, such as the safety management system (SMS) and the Aircraft Rescue & Fire Fighting (ARFF) collection of documents and regulations, along with links to the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). TRB's ACRP Report 12: An Airport Guide for Regional Emergency Planning for CBRNE Events, references ACRP 04-04: *Exercising Command-Level Decision Making for Critical Incidents at Airports.* Web-based collaboration tools would prove beneficial in helping airports satisfy compliance of 14 CFR Part 139.325, Airport Emergency Plan.
- Counties and local jurisdictions are likely to apply through the State Hazard Mitigation Grant Program for web-based collaboration tools. Airports, on the other hand, are likely to use the UASI grant funds. Also, traditionally a member of the airport emergency management team sits on the local UASI boards. The UASI may solicit the state for funds or may fund outright the program the airport is seeking to obtain.
- According to ACRP 04-04[6], this regulation allows the exercising of command-level decision making within the National Incident Management System (NIMS) and in

[3] See pg 16, http://www.faa.gov/about/plans_reports/business_plan2007/media/ASH%20FY2007%20Business%20Plan%20for%20Publication.pdf
[4] http://www.asias.faa.gov/portal/page/portal/asias_pages/asias_home/
[5] http://www.faa.gov/airports/airport_safety/
[6] http://rip.trb.org/browse/dproject.asp?n=12151

conformance with the requirements of 14 CFR Part 139.325, Airport Emergency Plan. Such a tool would supplement physical full-scale exercises as a means to exercise (and thereby improve) critical incident decision making. To do so, this tool must be affordable, cost-effective, easy to set up and use, have readily available support, provide a measured assessment, and allow participants from 14 CFR Part 139 airports to exercise the resources and policies they use every day. The objective of this research is to create a tool for exercising command-level decision making for critical incidents at 14 CFR Part 139 airports. The tool will include methods to measure and evaluate actions and outcomes including compliance with nationally recognized standards and Federal Aviation Administration (FAA) and Department of Homeland Security (DHS) requirements. The tool will be used to meet the training and exercise requirements of 14 CFR Part 139.325, Airport Emergency Plan, and will cover civil-aviation-specific scenarios for the nine hazard-specific sections identified in FAA Advisory Circular 150-5200/31 A, Airport Emergency Plan (September 30, 1999). The ten functional sections, identified in AC150-5200/31 A, provide a good starting point for development of the tool. To reflect airport needs, however, the tool will allow an airport to readily customize training and exercises for their staffing and geographic areas. Finally, the tool will present training and exercise options and will track the progress of individual employees and teams in meeting training requirements. The tool must also be configured to protect airport information that is too sensitive to be released to the public.

## Infrastructure, Physical, and Logical Requirements




Application Components
Map
Dashboard
Video
Notification Comms
Airport Website
E-Mail/ Chat
Input Systems
RFID - ID Badges
Door Alarms
Security Cameras
NLETS - Security
Weather Data
GPS or Transponder
Alternate Server
Network Server
Web Based Network
Airport Agencies
Airport EOC
Dispatch
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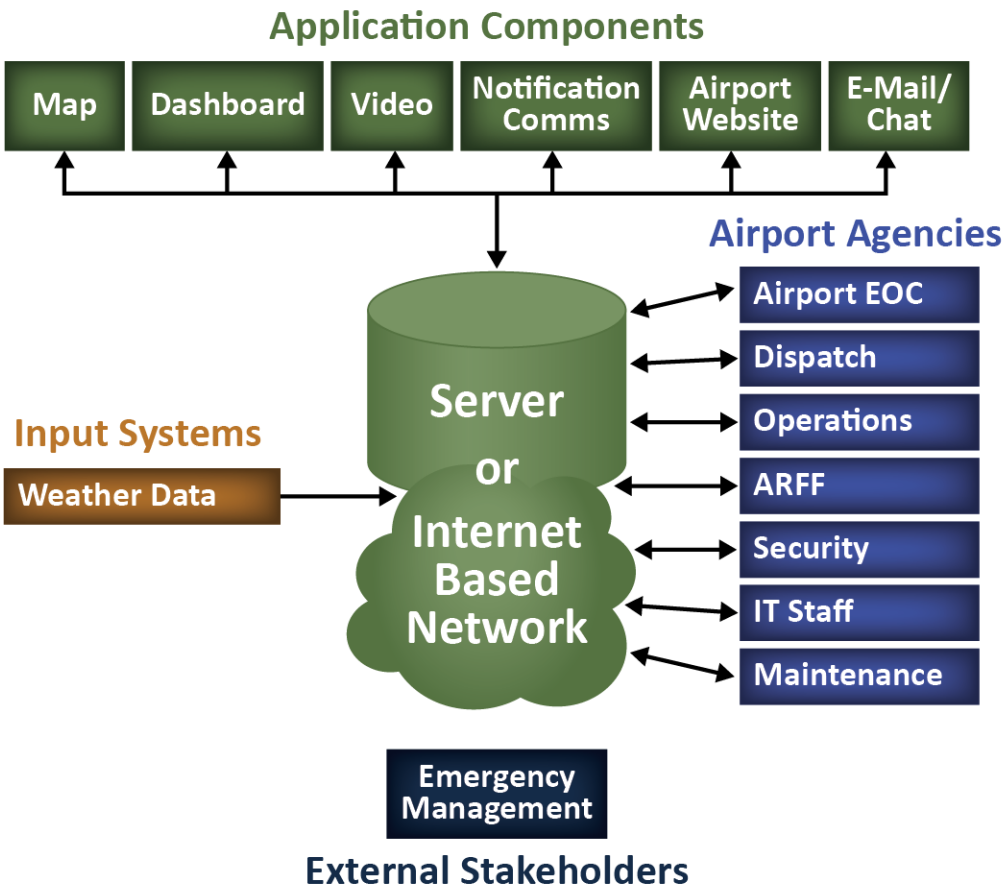
TSA
IT Staff
Maintenance
Emergency Management
Airlines
FAA
TSA
CBP
Community
External Stakeholders




## Geographic Information System (GIS) Mapping Tools

- Creates a COP using Esri products
- Offers the ability to control visibility of geospatial layers
- Automatically zooms in/out between mapping systems
- Imports/exports mapping data from/to other systems
- Uses hot keys to return display to home screen
- Allows the user to add and display incident site information
- Allows the user to display data in multiple coordinate systems
- Tracks aircraft in real time on the runway
- Tracks vehicles in near real time on the tarmac
- Tracks emergency response vehicle locations in near real time
- Displays crash, spill, fire, accident, or incident sites
- Allows various airport agencies to input data
- Displays regional jurisdiction boundaries

- Integrates external medical, emergency management, law enforcement, fire, and EOC information
- Displays security sensor locations and nominal coverage or fields of view
- Displays security alarm activation status
- Displays security gate locations and status
- Displays gate status
- Generates and displays guard post locations, assets, weapons, and coverage

## Dashboard

- Tracks and monitors status information
- Assigns and tracks resources

## Updates and Maintenance Plans

- Vendor provides periodic updates and version releases (system is configurable)
- Vendor provides maintenance plan and technical support
- Maintenance and system application administration ensures reliability and accuracy of shared data

## Training Support

- Vendor provides training support
- Support can be web-based or web access (no stand-alone capability)

## Integration with Emergency Management Systems

- Integrates with other emergency management systems (Common Alerting Protocol [CAP])
- Maintains a level of interoperability with other technologies and mutual aid or community partners
- Maintains protocols on sharing information with stakeholders
- Implements strategies and lessons learned from the multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools

## Security

- Must be secure (supports authentication/authorization)
- Must ensure security and protection of systems and data information
- Must consider liability issues and mitigation measures (e.g., National Law Enforcement Telecommunications System [NLETS] and various state, local, and tribal variations)

- Nearly all systems use username and password for access, and most web-based systems have functional accounts where certain information is restricted or only accessible to those with a need to know. These functional accounts are generally based on emergency management naming schemes or functions such as operations, plans, and security.
- Law enforcement sensitive information is available on some systems, strictly on a need-to-know basis.
- Nearly all applications evaluated use secure socket layer protection procedures.

# CHAPTER 5: DETAILED OUTLINE OF THE PRIMER

Front Matter

Cover
Title Page
Acknowledgment of Sponsorship and Disclaimer
Abstract

Body of the Report

Author Acknowledgments
Executive Summary
Introduction
Primer Goal

Chapter 1: Acquiring a WBEMCT
- What is a WBEMCT?
- Types of WBEMCTs
- Communication and Collaboration
- WBEMCT Features
- Dashboard
- Common Operating Picture
- Record Keeping
- Training

Chapter 2: Considerations before Acquiring and Using a WBEMCT
- Communication with Internal and External Stakeholders
- Cost (Initial, Maintenance/Upgrades, Ongoing Operational Costs)
- Current Systems and Integration
- System Security
- Staffing

Chapter 3: How to Fund a WBEMCT
- Airport Capital Purchase
- Airport Improvement Program (AIP)
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- Acquisition of a System or the Rights to a System under a Regional Entity (City or County)

Chapter 4: Creating a Successful WBEMCT
- Operational Requirements for WBEMCT Implementation
- Schematics
- System Security and Concerns

Chapter 5: Best WBEMCT Practices
- Best Practice Recommendations for Day-to-Day Operations
- Available Training
- Sample Exercises

Chapter 6: Developing a Successful WBEMCT
- Criteria for Choosing a WBEMCT
- Core Capabilities
- Level 1 Enhanced Features
- Level 2 Enhanced Features
- Lessons Learned
- What to Do
- What Not to Do
- Reliability and Accuracy of Shared Data

Conclusions

Appendix A: Requirements Matrix
Appendix B: A Sampling of Different WBEMCTS
- CommandCore
- DisasterLAN
- E Team, E-Sponder Express, E-Sponder Alerts, and NC4 Risk Center
- Knowledge Center
- MissionMode Alert and Situation Center
- OpsCenter
- Response Management Information System (Response MIS)
- Situator
- Virtual Agility
- WebEOC

Appendix C: Glossary of Acronyms

# TABLES

**Table 1: Case Study Subjects**

| Case Study Number | Case Study Subject |
|---|---|
| 1 | Pittsburgh International and Allegheny County Airports |
| 2 | Pennsylvania Emergency Management Agency |
| 3 | Texas Coordination Projects (Dallas/Ft. Worth International Airport, El Paso International Airport and San Antonio International Airport) |
| 4 | DisasterLAN |
| 5 | E Team, E-SPONDER Express |
| 6 | Knowledge Center |
| 7 | MissionMode Alert and Situation Center |
| 8 | OpsCenter |
| 9 | RESPONSE Management Information System |
| 10 | NICE Situator |
| 11 | VirtualAgility |
| 12 | WebEOC |

## Table 2: Interview Questions

| Name of Airport: | Date: |
|---|---|
| **Question** | **Comments** |
| 1) Does your airport use web-based emergency management collaboration tools?<br>1–Yes 2—No 3—Don't know | If yes, name of the system and date acquired: |
| 2) Would you recommend your system to other airports?<br>1—Very unlikely 2—Unlikely 3—Somewhat unlikely 4—Neither likely nor unlikely<br>5—Somewhat likely 6—Likely 7—Very likely 8—Don't know | |
| 3) System Operators are highly proficient on the system we use.<br>1—Strongly disagree 2—Disagree 3—Somewhat disagree 4—Neither agree nor disagree<br>5-Somewhat agree 6-Agree 7-Strongly agree 8-Don't know | |
| 4) Your system is provided to the airport by another entity (e.g., city, county, or state government).<br>1—Yes 2—No 3—Don't know | |
| 5) The airport purchased your system using airport funding.<br>1—Yes 2—No 3—Don't know | If yes, was the system purchased, leased, or billed monthly as in software as a service (SAAS)? |
| 6) The airport purchased your system using grant funding.<br>1—Yes 2—No 3—Don't know | Airport Improvement Program (AIP), U.S. Department of Homeland Security (DHS), or state? |
| 7) This system results in increased efficiencies in planning, response, and recovery from emergencies or disasters.<br>1—Strongly disagree 2—Disagree 3—Somewhat disagree 4—Neither agree nor disagree<br>5—Somewhat agree 6—Agree 7—Strongly agree 8—Don't know | |
| 8) This system results in any cost savings in time, personnel, or other areas.<br>1—Strongly disagree 2—Disagree 3—Somewhat disagree 4—Neither agree nor disagree<br>5—Somewhat agree 6—Agree 7—Strongly agree 8—Don't know | What other areas? |

| Name of Airport: | Date: |
|---|---|
| 9) Is your system based on the National Incident Management System (NIMS)/Incident Command System (ICS) framework?<br>1–Yes 2–No 3–Don't know | If No, is it based on another system? Please clarify. |
| 10) Does the system generate NIMS-compliant forms?<br>1–Yes 2–No 3–Don't know | |
| 11) Does the system allow you to customize forms within the software?<br>1–Yes 2–No 3–Don't know | |
| 12) Your system allows you to import documents from other sources.<br>1–Yes 2–No 3–Don't know | |
| 13) Your system responds quickly to input.<br>1–Strongly disagree 2–Disagree 3–Somewhat disagree 4–Neither agree nor disagree<br>5–Somewhat agree 6–Agree 7–Strongly agree 8–Don't know | |
| 14) The system archives the events.<br>1–Strongly disagree 2–Disagree 3–Somewhat disagree 4–Neither agree nor disagree<br>5–Somewhat agree 6–Agree 7–Strongly agree 8–Don't know | |
| 15) Overall, are you satisfied with your system?<br>1–Very dissatisfied 2–Moderately dissatisfied 3–Slightly dissatisfied 4–Neutral<br>5–Slightly satisfied 6–Moderately satisfied 7–Very satisfied 8–Don't know | |
| 16) Your system is easily interoperable with other technologies and mutual aid or community partners.<br>1–Strongly disagree 2–Disagree 3–Somewhat disagree 4–Neither agree nor disagree<br>5–Somewhat agree 6–Agree 7–Strongly agree 8–Don't know | If it is interoperable, what other types of systems/software applications? Mark all that apply: Enterprise Asset Management (EAM), Computer aided Dispatch (CAD), Financial, GIS |
| 17) Do you use your system to track day-to-day operations?<br>1–Strongly disagree 2–Disagree 3–Somewhat disagree 4–Neither agree nor disagree<br>5–Somewhat agree 6–Agree 7–Strongly agree 8–Don't know | What type of operations? |

| Name of Airport: | Date: |
|---|---|
| 18) Does your current system support the use of "smart" phones?<br>1—Strongly disagree 2—Disagree 3—Somewhat disagree 4—Neither agree nor disagree<br>5—Somewhat agree 6—Agree 7—Strongly agree 8—Don't know | Tablets? Text? E-mail? Call? Radio? SAT Phones? |
| 19) How would you rate the level of ease in successfully operating this software?<br>1–Very difficult 2–Moderately difficult 3–Difficult 4–Neutral<br>5–Moderately easy 6–Easy 7–Very easy 8–Don't know | |
| 20) There were problems or significant issues in implementing your system.<br>1—Strongly disagree 2—Disagree 3—Somewhat disagree 4—Neither agree nor disagree<br>5—Somewhat agree 6—Agree 7—Strongly agree 8—Don't know | |
| 21) Has your system been upgraded?<br>1—Yes 2—No 3—Don't know | |
| 22) Has your system been secure?<br>1—Very unsecure 2—Unsecure 3—Somewhat unsecure 4—Fair<br>5—Somewhat secure 6—Secure 7—Very secure 8–Don't know | |
| 23) The vendor provides support for your system through a service contract.<br>1—Strongly disagree 2—Disagree 3—Somewhat disagree 4—Neither agree nor disagree<br>5—Somewhat agree 6—Agree 7—Strongly agree 8—Don't know | |
| 24) Your information technology (IT) department provides support for your system in-house.<br>1—Strongly disagree 2—Disagree 3—Somewhat disagree 4—Neither agree nor disagree<br>5—Somewhat agree 6—Agree 7—Strongly agree 8—Don't know | Who provides this service? 1. In House IT? 2. External IT? 3. Different Organization? 4 Vendor Technical Support? |
| 25) Any implementation strategies and lessons learned from multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU that you would share with other airports (open answer): | |
| 26) What have users found the system does well, and/or what does it not do well, and what in their perception it would take (if applicable) to migrate to more daily uses? | |

**Table 3: Additional Interview Information**

| Airport Demographics (To be Completed by the Interviewer) | | Name of Interviewer |
|---|---|---|
| NPIAS Categorization | Name and Title of Person Interviewed | FAA Region |
| Number of Full-Time Employees (FTEs) | Owner/Operator/Maintenance Division of System for the Airport | Airport Contribution to the Purchase or Maintenance of the System |
| Jurisdiction (e.g., City, County, State, or Private) | | Governance Structure |
| Other Information | | |

**Table 4: Intended Airports to Contact**

| FAA Regions | Name of Interviewee | NE | EA | SO | GL | CE | SW | AL | NM | WP |
|---|---|---|---|---|---|---|---|---|---|---|
| Large Hub | | | | | | | | | | |
| DEN | | | | | | | | | X | |
| LAX | | | | | | | | | | X |
| MSP | | | | | X | | | | | |
| BOS | Jeff Jordan, Senior Project Manager in IT Department | X | | | | | | | | |
| DTW | | | | | X | | | | | |
| SEA | | | | | | | | | | X |
| JFK | | X | | | | | | | | |
| Medium Hub | | | | | | | | | | |
| MCI | Ian Redhead, Deputy Director, Operations and Maintenance | | | | | X | | | | |
| MEM | | | | X | | | | | | |
| STL | | | | | | X | | | | |
| PIT | | | X | | | | | | | |
| BUR | | | | | | | | | | X |
| MKE | | | | | X | | | | | |
| AUS | Jim Smith | | | | | | X | | | |
| CMH | | | | | X | | | | | |
| RNO | Mike Scott, Operations Manager Communications, EOC | | | | | | | | | X |
| Small Hub | | | | | | | | | | |
| ELP | Terry Sharp | | | | | | X | | | |
| CAK | | | | | X | | | | | |
| COS | | | | | | | | | X | |
| PIE | | | | X | | | | | | |

| FAA Regions | Name of Interviewee | NE | EA | SO | GL | CE | SW | AL | NM | WP |
|---|---|---|---|---|---|---|---|---|---|---|
| BTV | Kelly Colling, Airport Operations | X | | | | | | | | |
| SDF | | | | X | | | | | | |
| BOI | | | | | | | | | X | |
| GRR | Robert Benstein | | | | X | | | | | |
| SGF | | | | | | X | | | | |
| FAR | | | | | X | | | | | |
| Non-hub Primary | | | | | | | | | | |
| LRD | Jose Flores | | | | | | X | | | |
| PBG | | | X | | | | | | | |
| ACK | David Sylvia, Airfield Manager and ARFF Chief | X | | | | | | | | |
| VPS | | | | X | | | | | | |
| MVY | | X | | | | | | | | |
| BHB | | X | | | | | | | | |
| LYH | | | X | | | | | | | |
| CWF | Anthony Ware | | | | | | X | | | |
| FSD | | | | | X | | | | | |
| BGR | | X | | | | | | | | |
| DLH | | | | | X | | | | | |
| GRI | | | | | | X | | | | |
| General Aviation Airports | | | | | | | | | | |
| TET | | | X | | | | | | | |
| VNY | | | | | | | | | | X |
| DVT | | | | | | | X | | | |
| APA | | | | | | | | | X | |
| NEW | Fred Truitt, Acting Director | | | | | | X | | | |

| FAA Regions | Name of Interviewee | NE | EA | SO | GL | CE | SW | AL | NM | WP |
|---|---|---|---|---|---|---|---|---|---|---|
| LVK | Genevieve Paftor-Cohn<br>Livermore-Pleasanton, EM | | | | | | | | | X |
| SLR | Joey Baker | | | | | | X | | | |
| COT | Elton Page, Airport Manager | | | | | | X | | | |
| RHV | Chris Nucci | | | | | | | | | X |
| HDC | Jason Ball | | | | | | X | | | |
| JQF | Richard Lewis | | | | X | | | | | |
| APA | | | | | | | | | X | |
| JBC | | X | | | | | | | | |
| DOT Alaska | | | | | | | | X | | |
| DOT Hawaii | | | | | | | | | | X |

**Table 5: Taxonomy of Airports**

| Airport Code | NPIAS Categorization | FAA Region | Jurisdiction (e.g., City, County, State, or Private) | Governance Structure | System Used | Overall Satisfied With System? | System Is Interoperable With Other Technologies and Mutual Aid Partners |
|---|---|---|---|---|---|---|---|
| BOS | Large Hub | NE | Airport Authority | Airport Authority | n/a | n/a | n/a |
| DEN | Large Hub | NM | City and county | City Department, Enterprise Fund, Mayor-Appointed Manager Of Aviation | WebEOC | Moderately satisfied | Agree |
| DTW | Large Hub | GL | Airport Authority | Independent Authority | E Team | Very dissatisfied | Strongly agree |
| HNL | Large Hub | WP | State | Governor/State | n/a | n/a | n/a |
| JFK | Large Hub | EA | State | Port Authority | n/a | n/a | n/a |
| LAX | Large Hub | WP | City | City Enterprise Department | E-SPONDER | Moderately dissatisfied | Strongly disagree |
| MSP | Large Hub | GL | State | State/Quasi Airport Authority | n/a | n/a | n/a |
| SEA[7] | Large Hub | NW | Airport Authority | Airport Authority Commission | WebEOC | Very dissatisfied | Strongly disagree |
| SEA | Large Hub | NW | Airport Authority | Airport Authority Commission | OpsNet | Very satisfied | Neither agree nor disagree |
| | | | | | | | |
| ANC | Medium Hub | NW | State | Governor/State | n/a | n/a | n/a |
| AUS | Medium Hub | SW | City | City | n/a | n/a | n/a |

[7] SEA uses two different systems (WebEOC and OpsNet) and was therefore asked for feedback on both systems. For this reason, SEA has been listed twice on this chart.

| Airport Code | NPIAS Categorization | FAA Region | Jurisdiction (e.g., City, County, State, or Private) | Governance Structure | System Used | Overall Satisfied With System? | System Is Interoperable With Other Technologies and Mutual Aid Partners |
|---|---|---|---|---|---|---|---|
| BUR | Medium Hub | WP | Airport Authority | Airport Authority | WebEOC | Slightly satisfied | Neither agree nor disagree |
| CMH | Medium Hub | GL | Airport Authority | City/County/at Large Airport Authority | ELS: Electronic Logging Software by Landrum & Brown | Moderately satisfied | Neither agree nor disagree |
| MCI | Medium Hub | CE | City | City Department, answer to City Manager | Everbridge Aware Notification System | Moderately satisfied | n/a |
| MEM | Medium Hub | SO | Airport Authority | Airport Authority | Everbridge Aware Notification System | Moderately satisfied | Unknown |
| MKE | Medium Hub | GL | County | County Board of Supervisors | E-SPONDER | Very satisfied | Agree |
| PIT | Medium Hub | EA | Airport Authority | Airport Authority | Knowledge Center | Very satisfied | Agree |
| RNO | Medium Hub | WP | Airport Authority | Independent Authority | WebEOC | Slightly satisfied | Unknown |
| | | | | | | | |
| BOI | Small Hub | NW | City | City | WebEOC | Moderately satisfied | Agree |
| BTV | Small Hub | NE | City | City Council-Mayor-Airport Manager, Airport Commission Advisory | n/a | n/a | n/a |
| CAK | Small Hub | GL | n/a | Airport Authority | n/a | n/a | n/a |

| Airport Code | NPIAS Categorization | FAA Region | Jurisdiction (e.g., City, County, State, or Private) | Governance Structure | System Used | Overall Satisfied With System? | System Is Interoperable With Other Technologies and Mutual Aid Partners |
|---|---|---|---|---|---|---|---|
| COS | Small Hub | NW | City | Strong Mayor | WebEOC | Very satisfied | Agree |
| ELP | Small Hub | SW | County | City | WebEOC | Very satisfied | Unknown |
| FAR | Small Hub | GL | City | Airport Authority | n/a | n/a | n/a |
| GRR | Small Hub | GL | n/a | County | n/a | n/a | n/a |
| SDF | Small Hub | SO | n/a | Airport Authority | n/a | n/a | n/a |
| SGF | Small Hub | CE | City | City | n/a | n/a | n/a |
| VPS | Small Hub | SE | County | County Manager | n/a | n/a | n/a |
| | | | | | | | |
| ACK | Non Hub Primary | NE | Town | Town Selectmen, Airport Commission, Airport Manager | Reverse 911 Notification System | Very satisfied | Strongly agree |
| BGR | Non Hub Primary | NE | City | City | n/a | n/a | n/a |
| DLH | Non Hub Primary | GL | City | Airport Authority | DoD ACES-FB | Very satisfied | Disagree |
| FSD | Non Hub Primary | GL | Airport Authority | Airport Authority | n/a | n/a | n/a |
| GRI | Non Hub Primary | CE | n/a | Airport Authority | n/a | n/a | n/a |
| LRD | Non Hub Primary | SW | City | City | n/a | n/a | n/a |
| | | | | | | | |
| APA | General Aviation | NW | n/a | Airport Authority | n/a | n/a | n/a |
| BJC | General Aviation | NW | County | County | n/a | n/a | n/a |
| COT | General Aviation | SW | County | County | n/a | n/a | n/a |
| CWF | General Aviation | SO | Airport Authority | Airport Authority | Thorguard Plus of Louisiana | Moderately satisfied | Strongly agree |

| Airport Code | NPIAS Categorization | FAA Region | Jurisdiction (e.g., City, County, State, or Private) | Governance Structure | System Used | Overall Satisfied With System? | System Is Interoperable With Other Technologies and Mutual Aid Partners |
|---|---|---|---|---|---|---|---|
| DBT | General Aviation | WP | City | City Manager | E-SPONDER | Moderately satisfied | Unknown |
| HDC | General Aviation | SW | City | City | n/a | n/a | n/a |
| JQF | General Aviation | SE | City | City | n/a | n/a | n/a |
| LVK | General Aviation | WP | City | Enterprise Activity under City Public Works Department | City E-Mail | Very dissatisfied | Unknown |
| NEW | General Aviation | SW | Levee Board | Levee Board | n/a | n/a | n/a |
| PIE | General Aviation | SO | County | County Board Of Commissioners | n/a | n/a | n/a |
| RHV | General Aviation | SW | County | County | n/a | n/a | n/a |
| SLR | General Aviation | SO | City | City | n/a | n/a | n/a |
| TEB | General Aviation | EA | Airport Authority | Port Authority | n/a | n/a | n/a |
| VNY | General Aviation | PW | City | Enterprise Department | Everbridge Aware | Very satisfied | Neither agree nor disagree |

**Table 6: Search Terms Used in the ACRP 04-12 Literature Review**

| |
|---|
| Software Applications |
| ADMS |
| Cisco Software EOC |
| Command Core |
| E Team |
| E-SPONDER |
| Everbridge |
| Knowledge Center |
| Mission Mode |
| OpsCenter Alert Technologies |
| Passur Airport Monitor |
| Sensis ADSE-X |
| WebEOC |
| Facebook / Twitter social-media applications |
| Social Media +Emergency +airport |
| Social Media +Disaster +airport |
| Social Networking +emergency +airport |
| Social networking +disaster +airport |
| Twitter +emergency +airport |
| Facebook +emergency +airport |

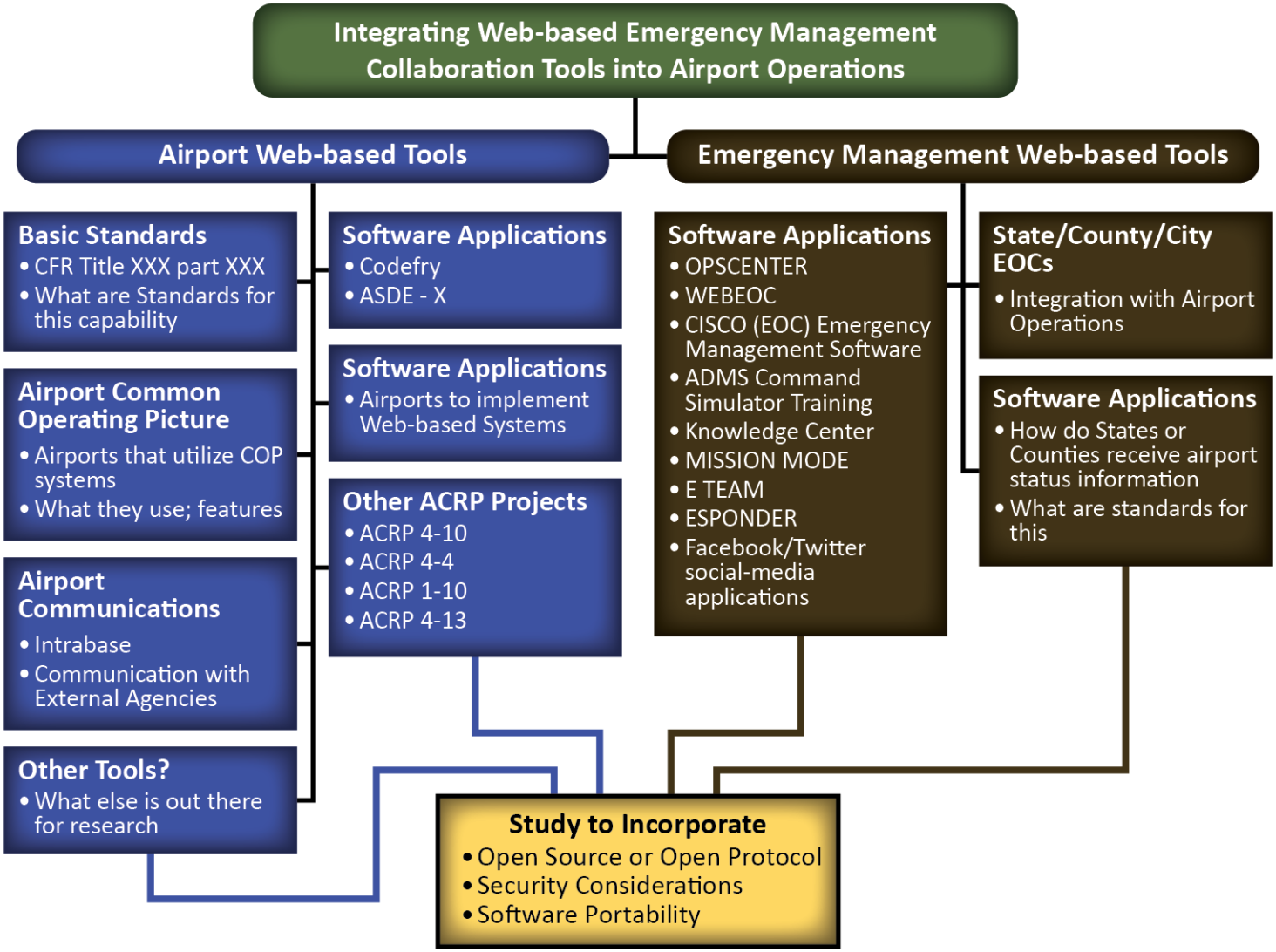


Figure 1: Web-based Literature Map

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# APPENDIX B: ACRONYMS AND GLOSSARY

| | |
|---|---|
| ACRP | Airport Cooperative Research Program (ACRP) is an industry-driven, applied research program that develops near-term, practical solutions to problems faced by airport operators. ACRP is managed by the Transportation Research Board (TRB) of the National Academies and sponsored by the Federal Aviation Administration (FAA). The research is conducted by contractors who are selected on the basis of competitive proposals. |
| AEP | Airport Emergency Plan |
| AGC | Allegheny County Airport |
| AIP | Airport Improvement Program |
| ANG | Air National Guard |
| API | Application Programming Interface |
| ARFF | Aircraft Rescue Fire Fighting |
| AWP | An amplified work plan expands on the roles of the research team and describes how they will contribute to completing each task. |
| BMP | Best Management Practices |
| CAD | Computer Aided Dispatch |
| CAP | Common Alerting Protocol |
| CCTV | Closed Circuit Television |
| CIMS | Crisis Information Management Software (CIMS) is the software found in emergency operation centers (EOCs) that supports the management of crisis information and the corresponding response by public safety agencies. |
| COP | Common Operating Picture |
| COTS | Commercially available off-the-shelf (COTS) is a Federal Acquisition Regulation (FAR) term defining a non-developmental item (NDI) of supply that is both commercial and sold in substantial quantities in the commercial marketplace, and that can be procured or used under government contract in the same precise form as available to the general public. |
| DFW | Dallas/Fort Worth International Airport |

| | |
|---|---|
| DHS | Department of Homeland Security |
| DoD | Department of Defense |
| DOT | Department of Transportation |
| EAM | Enterprise Asset Management |
| EMA | Emergency Management Agency |
| ELP | El Paso International Airport |
| EMPG | Emergency Management Preparedness Grant |
| EOC | An emergency operations center (EOC) is a central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level in an emergency situation, and ensuring the continuity of operation of a company, political subdivision, or other organization. |
| FAA | Federal Aviation Administration |
| FAA ADO | Federal Aviation Administration Airport District Offices |
| FAR | Federal Aviation Regulation |
| FEMA | Federal Emergency Management Agency |
| FOD | Foreign Object Debris |
| FTE | Full Time Employee |
| GA | General Aviation |
| GIS | Geographic Information System |
| Google Scholar | Google Scholar provides a search of scholarly literature across many disciplines and sources, including theses, books, abstracts, and articles. |
| HSGP | Homeland Security Grant Program |
| ICS | Incident Command System |
| IEM | Innovative Emergency Management, Inc. |

| | |
|---|---|
| IN | Indiana |
| IPAWS | Integrated Public Alert and Warning System – As part of section 508 (April 16, 2010), of the rehabilitation act of 1973 requires electronic information technology used by the Federal Government to be accessible for people with disabilities |
| IROPS | Irregular Operations |
| IT | Information Technology |
| KC | Knowledge Center |
| MOU | Memorandum of Understanding |
| NIMS | National Incident Management System |
| NLETS | National Law Enforcement Telecommunications System |
| NOTAM | Notice to Airmen |
| NPIAS | National Plan of Integrated Airport Systems |
| OGC | Open Geospatial Consortium |
| Open Source | The term open source describes practices in production and development that promote access to the end product's source materials. |
| PA | Pennsylvania |
| PEMA | Pennsylvania Emergency Management Agency |
| PFC | Passenger Facility Charge |
| PIT | Pittsburgh International Airport |
| POC | Point of Contact |
| RFID | Radio Frequency Identification |
| RFP | Request for proposal (RFP) is issued at an early stage in a procurement process, where an invitation is presented for suppliers, often through a bidding process, to submit a proposal on a specific commodity or service. |
| SAAS | Software as a Service |

| | |
|---|---|
| SAT | San Antonio International Airport |
| SITREP | Situation Report |
| SME | Subject Matter Expert |
| Social media | The term social media refers to the use of web-based and mobile technologies to turn communication into an interactive dialogue. |
| SSL | Secure Socket Layer |
| STEP | Supporting Technology Evaluation Program |
| STRAC | Southwest Texas Regional Advisory Council |
| TRB | Transportation Research Board |
| TWIRP | Texas WebEOC Interoperability Project |
| UASI | Urban Area Security Initiative |
| WebEOC | WebEOC system developed by ESi |

# APPENDIX C: DATA COLLECTION PLAN

## Introduction

IEM, together with Smith-Woolwine and Associates, Kim Kenville Consulting, Newton & Associates, and Kimley-Horn and Associates, prepared a primer on integrating web-based emergency management collaboration tools into airport operations. This primer will be used by airport staff to evaluate and implement web-based collaboration tools that provide a COP for both day-to-day operations and full emergency response management.

As required by the RFP for the ACRP 04-12 project, the IEM team completed Task 2, which was described as follows:

> Prepare a data collection plan to gather the following information to be included in the primer: (1) basic capabilities and limitations of web-based collaboration tools; (2) key stakeholder roles and responsibilities; (3) techniques for internal and external communication with stakeholders; (4) level of interoperability with other technologies and mutual aid community partners; (5) security and protection of systems and data information; (6) maintenance and system application administration; (7) liability issues and mitigation measures (e.g., NLETS and various state, local, and tribal variations); (8) system reliability and accuracy of shared data; (9) staffing issues that include user, system administration, and training; (10) costs, funding issues, and potential funding sources; (11) infrastructure, physical, and logical requirements; (12) protocols on sharing information with stakeholders; (13) implementation strategies and lessons learned from the multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU; (14) data elements and commonly used features and functions of each web-based tool in use at airports; and (15) any other information necessary to achieve the objective.

Since public airports of all sizes and types can use the final product when considering implementing a web-based collaboration tool, data from numerous sources was required in order to develop a comprehensive and useful primer. The overall goal of the project and, consequently, of the data collection process was to evaluate software already in use by airports or EMAs and to evaluate those features that are desirable for airports to implement. The IEM team sought data from airport, county, and state agencies in an effort to determine how these agencies share information on a day-to-day basis and during contingency operations.

With approval from the ACRP Panel, the IEM team completed the data collection plan between October 15, 2011, and October 30, 2011. By combining literature research with specific data targets and organizations, the IEM team plans to identify the common components to help public airport operators establish web-based tools. These components

are inherent in the planning of, assessment of, response to, and recovery from events that may negatively affect airport operations.

## Purposes of Data Collection

Data collection served the following three purposes for this project:

- To identify and prioritize airports, agencies, and groups that have implemented web-based emergency management collaboration tools
- To examine entities that have well-defined lines of communication via web-based emergency management collaboration tools with private, regional, international, and military airports within their jurisdictions
- To narrow the focus on those entities whose best practices address the data collection objectives

## Types of Data Sought

The RFP specified the information which must be included in the primer, which, in turn, dictates the categories of data to be sought during the data collection phase. The following are the primary data categories on which the IEM team concentrated:

- Basic capabilities and limitations of web-based collaboration tools
- Key stakeholder roles and responsibilities
- Techniques for internal and external communication with stakeholders
- Level of interoperability with other technologies and mutual aid or community partners
- Security and protection of systems and data information
- Maintenance and system application administration
- Liability issues and mitigation measures (e.g., NLETS and various state, local, and tribal variations)
- System reliability and accuracy of shared data
- Staffing issues that include user, system administration, and training
- Reporting capabilities of system (daily reports and annual reports)
- Costs, funding issues, and potential funding sources
- Infrastructure, physical, and logical requirements
- Protocols on sharing information with stakeholders
- Implementation strategies and lessons learned from the multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU
- Data elements and commonly used features and functions of each web-based tool in use at airports

- Airport demographic data
  - National Plan of Integrated Airport Systems (NPIAS) categorization
  - Federal Aviation Administration (FAA) region
  - Governance structure
  - Number of employees
  - Which division operates or maintains the system for the airport
  - Airport contribution to the purchase or maintenance of the system
  - Jurisdiction within the county or state
- Any other information necessary to achieve the objective

## Methodology

To prepare this data collection plan, each team member reviewed a matrix of the previously mentioned data categories crossed with the entities (e.g., airports, software applications, EMAs, and other stakeholders) and developed sub-plans for the matrix cell(s) falling in his or her area of expertise. This included building an outline of talking points designed to develop a strategy for how to best capture the relevant data needed from each particular discipline. The threefold goal of engaging in active discussion, developing new concepts for robust data collection, and fostering consensus was successfully accomplished. The resulting data collection sub-plans were consolidated into the plans presented in the specific data collection sub-plans section.

The primary data collection method was one-to-one contact with senior airport managers, software vendors, and EMAs. The airports and other entities were selected by the subject matter experts (SMEs) on the IEM team and were identified in the specific data collection sub-plans in this document. Initial contact was made via e-mail with a senior manager to introduce the project and request a designation of the best individual contact(s) within that organization, and then a phone interview was conducted. Most questions during the phone interview were open ended, and nearly all gathered qualitative data. A few gathered quantitative historical data. Follow-up inquiries were made by e-mail as necessary. The IEM team compiled a list of points of contact (POCs) for discussion during a conference call with the ACRP Panel.

Throughout the data collection phase, the IEM team continued to expand the literature review and compiled quantitative data. IEM used collected information to create a best practices flow diagram with swim lanes showing possible uses of these web-based collaboration tools. These flow diagrams will highlight groups that input data and how these data flow throughout the airport and possibly to EMAs.

If preliminary results indicated a need to adjust the data collection plan, the IEM team consulted with the ACRP Program Officer and submitted the proposed changes to the ACRP Panel for review and approval.

# *Specific Data Collection Sub-Plans*

## Airports—Web-based Collaboration Tools (Day-to-Day and Emergency Management)

For this sub-plan, IEM ascertained information from airports in an effort to answer the following questions:

- What type of web-based collaboration tools are used at airports?
- How do airports use these tools day-to-day and during contingency operations?
- How do airports implement these systems?
- What are desirable aspects of web-based tools?
- What elements are not desirable?
- How are security and portability issues addressed?
- How do airports incorporate social media into emergency management?

### Airport Interview Questions

Table 2 presents the questions the IEM team asked the appropriate airport representatives. The IEM team contacted the airports listed in Table 4 based on firsthand knowledge of these airports or research conducted for the literature review under Task 1. IEM's airport selection included public-use airports from a full representation of various regions, sizes, and types. Since results of this sub-plan were essential for the case study plan, IEM scheduled this data collection process throughout the month of October 2011.

## Airports—Financial Data

A major objective of this project was to determine a means for airports to obtain funding to install these web-based systems. The IEM team maintained close ties with airport officials and financial managers. The IEM team will contact select airport financial managers at the same locations as those listed in Table 4 to determine how airports best implemented web-based collaboration tools into airport operations.

### Airport Finance Interview Questions

IEM contacted appropriate airport representatives and attempted to seek quantitative data (if airport officials were willing and able to disclose this financial information) by posing the following questions:

- Does the airport have a web-based emergency management collaboration tool?
- What system is the airport using?
- How did the airport fund the initial procurement for this system?
- Were grant, lend/lease (non-federal) funds used to purchase this system?
- Was this system "gifted" on a pre-commercial basis as a test bed location?
- Did the airport seek funding from federal sources?

- What was the cost for this system (include capital and operational costs)?
- What are the annual operating costs?
- How many workstations does the airport have set up?

## Web-based Software Application for Airports

The IEM team researched a number of software applications, both in support of airports and in use by EMAs or commercial agencies. In an effort to better understand their capabilities, IEM recommended that the developers of the following be contacted:

- Cisco Software EOC—Not airport COP
- Command Core—Developed by Technical Radium; called on November 15
- Everbridge AWARE—Developed by Everbridge; Michael Cardarelli
- Knowledge Center—Developed by Command Core; Bill Dunlap
- Mission Mode—Developed by Mission Mode; Grant Schlosser
- Ops Center—Developed by Alert Technologies Corp; John Merlo
- PSSI—Called on November 14
- Situator—Developed by Nice Systems; Yohai West
- WebEOC—Developed by ESi; Kim Frierson
- Sensis ASDE-X—Called on November 10 and November 15
- ADMS—Simulation System; not emergency management COP
- Passur Airport Monitor (OPSNET)—Developed by Passur Aerospace; Renee Alter
- Send Word Now—Developed by Send Word Now; Cort Wayneman
- NC4—Develops E Team, E-SPONDER, and Risk Center; Norbert Butler
- E Team—Developed by NC4; Norbert Butler
- E-SPONDER—Developed by NC4; Norbert Butler
- Ravealert—Rave Mobile Safety; John Green
- X-Matters—Called on November 10 and November 15
- Passur Aerospace OPSnet—Not for emergency management; airport to airline use; Renee Alter
- ACES-FD—AF System; no point of contact
- DisasterLAN—Buffalo Computer Graphics; Nancy Kensy
- Alertus—Alertus Technologies; Jason Volk

### Software Vendor Interview Questions

The IEM team asked the following questions of the appropriate software representatives:

- What type of software applications are provided to airports?

- What are the primary capabilities of this system?
- How many airports use the system?
- Are there other groups that use your applications in support of emergency management?
  - Can those applications be tailored to airport operations?
- How would airports use this system day-to-day and during contingency situations?
- Is there a dashboard available for airport managers?
- Is it portable to various hardware platforms?
- Can the software run on existing hardware at the airport?
  - If not, what would be required to run the software?

- Can this software provide data updates to county or state EOCs?
- Is it compatible with other systems used by county or state EMAs?
- What were some of the significant training issues associated with implementation?
  - What kind of training is available?
  - What are the types of customer support options that are available (e.g., 24-hour, telephone, and online)?
- Assuming that there are 10 workstations throughout each airport, what is the cost of this system to be installed?
  - What are the hardware costs?
  - Is there a requirement to install a central server?
  - Is an uninterruptable power supply required?
  - Are there any software license costs?
  - What are the licensing options?
  - Are there any other associated costs?
  - Are there annual or periodic version upgrades?
    - What is the cost for upgrades?
  - How are defects managed and fixed?
  - Are desired enhancements to the system allowed?
    - What are the customization options?
    - What is the customization process?
    - What are the customization costs?
    - What is involved in creating customization based on a new requirement?
- Can this software accept inputs from social media tools?

- Can this software send information to social media tools?

The following are follow-on questions that were posed, as required, to an IT department or software developers. These inputs helped the IEM team create a best practice system block diagram of emergency management collaboration tools:

- Does the software support any open protocols?
- What parts of the system are built using open-source frameworks?
- What parts of the system are available as open source for developers?
  - What is the open-source licensing name?
- What languages were used to develop the applications?
- What database(s) is used by the application?
- What third-party frameworks are used by the applications?
  - What third-party application programming interface (API) (e.g., Twitter and Facebook) is being used by the application?
- What protocols are being used?
- What are the levels of documentation provided?
- What are the standards and compliances that are supported?
  - Does the Geographic Information System (GIS) support the Open Geospatial Consortium (OGC)?
  - Are the incident command forms NIMS-compliant?
- What quality assurance processes are in place?
- What system parts can share data, and what protocols are used?
- Does the application support or provide:
  - Secure socket layer (SSL)?
  - Remote access?
  - System logs?
  - Access control?

## State, County, City Emergency Management Agencies

The literature review from Task 1 provided IEM with information on county and state EMAs. Part of this study determined how airports interact with county and state emergency management and if there are avenues to leverage those relationships through the use of web-based systems.

The IEM team focused data collection on the state aviation director or state EMA representing the following states:

- Connecticut
- Michigan
- New York
- New Jersey
- Vermont
- Pennsylvania
- Oregon
- Texas

The IEM team selected the EMAs of Allegheny County, PA and Indianapolis, IN. As IEM team members talked to airport managers, they identified additional cities or counties where airport managers provide status updates. Discussions with airport representatives led to the Team contacting other agencies to include FEMA (through the FEMA Regions) and/or state EMAs, as appropriate.

These organizations have established collaboration tools in place, or suggested that counties (within the state) implement specific software solutions. Data were collected from these states and counties throughout October 2011.

### Emergency Management Interview Questions

The following questions were developed to address the primary question of how counties and states coordinate emergency management activities at airports.

- How do the counties and states track the status of airports within them?
- Have the counties and states ever paid for such a system at any airport in the state?
- If the counties and states ever put someone in the state EOC, does that person have connectivity with any airport via one of these systems?
- Have the counties and states mandated airports to use specific software in their area?
    - What software application were the counties and states mandated to use?
    - What are the key features of this software solution?
    - Did the counties and states support their airports in obtaining funds to implement a specific software application?
    - How often are airports required to provide updates to this system?
- Do entities use NIMS/ICS forms for communication during disasters?
- What problems have occurred in communications in recent activations?
- How do deployed teams communicate with airports?
- Does the state or county use social media tools to communicate with airports?

- Does the state or county use social media to inform the public of the current status at an airport?

## Data Collection Plan Summary

Data gathered from these questions formed the baseline for the Working Paper submitted to the ACRP Panel under Task 4 at the end of November 2011. The overall goal of this effort was to help all U.S. airports, regardless of size or geographical location, to develop and implement web-based collaboration tools. These tools can help airports track the status of their airport day-to-day as well as during contingency operations, and will help airports inform county and state EMAs of their status.

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# APPENDIX D: WORKING PAPER

## Introduction

IEM, together with Smith-Woolwine and Associates, Kim Kenville Consulting, Newton & Associates, and Kimley-Horn and Associates, continued efforts toward preparing a primer on integrating web-based emergency management collaboration tools into airport operations. This primer will be used by airport staff to evaluate and implement web-based collaboration tools that provide a COP for both day-to-day operations and full emergency response management.

As required by the RFP for the ACRP 04-12 project, the IEM team completed Task 3, which was to conduct a data collection plan. Since public airports of all sizes and types can use the final product when considering implementing a web-based collaboration tool, data from numerous sources were required in order to develop a primer that would be comprehensive and useful. The overall goal of the project and, consequently, of the data collection process, was to evaluate software already in use by airports or EMAs and to evaluate those features that are desirable for airports to implement. The IEM team obtained information from airports, county, and state EMAs and software developers in an effort to determine how these agencies share information on a day-to-day basis and during contingency operations.

## Methodology

To complete this data collection and working paper, each team member reviewed the matrix of data categories crossed with the entities (e.g., airports, software applications, EMAs, and other stakeholders) and developed sub-plans for the matrix cell(s) falling within his or her area of expertise. This included building an outline of talking points designed to guide the team with a strategy for how to best capture the relevant data needed from each particular discipline. The threefold goal of engaging in active discussion, developing new concepts for robust data collection, and fostering consensus was successfully accomplished. The resulting data collection sub-plans were consolidated into the plans presented in the Specific Data Collection Results Sub-Plans section below.

The primary data collection method consisted of one-to-one contact with senior airport managers, software vendors, and EMAs. The airports and other entities were selected by the subject matter experts (SMEs) on the IEM team. Initial contact was made via e-mail to a senior manager to introduce the project and request a designation of the best individual contact(s) within that organization, and then a phone interview was conducted. Most questions during the phone interview were open-ended, and nearly all gathered qualitative data. A few obtained quantitative data, which are summarized below. Follow-up inquiries were made by e-mail as necessary.

# Specific Data Collection Results Sub-Plans

## Airports—Web-based Collaboration Tools

For this sub-plan, IEM obtained information from airports in an effort to answer the following questions:

- What type of web-based collaboration tools are used at airports?
- How do airports use these tools day-to-day and during contingency operations?
- How do airports implement these systems?
- What are desirable aspects of web-based tools?
- What elements are not desirable?
- How are security and portability issues addressed?
- How do airports incorporate social media into emergency management?

### Interview Questions Summary

The IEM team interviewed officials from 40 airports (SEA provided two inputs as they use two systems) as part of this process (see Table 7.) This subset represents 77 percent of the 52 airports in the Data Collection Plan. Of the remaining 12 airports, 11 did not respond and one declined to participate. Airports ranged from large hubs to small hubs and general aviation airports. General aviation airports seemed somewhat less likely to reply than commercial airports. The team interviewed representatives from each region as identified in the Data Collection Plan. Once contacted, airport staff personnel were very cooperative in the interviews.

The following are among the key findings discovered:

- Forty-nine percent of airports interviewed used web-based collaboration tools. Of those airports that had a system in place, 68 percent were generally satisfied with the system they were using. Seventy percent would generally recommend the use of their system. Seventy percent indicated the airport operators were generally proficient on the use of the system. Sixty-eight percent believe their system to be generally easy to use. Thirty-two percent use the system to track day-to-day operations, though several were dissatisfied with this capability. Systems in use at the airports that were interviewed included WebEOC, E Team, Everbridge, DisasterLAN, Knowledge Center, Reverse 911, and ACES-FB (a Department of Defense [DoD]-developed system).
- Forty-one percent stated the system they have in place was provided to them by a city, county, or state government agency, while 36 percent indicated the airport funded the system. Seventy-one percent of those interviewed with a system stated that the system they have in place is billed monthly as SAAS. Fifteen percent of airports with a system purchased the system using UASI grant funding, though funding generally came out of operating budgets, the DoD, state EMAs, or DHS.

- Seventy-eight percent believe the system results in increased efficiencies in planning response and recovery from emergencies or disasters. Seventy-six percent generally believe use of their system results in cost savings on time, personnel, or other areas. Systems can systematically track the resources allocated toward a response. Systems enhance communication with EMAs resulting in efficiency of resource allocation and avoidance of duplication of effort.
- Seventy-six percent claim their system is based on NIMS/ICS guidance. Seventy-three percent stated their system provided NIMS compliant forms. Sixty-one percent believe their system was interoperable with other technologies and mutual aid or community partners. If the local or state government agency used the same system, this was the primary means of interoperability. Some systems did not work well with emergency management software.
- Forty-six percent claimed forms on their system could be modified and 70 percent indicated forms could be imported from other sources.
- Nearly all with a system in place indicated their system responded quickly to input and 100 percent indicated their system provided the capability to archive events.
- Sixty-five percent indicated their system supported the use of smartphones. General comments included the ability of systems to send text messages and e-mail to phones.
- Fifty-three percent asserted that the system did not pose significant issues in implementing.
- Sixty-two percent claimed their system had received upgrades since being implemented.
- Ninety-four percent think that their system is generally secure.
- Sixty-six percent have a service contract on their system, and 62 percent have an IT department to provide support for their system.

**Table 7: Status of Airport Interviews**

**C = Completed, D = Declined to participate or did not respond**

| FAA Regions | NE | EA | SO | GL | CE | SW | AL | NM | WP |
|---|---|---|---|---|---|---|---|---|---|
| Large Hub | | | | | | | | | |
| DEN | | | | | | | | C | |
| LAX | | | | | | | | | C |
| MSP | | | | C | | | | | |
| BOS | C | | | | | | | | |
| DTW | | | | C | | | | | |
| SEA | | | | | | | | | C |
| JFK | C | | | | | | | | |

| FAA Regions | NE | EA | SO | GL | CE | SW | AL | NM | WP |
|---|---|---|---|---|---|---|---|---|---|
| Medium Hub | | | | | | | | | |
| MCI | | | | | C | | | | |
| MEM | | | C | | | | | | |
| STL | | | | | D | | | | |
| PIT | | C | | | | | | | |
| BUR | | | | | | | | | C |
| MKE | | | | C | | | | | |
| AUS | | | | | | C | | | |
| CMH | | | | D | | | | | |
| RNO | | | | | | | | | C |
| Small Hub | | | | | | | | | |
| ELP | | | | | | C | | | |
| CAK | | | | C | | | | | |
| COS | | | | | | | | C | |
| PIE | | | D | | | | | | |
| BTV | D | | | | | | | | |
| SDF | | | C | | | | | | |
| BOI | | | | | | | | C | |
| GRR | | | | C | | | | | |
| SGF | | | | | C | | | | |
| FAR | | | | C | | | | | |
| Non-hub Primary | | | | | | | | | |
| LRD | | | | | | D | | | |
| PBG | | D | | | | | | | |
| ACK | C | | | | | | | | |
| VPS | | | C | | | | | | |
| MVY | D | | | | | | | | |
| BHB | D | | | | | | | | |
| LYH | | C | | | | | | | |
| CWF | | | | | | C | | | |
| FSD | | | | C | | | | | |
| BGR | C | | | | | | | | |
| DLH | | | | C | | | | | |
| GRI | | | | | C | | | | |

| FAA Regions | NE | EA | SO | GL | CE | SW | AL | NM | WP |
|---|---|---|---|---|---|---|---|---|---|
| General Aviation Airports | | | | | | | | | |
| TEB | | C | | | | | | | |
| VNY | | | | | | | | | C |
| DVT | | | | | | | | | C |
| APA | | | | | | | | C | |
| NEW | | | | | | D | | | |
| LVK | | | | | | | | | C |
| SLR | | | | | | C | | | |
| COT | | | | | | C | | | |
| RHV | | | | | | | | | C |
| HDC | | | | | | D | | | |
| JQF | | | | D | | | | | |
| BJC | C | | | | | | | | |
| DOT Alaska | | | | | | | C | | |
| DOT Hawaii | | | | | | | | | C |

## Airports—Financial Data

A major objective of this project was to determine a means for airports to obtain funding to install web-based systems. A summary of the financial data collection results is provided below.

### Financial Data —Summary Comments

- According to the surveys and interviews of the subject airports, a combination of funding sources were used to fund the acquisition costs of the various web-based systems.
- These funding sources include airport operating budgets, DHS grants, FAA, DoD, and others.
- Results of this sub-plan were essential for the case study plan.

The results of the financial information obtained during the data collection survey was summarized and expanded upon in the primer. A detailed description of the possible funding sources that may be available to fund the web-based systems was covered in the primer. These potential funding sources include

- Federal Airport Improvement Program Funds
- Federal Passenger Facility Charge Program Funds
- Other Federal Agency Funds
- State Aviation Agency Funds

- City/County Funds
- Airport General Funds

Discussions with Federal Aviation Administration (FAA) Headquarters' personnel responsible for the administration of the Airport Improvement Program (AIP) was also summarized in the primer and covered relevant issues regarding the eligibility of funding for the web-based systems from AIP entitlement and/or discretionary grants. In this regard, the primer cited specific paragraphs from the AIP Handbook (Handbook), FAA Order 5100.38C dated June 28, 2005, to direct the readers to the appropriate area of the handbook to assist in the grant application process with their local Airport Districts Office. With few exceptions, Passenger Facility Charge (PFC) eligibility parallels AIP cost eligibility.

The primer also discusses the results of the survey from airports that received funding from other federal agencies, state agencies, and subsidies from the local governmental controlling agency, and examines how the net cost of the web-based systems were paid for from general airport funds ( i.e., operating budget or capital budget). For those cases where local funds are expended to fund the costs (acquisition and operating) of web-based systems, a discussion of potential cost recovery measures is covered in the primer.

## Web-based Software Application for Airports

The IEM team researched a number of software applications, both in support of airports and in use by EMAs or commercial agencies. In an effort to better understand the capabilities unique to each system, IEM attempted to contact representatives associated with the following software products and developers:

- ALERTUS
- Cisco Software EOC
- Command Core
- E Team
- E-SPONDER
- Everbridge
- Knowledge Center
- MissionMode
- Ops Center
- PSSI
- WebEOC
- Sensis ASDE-X
- ADMS
- PASSUR AirportMonitor

- Send Word Now

## Software Company Data —Summary

### Notification Systems

- **ALERTUS**, developed by Alertus Technologies (http://www.alertus.com). The IEM team contacted Jason Volk, 866-425-3788, Jason@alertus.com
  The following are notable features of Alertus:
  - Alertus provides an interactive communications platform connecting to home phone, mobile devices, e-mail, text, pagers, and fax machines
  - Currently used at several major universities to include University of Virginia, University of Maryland and University of Kentucky, Gallaudet University
  - Overrides critical messages to television devices
  - Visual and audible alerting technology
  - Consistent messaging through multiple platforms
  - Enhanced Intelligibility voice systems
  - Panic button capability
  - Two way communication (response)
  - Multilingual capability
  - IPAWS compatible
- **Aware**, developed by Everbridge (http://www.everbridge.com/aware). The team contacted Michael Cardarelli, 818-230-9509, Michael.Cardarelli@everbridge.com.
  The following are notable features of Aware:
  - Aware provides an interactive communications platform connecting to home phone, mobile devices, e-mail, text, pagers, and fax machines
  - Currently used at 19 airports nationwide with a 100 percent renewal rate
  - Airport Operations Playbook incorporated into system; helps operators form messages during critical situations
  - Provided as SAAS; no hardware to purchase
  - Individuals can select best means of contact: primary, secondary, or tertiary
  - Supports Reverse 911 calling
  - Integrated into EMAs
  - Provides polling capability (e.g. press 1 if evacuating, 2 if still at work, 3 if you have an emergency and need help)
  - Provides quota notification (e.g. we need six people to work snow plows)
  - Conference bridge notification (e.g. launches conference call to Operations, Maintenance, ARFF)

- Provides final notification (e-mail message to inform that an incident is resolved)
- High-quality text-to-speech capability

- **RaveAlert**, developed by Rave Mobile Safety (http://www.ravemobilesafety.com/campus/ravealert.html). The team contacted John Green, 508-532-8915, jgreen@ravemobilesafety.com.
  The following are notable features of RaveAlert:
  - Primarily a voice alerting and text broadcast system
  - Receives alerts and warnings on broadcast messages
  - Built for a mobile environment
  - Used at University of Kansas (among other institutions) as mass notification of incidents affecting a student population
  - Provided as SAAS, with no hardware to purchase
  - Can broadcast 50,000 messages per minute
  - Customers can create profiles that can include photo and description of individual, unique health information, etc.
  - Ties to smart911.com website; as customers provide profile information, this is available to dispatchers when an individual calls 911
  - Can send to social media applications
  - Cannot broadcast from social media applications
  - Primary customer base is universities
  - Could be used to support airport notification
  - RaveAlert is not currently used in airports
  - Another solution provided by Rave Mobile Safety is GUARDIAN
- **Send Word Now**, developed by Send Word Now (http://www.sendwordnow.com/). The team contacted Cort Wayneman; 703-403-2051 Cort.Wayneman@sendwordnow.com The following are notable features of Send Word Now:
  - Send Word Now provides incident management and incident alerting capability
  - Used by Wal-Mart, universities, San Diego Airport, Denver Airport
  - Multi-lingual capability
  - Rapid notification to e-mail, phone, pager, fax machine
  - Includes weather blast module
  - Provided as SAAS, with no hardware to purchase
  - Can send pictures, video, text, voice messages
  - Dashboard allows operator to track messages sent and received

- Operators can respond back to sender through multiple devices

- **xMatters**, developed by xMatters (http://www.xmatters.com/). We contacted Christie DeMello, cdemello@xmatters.com.
  The following are notable features of xMatters:
  - Used at two airports
  - Relevance engine solution that works with existing applications and technologies, delivering what is important to the right people at the right time
  - Can send e-mail, text, voice messages to any platform
  - Users establish profiles
  - Notifications based on what matters to users
  - SAAS
  - Can tie into personnel database as required
  - Dashboard allows operators to view when message was sent and when individual answered or responded
  - Performs mass personalization, processing huge amounts of complex data and delivering different messages to different people, depending on what they need to know, and when they need to know it

### COPs – Status Tracking Capabilities

- **CommandCore**, developed by TechRadium (http://www.commandcore.net/). The attempted to contact the company on numerous occasions, but was unable to make contact. The information below is provided on its website:
  - CommandCore provides an integrated platform to prepare for, respond to, and recover from emergencies, disasters, and threats
  - As a technology tool for emergency management, CommandCore is used to strengthen and improve the acquisition of information, analyze data, coordinate activities, initiate mass communications
  - The CommandCore dashboard provides information in real time while conforming to NIMS
  - Uses a variety of methods to communicate with essential personnel—including one-to-one and one-to-many—through the use of mobile devices, land and mobile radios, and more
  - Utilizes GPS to locate anyone on the map and notify via multi-point polygon or circle

- **DisasterLAN**, developed by Buffalo Computer Graphics (http://www.buffalocomputergraphics.com/content/pages/dlan-crisis-info-mgmt-system). POC: Nancy Kensy, 716-822-8668, NKensy@bcgeng.com.
  The following are notable features of DisasterLAN:
  - Incident Management system with status board tracking capability

- Collects, tracks, and reports incident information and resources
- Color-coded situation awareness module to highlight call center entries
- NIMS compatible available ICS forms; develop incident action plans
- Links to EMAs
- Graphical interface system mapping capability
- Streaming video module
- Weather module provides local, regional, and national weather data
- Broadcast message capability
- Customized reports

▪ **E Team**, E-SPONDER Express, Alerts and Risk Center developed by NC4 (http://www.nc4.us/index.php). POC: Norbert Butler, 314-686-4100, Norbert.Butler@NC4.US.
The following are notable features of E Team:

- Collaboration tool to assist first responders in efficient and effective incident management by facilitating data tracking and real time communication
- NIMS compatible available ICS forms; develop incident action plans
- Position logbook, chat, checklists, customized reports available
- Automated field updates on various dashboard screens based on a single data entry
- Documented resource accountability; supports after-action reporting
- Configurable templates enhance flexibility
- Message capability through E-SPONDER Alerts
- Requires servers; may be able to reside on airport system and needs to be discussed with sales representative
- Could also be set up as SAAS
- Secure, interoperable with EMAs
- Dashboard to track incidents and response updates
- Maps recognized by E-SPONDER Express can be imported and exported
- Graphical Interface System mapping capability help to visually communicate critical information using Bing maps or Esri map services
- Risk Center includes Active Weather alerts
- Risk Center monitors global Risk inputs and alerts operators of items that are of concern to them

▪ **Knowledge Center**, developed by Knowledge Center (http://www.Knowledge Center.com/). POC: Bill Dunlap, 412-367-6073, bdunlap@Knowledge Center.com.
The following are notable features of Knowledge Center:

- Provides an intuitive, daily use tool to aid emergency managers to prepare, respond, and recover from large-scale incidents such as floods and chemical spills and monitor significant planned events such as conventions and sporting events
- Provides COP, graphical displays through Esri
- Status dashboard used to track, log, and update incidents
- Internally developed message notification system
- Used throughout Pennsylvania (47 out of 58 counties)
- Installed in various configurations, can provide a server, or set up as SAAS
- Generally installed as server at primary and back-up site
- ICS-based methodology for tracking incidents and events

▪ **MissionMode Alert and Situation Center**, developed by MissionMode Solutions (http://www.missionmode.com/). POC: Grant Schlosser, 877-833-7763, Grant.Schlosser@missionmode.com.
The following are notable features of MissionMode:

- Used by control centers and emergency management to manage daily operations issues with seamless escalation into emergency management when a crisis hits
- Logging, collaboration, checklists, contacts, resources, notification capability, COP
- Used at eight airports across the U.S. and Europe
- Logs activities, status and progress, situational awareness, and incidents to form audit trail
- Can be tuned to fit airport operations and their people, teams, processes, checklists, resources, and notifications
- Documents weather events
- Documents Foreign Object Debris (FOD), airside and landside activities, maintenance, weather, Notices to Airmen (NOTAMs), etc.
- Notification feature available and integrated into the logging
- Can send and receive information from mobile devices
- Dashboard provides clear overview of activities
- Provided as SAAS (subscription), with no additional hardware to purchase
- On-site, web-based, or computer based tutorials available

▪ **OpsCenter**, developed by Alert Technologies Corp (http://opscenter.com/). POC: John Merlo, 877-653-7887, John@alerttech.com.
The following are notable features of OpsCenter:

- OpsCenter provides a dashboard for tracking incidents and status information on an airport or municipality

- Automated journaling, maps, status boards, checklists
- Used to assign tasks and track actions taken
- Position-based login and permissions authorized based on requirement
- Adaptable, configurable screens allow users to modify required information they need access to
- NIMS-compatible, available ICS forms
- Installed within airport architecture; may require separate server; needs to be discussed with sales representative
- Provides graphic user interface to view incidents on a map
- Information sharing capability coming out in January 2012

▪ **Response Management Information System** (Response MIS), developed by Public Safety Systems Inc. (PSSI) (http://www.pssi.com/). POC: Linda Kossa, 301-459-8600, extension 321, linda.kossa@pssi.com.
The following are features of the Response MIS system:

- Integration with RESPONSE™ CAD provides real-time transfer of information to database
- Canned reports for units, incident, operators, time analysis, and summaries, plus capability to create ad-hoc queries and reports
- Ability to perform flexible and powerful queries against CAD incident and unit data elements, including remarks
- Ability to use the map button to map any search results on a pin-map and then click on any pin to view incident details
- Ability to perform queries helps define hot spots, provide up-to-the-minute data for roll call and many other crime analysis features
- Standard mapping functions apply to the display including ability to pan, zoom, apply/remove labels, layer control, and more
- Multiple displays can be viewed, saved, or printed.

▪ **Situator**, developed by Nice Systems (http://www.nice.com/situation-management/nice-situator). POC: Yohai West, 972-769-7378, Yohai.West@nice.com.
The following are features of the NICE Situator Software:

- NICE Situator is a situation management software platform that enables situation planning, response, and analysis
- Planning tool used to plan complicated procedures and respond to routine and emergency situations
- Rule-based task activation with event-triggered and time-triggered activation, sensor commands, automatic notifications, resource assignment, and escalation policies

- Control room and mobile applications provide real-time unified activity monitoring and control for all connected devices and systems
- Deploys and monitors the status of pre-planned procedures and sends multimedia messages using all types of communication systems
- Simulation and analysis tools enable detailed incident reporting and debriefing with time-coded playback of events

- **WebEOC**, developed by ESi (http://www.esi911.com/esi/index.php?option=com_content&task=view&id=377&Itemid=377). POC: 706-823-0911, kfrierson@esi911.com.
  The following are notable features of WebEOC:
  - Collaboration tool that creates a COP, allowing responders and emergency managers to share information and make sound decisions quickly
  - Web-enabled and locally configurable incident and event management system
  - Secure, interoperable with EMAs
  - Dashboard to track incidents and response updates
  - Position logbook, chat, checklists, customized reports available
  - Requires server installed at airport; may be able to reside on airport network environment
  - Various levels of pricing and support options available
  - Used by numerous states, counties, and airports nationwide
  - NIMS-compatible, available ICS forms; develop incident action plans
  - Links to EMAs
  - Graphical interface system mapping capability

### Other Systems (Interviewed)

- **OPSnet**, developed by PASSUR Aerospace (http://www.passur.com/passur-opsnet-product-detail.htm). POC: 703-414-8197, Renee.Johns.Alter@passur.com
  The following are notable features of OPSnet:
  - OPSnet is primarily an airport-to-airline communications tool
  - Provides field condition reports
  - Provides status of runways
  - Dashboard for airport operations and airline officials
  - Used at 17 airports
  - Provided as SAAS; no hardware to purchase
  - Does not tie into EMAs

- The IEM team additionally contacted the following vendors; however, the team determined these were not widely used to support web-based collaboration tools for airports:
  - ADMS Command, by ETC Simulation
  - Cisco Software EOC, by Cisco Creative Information Systems
  - ACES-FD, developed by USAF Civil Engineering
  - ASDE-X, by Sensis

## County and State Emergency Management Agencies

The literature review from Task 1 provided IEM with information on county and state EMAs. Part of this study was to determine how airports interact with county and state emergency management and if there are avenues to leverage those relationships through the use of web-based systems.

### Emergency Management Data Summary

The IEM team focused data collection on the state EMAs. Here is a summary of those discussions:

- **Connecticut**: Connecticut uses Aware by Everbridge as its notification system. The Team's POC was Don Lambert of Connecticut State Police. Aware allows the EMA to rapidly notify people on a particular area (Reverse 911) of a potential incident affecting a community. Operators can prioritize how they receive information (e.g., voice, text, e-mail) and the state can break messages down by groups. Airport managers could use this system by contacting the EMA and registering to receive messages (Opt In).
- **Michigan**: Michigan State Police Emergency Management & Homeland Security Division use E Team Version 3.0, which was acquired in 2003 using both Emergency Management Preparedness Grant (EMPG) and State Homeland Security Grant Program (HSGP) funding. This is an older version of E Team. They are currently preparing an RFP to examine the current version of E Team as well as other products on the market. The state allows any emergency management entity, including airports, access to their system at no charge. The state is aware of only three airports currently using its system: DTW, LAN, and TVC. They find it most useful for quickly sharing information with large numbers of participants at various levels of government.
- **New Jersey**: New Jersey uses E Team by NC4. The team's POC is Michael Augustyniak of the New Jersey State Police. New Jersey is the nation's largest client of E Team and has used E Team since 2000. The state uses the system's status board and can track and monitor incident management through the use of E Team. Airports can obtain access to E Team as a web-based tool, with no additional hardware to purchase. They must contact the appropriate EMA to obtain a username and password. E Team provides a Reverse 911 capability, communicator, chat, and status board. An operator can view information based on prioritization, and can set timers to follow up on incident actions. E Team supports a graphical user interface (COP

mapping) capability; however, this is not in use at this time. The developer of E Team hopes to incorporate this feature early in 2012.

- **New York**: New York uses DisasterLAN, by Buffalo Computer Graphics. The Team's POC was Brian Head of the New York State Office of Emergency Management. Airports throughout New York can obtain usernames and passwords and provide inputs to DisasterLAN as well as view information available on DisasterLAN. Airports do not need additional hardware to access this system. The New York State Office of Emergency Management believes this capability meets or exceeds its mission requirements. Several counties within New York have purchased their own system (for internal county information) and this information is transmitted to the state system. DisasterLAN is integrated with the state's rapid communication system. The system has a COP and status board capability and can send information to external agencies that use WebEOC systems.
- **Oregon**: Oregon uses OpsCenter, by Alert Technologies Corp. The Team's POC is Doug Jimenez of Oregon Emergency Management. Oregon Emergency Management uses OpsCenter to track and monitor incident response throughout the state. Counties can log on to OpsCenter to request support from the State. This is how the state tracks and responds to incidents. Some of the counties in Oregon use WebEOC, while others have purchased their own OpsCenter system. Airport operators can use the system by contacting the EMA and registering to view the status board and to request support. No additional hardware or software is required. While OpsCenter has a mapping system, Oregon Emergency Management does not currently use that feature.
- **Texas**: The Texas Division of Emergency Management uses WebEOC as do several counties within Texas. One of the issues that have arisen in Texas is that different versions of the WebEOC do not communicate with each other without a special interface. As an example, while the U.S. Department of Homeland Security, TSA uses WebEOC v7.1, which was acquired in 2005, nationally it is not interoperable with the version of WebEOC used by the Texas Division of Emergency Management.
- **Vermont**: Vermont uses DisasterLAN by Buffalo Computer Graphics. The team's POC is Bob Weinert of Vermont Emergency Management. Airports throughout Vermont can obtain usernames and passwords and provide inputs to DisasterLAN. Vermont has used this system for the past eight years, and users speak very highly of DisasterLAN's capabilities. The system integrates with the state's Vermont alert rapid communications system. It also can tie into external WebEOC systems. Vermont uses this system every day to include the dashboard and mapping capability.

IEM interviewed the following city emergency management agency:

- **City of Indianapolis**: The City's Division of Homeland Security uses WebEOC that was purchased using a combination of State Homeland Security Grant and UASI grant funding. The city provides access to its WebEOC to all agencies within its jurisdiction including the Indianapolis International Airport (IND). The airport uses WebEOC to interface with the City's Division of Homeland Security during larger emergencies or disasters but not for day-to-day operations.

## Data Collection Plan Summary

The data resulting from these surveys formed the baseline for the categorization of airports and proposed case study plan, which was delivered to the ACRP Panel at the end of December 2011. The overall goal of this effort was to help all U.S. airports, regardless of size or geographical location, to develop and implement web-based collaboration tools into airport operations. These tools will help airports track the status of their day-to-day and contingency operations. These tools will also help them inform county and state EMAs of their status.

# APPENDIX E: TAXONOMY OF AIRPORTS AND CASE STUDY PLAN

## Introduction

IEM, together with Smith-Woolwine and Associates, Kim Kenville Consulting, Newton & Associates, and Kimley-Horn and Associates, continued efforts toward preparing a primer. The RFP, instructions from the ACRP Panel, amplified work plan (AWP), and data collection plan called for a literature review, an extensive series of interviews, and applicable case studies leading to the development of the primer.

In connection with Task 5 as set forth in the RFP, the IEM team developed a taxonomy of airports and highlighted attributes of emergency management software that would be most important to consider when choosing and implementing web-based collaboration tools. The team reviewed and analyzed the quantitative and qualitative information that was retrieved during the literature review and interviews and has selected 12 case study subjects. The subjects include two airport systems, a state EMA, and nine web-based emergency management software companies.

The purpose of the case studies was to further explore web-based emergency management tools that have been used or developed by the subjects and fill in any information gaps that were identified after the data collection interviews. These case studies fulfill the objectives stated in the RFP and AWP and address the following aspects of web-based tools:

- Best management practices (BMPs)
- Basic capabilities and limitations of web-based collaboration tools
- Techniques for internal and external communication with stakeholders
- Level of interoperability with other technologies (e.g., social media, smart phones) and mutual aid/community partners
- Security and the protection of systems and data information
- Maintenance and system application administration
- Liability issues and mitigation measures (e.g., NLETS and various state, local, and tribal variations)
- System reliability and accuracy of shared data
- Staffing issues that pertain to end user, system administration, and training
- Costs, funding issues, and potential funding sources
- Infrastructure, physical, and logical requirements
- Protocols on sharing information with stakeholders
- Notification capability within the system in use

- Implementation strategies and lessons learned from multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU
- Data elements and commonly used features and functions of each web-based tool in use at airports

The IEM team completed the case studies between February 2012 and April 2012. This taxonomy and case study plan, which was submitted to ACRP for the panel's approval, presents the justification and work approach for each case study. Following the submission of this plan, the team scheduled a conference call with the ACRP Panel to further discuss the plan.

## Taxonomy of Airports

The IEM team interviewed representatives from 47 airports during a six-week period. The team determined that the most useful basis for developing a taxonomy for these airports would be to use the NPIAS size categories (as set forth in the *Preliminary Calendar Year 2010 Enplanements at Primary Airports* and modified to reflect changes to data pertaining to Northwest Florida Beaches International Airport). In addition, a category was added for GA airports. Key information relating to these airports, together with the IEM team's findings, is listed in Table 5.

For airports with systems in place, the team used a seven-point Likert scale, asking representatives to note if they were very satisfied, moderately satisfied, slightly satisfied, neutral, slightly dissatisfied, moderately dissatisfied, or very dissatisfied with the system. They were also asked to provide insight into whether or not the system in place is interoperable with other technologies and mutual aid partners by answering strongly agree, somewhat agree, agree, neither agree nor disagree, disagree, somewhat disagree, or strongly disagree. While FAA regions, airport ownership, and governance structure do not appear to be significant factors when looking at the use and applicability of web-based systems, this information has been included in the table below for reference purposes.

## Summary of Data Collection Results

Of the 47 airports surveyed, eight are considered large hub airports by the FAA's NPIAS categorization system, meaning they enplane at least eight million passengers per calendar year. Of this group of eight airports, only four had web-based emergency management software systems in use, leaving 50 percent without systems. Of the four that had systems, two airports are city enterprises, and two are operated by airport authorities. Only one of the four airports with a system in place (SEA) was very satisfied with its current system.

Further analysis may determine that COTS systems lack specificity for airport operations. The interviews conducted also suggest that systems may have been purchased by the airport's jurisdiction with little or no input from the airport emergency management and operations staff. Such a practice would correlate with the three airports not being completely satisfied with the level of interoperability with other agencies.

For medium hub airports, nine of the 47 airports surveyed are classified in this area, meaning they enplane at least 1.8 to 6.6 million passengers per calendar year. Of the nine surveyed, seven (or 77 percent) had web-based emergency management systems. Of those seven, only one airport was not slightly or moderately satisfied with its current system. These medium hub airports represent a range of governance structures, from city and county to independent airport authority. There was some disagreement over the interoperability that the medium hub airport systems had with other mutual aid agencies.

In the small hub category—airports enplaning 360,000 to 1.7 million passengers—10 airports were surveyed, three of which used emergency management software systems and were very satisfied with their respective programs and interoperability with other mutual aid agencies. This shared level of satisfaction might be attributed to the fact that these three airports are city-owned. It appears that the systems were purchased by the jurisdictions and that the jurisdictions coordinated the training efforts to facilitate the maximization of the system's efficiencies and capabilities. For example, in Boise, airport officials were able to track man hours associated with emergency drills because of the emergency management software being online. From looking at this group of small hub airports, one can make the assumption that coordination between mutual aid partners and county/state EMAs in the purchase and training of the system is beneficial.

Non-hub airports represent the largest number of commercial and primary-use airports (airports with commercial airline service). This group represents airports with as few as 10,000 passengers per year and as many as 359,000 passengers per year, a very diverse categorization. The IEM team surveyed six non-hub airports and found that none of these airports have COTS emergency management software systems in place. One airport had Reverse 911 capabilities throughout its jurisdiction. An interesting variable that surfaced within this group is that many of these airports are joint-use in nature—housing a civilian commercial airport as well as the respective state's Air National Guard (ANG). These airports contract with their ANG for ARFF capabilities and do not possess detailed airport operations departments. In a sense, they outsource the ARFF capabilities. When interviewing non-hub airport managers, one airport (DLH) had its ARFF chief from the Minnesota Air National Guard participate in the call, and he stated that the Department of Defense (DoD) had its own system for web-based emergency management and he had used the system for well over 13 years. Most states had one airport that houses their ANG, and for this group there is no need for a COTS system, as a web-based emergency management system is provided by the DoD.

The final group of airports surveyed represents another diverse population, from the extremely busy Centennial and Van Nuys GA airports to those with little or no activity. Fourteen airports in the GA categorization were surveyed. Of this group, three have web-based emergency management systems in place, and they reported they are satisfied with their systems. These three GA airports represent reliever airports, which are airports located in metropolitan areas of at least 250,000 people and are specifically designated by the FAA. These three airports serve a very large general and business aviation clientele for the cities they support.

To summarize the data, 20 of the 47 airports interviewed had some sort of emergency management software system in place ranging from Reverse 911 (with no return communication) to e-mail systems, to fully integrated web-based emergency management software systems. Airports reporting the highest levels of satisfaction had sufficient training and use of the system and the system was coordinated with their local jurisdiction. The frequency of use was often brought up during the interview phase, as some airports only use their systems for their FAR Part 139 Airport Emergency Plan (AEP) yearly exercises or triennial full-scale mock disaster drills. Very few airports were using their COTS systems for day-to-day operations.

## Case Study Approach

## Information Sought for Case Studies 1–3

| Case Study Number | Case Study Subject |
|---|---|
| 1 | Pittsburgh International and Allegheny County Airports |
| 2 | Pennsylvania Emergency Management Agency |
| 3 | Texas Coordination Projects (El Paso International Airport, Dallas-Ft. Worth, and San Antonio International Airports) |

The following information was sought in connection with case studies 1–3:

- Basic capabilities and limitations of web-based collaboration tools
  - Utility in responding to accidents, emergencies, and disasters
  - Usefulness for day-to-day operations
  - Event recording and tracking
  - Event notification capabilities
- Chain of custody—can the system be used in court of law
- Key stakeholder roles and responsibilities
- Internal policy or procedures in place covering emergency operations
- Airport emergency procedures (county or state) in place highlighting information they need from airports
- Techniques for internal and external communication with stakeholders
- Level of interoperability with other technologies and mutual aid/community partners
- Security and protection of systems and data information
- Maintenance and system application administration
- Liability issues and mitigation measures (e.g., NLETS and various state, local, and tribal variations)

- System reliability and accuracy of shared data
- Staffing issues (e.g., manpower savings) that pertain to end user, system administration, and training
- Costs, funding issues, and potential funding sources
- Infrastructure, physical, and logical requirements
- Protocols on sharing information with stakeholders
- Implementation strategies and lessons learned from multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU
- Data elements and commonly used features and functions of each web-based tool in use at airports

## Information Sought for Case Studies 4–12

| Case Study Number | Case Study Subject |
|---|---|
| 4 | DisasterLAN |
| 5 | E Team, E-SPONDER Express |
| 6 | Knowledge Center |
| 7 | MissionMode Alert and Situation Center |
| 8 | OpsCenter |
| 9 | RESPONSE Management Information System |
| 10 | NICE Situator |
| 11 | VirtualAgility |
| 12 | WebEOC |

The following information will be sought in connection with case studies 4–12:

- What type of software applications could be provided to airports?
  - What are the primary capabilities of this system?
  - How many airports use the system?
  - How would airports use this system day to day and during contingency situations?
  - Is there a dashboard available for airport managers?
  - Can the system receive closed circuit television (CCTV) inputs?
  - Is there a requirement to install a central server or is this SAAS?
  - Can the software run on existing hardware at the airport?
    - If not, what would be required to run the software?
- Can this software provide data updates to county or state EOCs?
- Is it compatible with other systems used by county or state EMAs?

- What were some of the significant training issues associated with implementation?
  - What kind of training is available?
  - What are the types of customer support options available (e.g., 24-hour, telephone, and online)?
- Assuming that there are 10 workstations within each airport, what is the price range for this system?
  - What is the initial installation and set-up price range?
    - Less than $25,000
    - $25,000–$50,000
    - $50,000–$100,000
    - $100,000–$200,000
    - $200,000–$300,000
    - More than $300,000
  - What is the annual recurring cost?
    - Less than $25,000
    - $25,000–$50,000
    - $50,000–$100,000
    - $100,000–$200,000
    - $200,000–$300,000
    - More than $300,000
  - Are upgrade costs included in the recurring cost (maintenance contract)?
  - Are there any other associated costs?
  - How are defects managed and fixed?
  - Are desired enhancements to the system allowed?
    - What are the customization options?
    - What is the customization process?
    - What are the customization costs?
    - What is involved in creating customization to comply with a new requirement?
- Can this software accept inputs from social media tools?
- Can this software send information to social media tools?

The following are supplemental questions that can be posed, as required, to information technology (IT) department personnel or software developers:

- What parts of the system are built using open-source frameworks?
- What parts of the system are available as open source for other developers?
- Does the software support any open protocols?
- What parts of the system are built using open-source frameworks?
- What parts of the system are available as open source for developers?
  - What is the open-source licensing name?
- What languages were used to develop the applications?
- What database(s) are used by the application?
- What third-party frameworks are used by the applications?
  - What third-party API (e.g., Twitter and Facebook) and Service-Oriented Architecture (SOA) is being used by the application?
- What protocols are being used?
- What are the levels of documentation provided?
- What are the standards and compliances that are supported?
  - Does the GIS support the OGC?
- Are the incident command forms compliant with NIMS procedures?
- Does the system have the capability to create and view event logs?
- What quality assurance processes are in place?
- What system parts can share data and what protocols are used?
- Does the application support or provide the following?
  - SSL
  - Remote access
  - System logs
  - Access control
- Who monitors the system?
- What is your role in management of components of the system?
  - Managing hardware
  - Software components
  - Maintenance and service support
  - Support agreement
  - Bandwidth allocation

# *Case Study 1: Pittsburgh International and Allegheny County Airports*

Pittsburgh International Airport (PIT) uses Knowledge Center, the same system that is employed by county and Commonwealth EMAs throughout much of Pennsylvania. Knowledge Center provides an extensive web-based emergency management collaboration system. Knowledge Center is discussed more in detail under case study 6.

PIT was chosen as a case study subject for several reasons, including the following:

- While categorized as a medium hub, it is one of the larger NPIAS airports.
- It is already or has the potential to be fully integrated with the web-based systems of its mutual aid partners, adjacent local governments, and State government.
- The system has been operational long enough to allow for meaningful evaluation of capabilities, strengths, and weaknesses.

Like PIT, Allegheny County Airport (AGC) is operated by the Allegheny County Airport Authority and uses the same system (Knowledge Center) that is widely used throughout the state. Together with PIT, AGC was chosen as a case study subject for several reasons, including the following:

- As a GA airport located near a major city (Pittsburgh), it provides a good representation of how GA airports could use web-based collaboration tools.
- It has the potential to be fully integrated with the web-based systems of its mutual aid partners, adjacent local governments, and state government.
- The system has been operational long enough to allow for meaningful evaluation of capabilities, strengths, and weaknesses.

## Case Study Procedure

In November 2011, the IEM team interviewed the Pittsburgh airport leadership. From the interviews, the team collected data and found a wealth of information regarding how PIT maintains situational awareness of airport operations and communicates with emergency management. The IEM team believed it would be interesting to observe first-hand how this capability can be used to support emergency management information sharing at AGC. The main effort during the case study period was to analyze and compile information on how Knowledge Center is used at these airports.

The IEM team visited the Pittsburgh and Allegheny airports in February 2012 in an effort to better understand how these airports incorporate Knowledge Center into their operations. Results of these visits are highlighted in Appendix F: Case Study 1—Pittsburgh International and Allegheny County Airports.

## Case Study 2: Pennsylvania Emergency Management Agency

The Pennsylvania Emergency Management Agency (PEMA) currently uses WebEOC, though the rest of the Commonwealth uses Knowledge Center. The team wanted to examine the challenges and integration efforts between the two disparate systems. (SeeCase Study 1: Pittsburgh International and Allegheny County Airports and Case Study 6 Knowledge Center) for additional information.

PEMA was chosen as a case study subject for several reasons, including the following:

- It uses WebEOC, though they are in negotiation to switch to Knowledge Center.

### Case Study Procedure

The IEM team attempted to contact numerous individuals in an effort to conduct this case study. Attempts to visit the Commonwealth Emergency Management Agency were unsuccessful. IEM did talk with Mr. Kevin Campbell, the IT Director, who indicated he was attempting to switch over to Knowledge Center, though he did not know when this would occur.

## Case Study 3: Texas Coordination Projects

The Southwest Texas Regional Advisory Council (STRAC) and the Texas WebEOC Interoperability Project (TWIRP), an initiative that interconnects more than 35 jurisdictional servers across Texas and provides connectivity, information-sharing, and resource requests statewide, helped El Paso International Airport (ELP) set up WebEOC. The outcome was well-received, prompting San Antonio International Airport (SAT) to pursue implementing WebEOC as well.

The ACRP Panel suggested IEM look at Dallas Fort Worth International Airport (DFW), as the airport staff indicated they were not generally satisfied with their emergency management software. The IEM team explored this collaboration in an effort to evaluate if this approach could be a model for other counties to consider when incorporating web-based tools into airport operations.

STRAC, together with ELP, was chosen as a case study subject for several reasons, including the following:

- The coordination between STRAC and airports in Texas could provide a basis for best practices as it demonstrates how counties and airports can work together to integrate web-based collaboration tools.
- While WebEOC is well known and widely used within the emergency management community, it is not readily used at airports. Seeing how El Paso uses this system in conjunction with local and state EMAs may be beneficial to other airports.
- The system has been operational long enough to allow for meaningful evaluation of capabilities, strengths, and weaknesses. Lessons learned could be identified highlighting issues with DFW and their use of WebEOC.

### Case Study Procedure

In February 2012, individuals from the IEM team visited with representatives from ELP in an effort to learn how WebEOC connects the airport with the southwest Texas system. The team's intent was to ascertain the capabilities of this system and better understand the airport's concerns and lessons learned in implementing this system. The main effort during the case study period was to analyze and compile information on how WebEOC functions at ELP and SAT, and understand concerns from DFW.

## *Case Study 4: DisasterLAN*

After conducting an extensive literature review and interviews with personnel from Buffalo Computer Graphics Inc., the IEM team determined that a more extensive video teleconference should be conducted in an effort to observe the capabilities of the DisasterLAN software.

DisasterLAN was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the IEM team.
- While not currently used at airports, it is used within such major organizations as the New York State Office of Emergency Management and Vermont Emergency Management.

### Case Study Procedure

This case study was accomplished consisting of the following three steps:

- The IEM team contacted Buffalo Computer Graphics to determine if the company was willing and able to support this case study request.
- The Team participated in a software demonstration (video teleconference) to gain a better understanding of the product and its capabilities.
- Representatives from Buffalo Computer Graphics answered questions as the team went through the data collection process.

## *Case Study 5: E Team, E-SPONDER Express*

After conducting an extensive literature review and interviews with NC4 Corporation personnel, the IEM team determined that a more extensive video teleconference should be conducted in an effort to observe the capabilities of the E Team and E-SPONDER Express software.

E Team/E-SPONDER Express was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the IEM team.
- It is used at several airports and numerous EMAs and is well supported by NC4.
- It is NIMS/ICS-compliant and has many desired features for airports to consider.

### Case Study Procedure

This case study was accomplished consisting of the following three steps:

- The IEM team contacted NC4 to determine if the company was willing and able to support this case study request.
- The team participated in a software demonstration (video teleconference) to obtain a better understanding of the product and its capabilities.
- Representatives from NC4 answered questions as the team went through the data collection process.

## *Case Study 6: Knowledge Center*

After conducting an extensive literature review and interviews with Knowledge Center personnel, the team determined that a more extensive video teleconference should be conducted in an effort to observe the capabilities of the Knowledge Center software.

Knowledge Center was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the IEM team.
- As an intuitive, daily-use tool designed to aid emergency managers in preparing for, responding to, and recovering from large-scale incidents such as floods and chemical spills, it can also be used to monitor significant planned events such as conventions and sporting events, making it versatile enough to serve as a useful tool for airports.
- It has been used throughout Pennsylvania as a solution for managing daily emergency management operations. (SeeCase Study 1: Pittsburgh International and Allegheny County Airports and Case Study 2: Pennsylvania Emergency Management Agency).

### Case Study Procedure

This case study was accomplished consisting of the following steps:

- The IEM team met with representatives of Knowledge Center while at the Pittsburgh airport. The representatives provided an overview briefing and hands-on demonstration of the system and its capabilities.
- Representatives from Knowledge Center answered questions as the team went through the data collection process.

## *Case Study 7: MissionMode Alert and Situation Center*

After conducting an extensive literature review and interviews with MissionMode Solutions personnel, the team determined that a more extensive video teleconference should be conducted in an effort to observe the capabilities of the MissionMode software.

MissionMode Alert was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the team.

- It is used by control centers and emergency management to support daily operations issues, with seamless escalation into emergency management when a crisis hits.
- It is used at eight airports.

### Case Study Procedure

This case study was accomplished consisting of the following three steps:

- The IEM team contacted Mission Mode to determine if the company was willing and able to support this case study request.
- The team participated in a software demonstration (video teleconference) to obtain a better understanding of the product and its capabilities.
- Representatives from Mission Mode answered questions as the team went through the data collection process.

## *Case Study 8: OpsCenter*

After conducting an extensive literature review and interviews with Alert Technologies personnel, the IEM team determined that a more extensive video teleconference should be conducted in an effort to observe the capabilities of the OpsCenter software.

OpsCenter was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the team.
- OpsCenter provides a dashboard for tracking incidents and posting status information for an airport or municipality.
- Its unique features include adaptable, configurable screens that allow users to modify required information they need access to.

### Case Study Procedure

This case study was accomplished consisting of the following three steps:

- The team contacted Alert Technologies Corp to determine if the company was willing and able to support this case study request.
- The team participated in a software demonstration (video teleconference) to obtain a better understanding of the product and its capabilities.
- Representatives from Alert Technologies Corp answered questions as the team went through the data collection process.

## *Case Study 9: RESPONSE Management Information System*

After conducting an extensive literature review, the IEM team determined that a more extensive video teleconference with Public Safety Systems Incorporated (PSSI) should be

conducted in an effort to observe the capabilities of the RESPONSE Management Information System (MIS) software.

RESPONSE MIS was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the team.
- RESPONSE MIS software provides a number of capabilities applicable to airports, including real-time transfer of information to a database, which enables others to view the information and take appropriate actions.
- Sophisticated mapping functions include ability to pan, zoom, and apply/remove labels, layer control, etc.

### Case Study Procedure

The team contacted PSSI on numerous occasions. Regretfully, PSSI personnel did not respond to our follow-up requests to conduct a case study.

## *Case Study 10: NICE Situator*

After conducting an extensive literature review and interviews with NICE Systems personnel, the IEM team determined that a more extensive video teleconference should be conducted in an effort to observe the capabilities of the NICE Situator software.

NICE Situator was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the team.
- NICE Situator is a situation management software platform that enables situation planning, response, and analysis.
- It is in use at major airports such as LAX and MSY.

### Case Study Procedure

This case study consisted of the following three steps:

- The team contacted Nice Systems to determine if the company was willing and able to support this case study request.
- The team participated in a software demonstration (video teleconference) to obtain a better understanding of the product and its capabilities.
- Representatives from Nice Systems answered questions as the team went through the data collection process.

## *Case Study 11: VirtualAgility*

The IEM team contacted VirtualAgility to request an extensive video teleconference during which capabilities of the VirtualAgility software can be observed.

VirtualAgility was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the team.
- It is provided as SAAS.
- Unique features applicable to airports include incident management awareness and weather information.

### Case Study Procedure

This case study consisted of the following three steps:

- The team contacted Virtual Agility to determine if the company was willing and able to support this case study request.
- The team participated in a software demonstration (video teleconference) to obtain a better understanding of the product and its capabilities.
- Representatives from Virtual Agility answered questions as the team went through the data collection process.

## *Case Study 12: WebEOC*

After an extensive literature review and interviews with ESi representatives, the IEM team determined that a more extensive video teleconference should be conducted to observe the capabilities of the WebEOC software.

WebEOC was chosen as a case study subject for several reasons, including the following:

- It met the selection criteria identified by the Team.
- It is used by EMAs throughout the country.
- As a collaboration tool that creates a COP, it allows responders and emergency managers to share information and make sound decisions quickly.

### Case Study Procedure

This case study consisted of the following three steps:

- The team contacted ESi to determine if the company was willing and able to support this case study request.
- The team participated in a software demonstration (video teleconference) to obtain a better understanding of the product and its capabilities.
- Representatives from ESi answered questions as the team went through the data collection process.

# APPENDIX F: CASE STUDY 1—PITTSBURGH INTERNATIONAL AND ALLEGHENY COUNTY AIRPORTS

## Key Participants

- Mr. Nino Sapone, Pittsburgh Airport Director of Airfield Operations
- Mr. Byron Harriger III, Pittsburgh Airport Emergency Planning Manager
- Mr. Richard Wilson, Allegheny County Airport Director
- Ms. Stephanie Saracco, Allegheny County Airport Authority
- Mr. Alvin Henderson, Allegheny County Emergency Management
- Mr. Richard Wilson, Pittsburgh Airport Fire Chief
- Mr. Kurt Sopp, Pittsburgh Airport Training, Safety and Security
- Mr. Chuck Lewis, Project Manager Knowledge Center
- Mr. Jim Miorelli, Product Manager Knowledge Center

## Agenda

- 1000–1200: Discuss characteristics of emergency management procedures and the use of Knowledge Center with Pittsburgh and Allegheny airport representatives
- 1200–400: Follow up with airport personnel and Knowledge Center representatives and go over additional questions
- 1430: Depart

## Discussion

In support of ACRP 04-12 project, the IEM team conducted case study 1, a review of how the Pittsburgh and Allegheny County airports use Knowledge Center as their primary emergency management system supporting day-to-day and contingency operations. The team also completed case study 6, a review of the Knowledge Center software application. Results of these studies are summarized below.

## Desired Characteristics of Web-Based Emergency Management Collaboration Tools

### Key Stakeholders at Airport

- What agencies have a terminal in their work location? *Knowledge Center is a web-based system available to all airport personnel with a username and password. It is available from their laptops or desktops.*

- What are the key stakeholder roles and responsibilities—who uses the system? *Pittsburgh Fire Department, Police, TSA, Airport Operations and the Airport Communications Center (dispatch)*
- Who manages system management (IT) functions? *System is web-based and certain individuals are assigned system administrator privileges*.

## Internal Procedures

- Does the airport have an internal policy or procedures in place covering emergency operations? *The airport has internal policies concerning what type of information is reportable to* EMAs. *The airport is required to notify the EMA when activating triggers through their Pennsylvania Incident Reporting System (PEIRS). They use Knowledge Center to report these incidents. The county EMA has an internal policy covering the items they need to respond to (regardless of source).*
- Does the county or commonwealth have airport emergency procedures in place (highlighting information they need from airports)? *The county has checklists they maintain through the use of Knowledge Center in reaction to incidents.*
- What are the techniques for internal and external communication with airport officials and EMAs? *The airport follows manual checklists and notifies the airport authority, county emergency management, or other agencies as the situation dictates.*
- What information do you share with EMAs? *Data elements and commonly used features and functions of each web-based tool in use at airports. Knowledge Center automatically fills in data elements required on dashboard screens at the county and Commonwealth Emergency Management Agency. Knowledge Center can populate required fields within WebEOC. The Commonwealth Emergency Management Agency is currently moving from WebEOC to Knowledge Center*.
- What is the chain of custody? Can the system be used in court of law? *According to the county EMA representative, data entered into Knowledge Center can be used in a court of law.*

## Integration with Emergency Management Systems

- Is it able to integrate with other emergency management systems (Common Alerting Protocol)? *Yes, Knowledge Center automatically populates appropriate fields within PEIRS, WebEOC.*
- What is the level of interoperability with other technologies and mutual aid or community partners? *Knowledge Center is used in approximately 58 counties throughout Pennsylvania.*
- Is it compatible with other systems used by county or Commonwealth EMAs? *Knowledge Center is used in approximately 58 counties throughout Pennsylvania.*

## Internal/External Communications

- What are the techniques for internal and external communication with stakeholders? *Knowledge Center used in PEMA Region 13 counties.*

- What are the data elements and commonly used features and functions of each web-based tool in use at airports? *Airport information available for display on dashboard and on graphical interface system.*
- Is the system capable as a Reverse 911 system? *Not currently, though the system is capable of displaying plume model data resulting from an event. This information can be used to notify affected populations in the area through a third party notification system.*
- Does the system contain notification and response (communications) feature? *Not currently.*
- Does the system have event notification capabilities? *Knowledge Center can provide text alert to airport operations personnel through their e-mail or phone.*

## Staffing Issues That Include User, System Administration, and Training

- Are there any staffing issues (e.g., manpower savings) that pertain to end user, system administration, and training? *This is a primary emphasis by the group as they felt by using Knowledge Center and having everyone on the system, they were better able to collaborate on issues or incidents. It saves time as multiple agencies see the information as it is entered.*
- Demonstrate how the software helps save resources and time. *See above.*

## Basic Capabilities of System

- How do you use this system day to day? *Pittsburgh uses the system day to day in order to track and respond to incidents. Airport officials believe they haven't reached their full potential and that more should be done with the system. Allegheny airport officials have access to the system, though they do not use it on a daily basis. They log in when there is an incident and they need to report or respond to incidents.*
- Is it useful in accidents, emergencies, and disasters? *The system is very useful when responding to or collaborating with external agencies or the EMA.*
- Is there a dashboard available for airport managers? *Yes, a very good feature.*
- Event recording and tracking? *Yes, can track information for several years back.*
- Can the system receive closed circuit television (CCTV) inputs? *Not currently.*
- Does the system have a feature to help monitor security gates? *Not currently, though again, the airport personnel believe they have not fully explored all aspects of the system.*

## GIS Mapping Tools

- Does it have a COP (map, using Esri products)? *Yes*
- See Knowledge Center worksheet for additional answers to questions.

## Dashboard

- Is the dashboard capable of tracking and monitoring status information? *Yes*
- Is the dashboard capable of assigning and tracking resources? *Yes*
- Is the dashboard used to follow up on actions? *Not currently*

## Reporting Capabilities of System (Daily Reports and Annual Reports)

- Do you use this system to generate daily, weekly, or monthly reports? *Yes, the system has this capability.*
- Do you or can you use this system to track hours and report to FEMA or other agencies? *Yes.*

## Infrastructure, Physical, and Logical Requirements

- Is there a requirement to install a central server or is this SAAS? *No, Pittsburgh and Allegheny airports have the system provided for their use at no cost to them. It was purchased by the county emergency management agency. It is not available as a SAAS program. The system consists of a series of 4 servers, hot-linked to another series of 4 servers in another location (Pittsburgh and Cleveland, in this scenario).*
- Can the software run on existing hardware at the airport? *The system runs on existing hardware platforms. Any device with access to the Internet (and valid username, password) can access the system.*
    - If not, what would be required to run the software? *Access to the Internet is the only requirement.*
- Do you have examples of network layout (diagram we could have and use)? *Pittsburgh and Allegheny do not have a network diagram, as Knowledge Center is available on any computer with access to the Internet.*

## Security

- Is a username/password required? *Yes*
- Is there security and protection of systems and data information? *Yes*
- Are there liability issues and mitigation measures (e.g., NLETS and various Commonwealth, local, and tribal variations)? *Yes*

## Updates and Maintenance Plans

- Does the vendor provide periodic updates and version releases (is the system configurable)? *Yes, Knowledge Center generally strives for two major releases and one minor release each year. New requirements from multiple sources are available to all users.*
- Does the vendor provide a maintenance plan and technical support? *Yes*

- Is there maintenance and system application administration? *Yes*
- Is there system reliability and accuracy of shared data? *Yes*
- Are updates affecting other airports shared with your airport? *Yes*

### Costs, Funding Issues, and Potential Funding Sources

- What are the costs, funding issues, and potential funding sources? *System was purchased by the county emergency management agency.*
- Are there any implementation strategies you can offer to other airports? Are there any lessons learned from multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU? *The Pittsburgh Airport and Allegheny Airports did not purchase their system. They have user accounts through the county emergency management agency.*
- Where did funding come from for installation? *County EMA.*
- Where does funding come from to support annual licenses and other costs? *County EMA (PEMA Region 13).*

### Training Support

- Does the vendor provide training support? *Yes, via webinar or in person. They also rely on train-the-trainer instruction.*
- Is it web-based or web access (no stand-alone capability)? *Airport officials at both locations found the system to be highly intuitive and easy to use. Training sessions are available as requested by customers.*

## *Conclusions*

### Web-Based System

- Allegheny County contracted with Knowledge Center to develop this web-based system for Region 13 stakeholders. The Pittsburgh and Allegheny County airports do not fund this capability. They are required to provide user training and ensure airport personnel are familiar with this system.
- The airport uses paper checklists, though these could be placed on Knowledge Center, as the county uses their checklists on the system.
- Knowledge Center system updates occur every two minutes, providing sufficient data reliability for the EMA.
- There is no network configuration for the Pittsburgh or Allegheny airport, as the system is available on any system with Internet access.
- It was used by the Pittsburgh and Allegheny airports during the G-20 summit in 2009.
- Knowledge Center uses a tool called Knowledge Center Alerts to notify emergency management personnel of an incident (as identified by users through their system administrator).

- The Pittsburgh airport still uses a separate Computer-aided Dispatch (CAD) system to track incidents on the airport and the fire chief has a separate system they use for day-to-day operations.
- Best Practices: System should be configurable rather than programmable. The system should provide tools to allow the system administrator to configure a screen. This alleviates the need for a programmer to modify the system for each user.

# APPENDIX G: CASE STUDY 2—PENNSYLVANIA EMERGENCY MANAGEMENT AGENCY

The Pennsylvania Emergency Management Agency (PEMA) currently uses WebEOC, though the rest of the Commonwealth uses Knowledge Center. The IEM team wanted to examine the challenges and integration efforts between the two disparate systems. (SeeCase Study 1: Pittsburgh International and Allegheny County Airports and case study 6 Knowledge Center).

The team attempted to contact numerous individuals within PEMA in an effort to conduct this case study. Attempts to visit the Commonwealth Emergency Management Agency were unsuccessful. The Team did talk with Mr. Kevin Campbell, the IT Director, who indicated he was attempting to switch over to Knowledge Center, though he did not know when this would occur.

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# APPENDIX H: CASE STUDY 3—TEXAS COORDINATION PROJECTS

## Case Study 3a: Dallas/Fort Worth International Airport

### Purpose

The purpose of this trip was to conduct case study 3a, Dallas/Fort Worth (DFW) International Airport supporting ACRP 04-12, task 6. This case study showed how DFW uses web-based emergency management collaboration tools to work with county and state emergency management. The IEM team conducted the case study with the support of DFW personnel.

### Key Participants

- Mr. Alan Black, DFW Department of Public Safety
- Mr. David McCurdy, DFW Department of Public Safety
- Key personnel from DFW Airport to include the fire chief and emergency management personnel

### Agenda

- February 27, 2012
- 1000–1400: Discuss characteristics of emergency management procedures and the use of WebEOC within the airport operations center
- 1430: Depart

### Discussion

In support of the ACRP 04-12 project, the IEM team conducted case study 3a, a review of how the DFW International Airport uses WebEOC as their primary emergency management system supporting day-to-day and contingency operations. Results of these studies are summarized below.

## Desired Characteristics of Web-Based Emergency Management Collaboration Tools

### Emergency Management Process

- Would you provide an overview of how the airport conducts emergency management? *DFW has a new state of the art airport operations center, with expanded EOC established in case of catastrophic incidents. DFW is operated by a semi-autonomous airport authority and has organic resources equivalent to a small city including a 150 person police department, a 170 person fire service, and its own full time emergency management staff. They rarely require support from surrounding*

*jurisdictions and more often provide support to agencies outside the fence. They rarely provide or require situation reports (SITREPS) or a COP to or from surrounding jurisdictions.*

- Do you have a mobile command center? *The airport has a dispatched mobile EOC to support on scene incident command functions.*
- Do you have access to web-based systems as part of the mobile command center? *The mobile EOC does not have access to WebEOC system when deployed.*

## Key Stakeholders at Airport

- What agencies have a terminal in their work location: *As WebEOC is a web-based system, it is available to all airport personnel with a username and password. It is available from their laptop or desktop computers. WebEOC is primarily used in the newly developed airport operations center.*
- What are the key stakeholder roles and responsibilities? Who uses the system? *DFW Fire Department, Police, TSA, Customs and the airport operations center (dispatch). During activations air carriers provide a representative in the Airport EOC and use WebEOC through airport personnel.*
- Who manages system management (IT) functions? *WebEOC is provided to DFW airport through one of the counties in which the airport resides. The county manages all IT functions required with WebEOC and provides the airport with usernames and passwords to log in.*
- Does the airport have an internal policy or procedures in place covering emergency operations? *The airport has internal policies concerning what type of information is reportable to* EMAs. *The airport reports information to the county emergency management as determined by the airport operations center watch officer.*
- Does the county or state have airport emergency procedures in place (highlighting information they need from airports?) *The county has checklists in place. As the airport does not work for the EMA, only information that warrants reporting is sent to the county EMA.*
- What are the techniques for internal and external communication with airport officials and EMAs? *The airport follows manual checklists and notifies the airport authority, county emergency management, or other agencies as the situation dictates.*
- What information do you share with EMAs? *The county and airport share the same emergency management software, so there is no issue with sharing information. Appropriate data elements automatically populate fields within the county system.*

## Integration with Emergency Management Systems

- Is it able to integrate with other emergency management systems (Common Alerting Protocol)? *Not applicable in this case as both use WebEOC.*
- What is the level of interoperability with other technologies and mutual aid or community partners*? DFW airport typically works with two counties in which it*

*resides and the State of Texas. All those mutual-air partners use WebEOC and are interoperable with each other. DFW airport does not integrate WebEOC with any other technologies.*

- Is it compatible with other systems used by county or state EMAs? *The State of Texas uses WebEOC to interact with counties, and both counties in which DFW airport resides use WebEOC. WebEOC is provided to DFW airport by one of their countie, so all agencies are on the same system.*

## Internal/External Communications

- What are the techniques for internal and external communication with stakeholders? *Primarily telephone and e-mail. The airport does not normally use WebEOC on a daily basis.*
- What are the data elements and commonly used features and functions of each web-based tool in use at airports? *Airport information available for display on dashboard and on graphical interface system.*
- Is the system capable as a Reverse 911 system? *This is not a feature used by the airport.*
- Does the system contain notification and response (communications) feature? *This is not a feature used by the airport.*
- Does the system contain event notification capabilities? *This is not a feature used by the airport.*

## Staffing Issues That Include User, System Administration, and Training

- Are there any staffing issues (e.g., manpower savings) that pertain to end user, system administration, and training? *While not used day to day, WebEOC provides enhanced collaboration between the airport and the city/county EMA.*
- Demonstrate how the software helps save resources and time? *See above.*

## Basic Capabilities of System

- How do you use this system day to day? *DFW does not use the system on a daily basis.*
- Is it useful in accidents, emergencies, and disasters? *The airport officials have not had the need to employ this system over the past year (outside of occasional exercises). They believe WebEOC could be useful in collaborating with external agencies or mutual aid partners.*
- Is there a dashboard available for airport managers? *Yes.*
- Is there event recording and tracking? *Yes.*
- Can the system receive closed circuit television (CCTV) inputs? *Not currently.*
- Does the system have a feature to help monitor security gates? *Not currently.*

## GIS Mapping Tools

- Does it have a COP (map, using Esri products)? *Not observed under this case study. See results from WebEOC case study.*
- See the WebEOC worksheet for additional questions.

## Dashboard

- Is the dashboard capable of tracking and monitoring status information? *Not observed.*
- Is the dashboard capable of assigning and tracking resources? *Not observed as part of this case study. See case study 12 on WebEOC.*
- Is the dashboard used to follow up on actions? *Not observed.*

## Reporting Capabilities of System (Daily Reports and Annual Reports)

- Do you use this system to generate daily, weekly, or monthly reports? *Yes, the system has this capability.*
- Do you or can you use this system to track hours and report to FEMA or other agencies? *Yes, though this feature is not currently used.*

## Infrastructure, Physical, and Logical Requirements

- Is there a requirement to install a central server or is this SAAS? *No, DFW has user accounts and passwords provided by the county EMA.*
- Can the software run on existing hardware at the airport? *The system runs on existing hardware platforms. Any device with access to the Internet (and valid username, password).*
    - If not, what would be required to run the software? *Access to the internet is the only requirement.*
- Do you have examples of network layout (diagram we could have and use)? *DFW does not have a network diagram for their emergency management system.*

## Security

- Does it require a user name/password? *Yes*
- Is there security and protection of systems and data information? *Yes*
- Are there liability issues and mitigation measures (e.g., NLETS and various state, local, and tribal variations)? *Yes*

## Updates and Maintenance Plans

- Does the vendor provide periodic updates and version releases (system is configurable)? *Yes, though the airport does not provide funds for this feature.*

- Does the vendor provide a maintenance plan and technical support? *Yes*
- Is there maintenance and system application administration? *Yes*
- Is there system reliability and accuracy of shared data? *Yes*
- Are updates affecting other airports shared with your airport? *Yes*

### Costs, Funding Issues, and Potential Funding Sources

- Costs, funding issues, and potential funding sources? *System was purchased by the county EMA.*
- Are there any implementation strategies you can offer to other airports? Lessons learned from multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU? *The DFW Airport did not purchase their system. They have user accounts through the county EMA.*
- Funding Sources: Where did funding come from for installation? *County EMA.*
- Where does funding come from to support and annual licenses and other costs? *County EMA.*

### Training Support

- Vendor provides training support? *Yes, though they primarily rely on train the trainer instruction. The system is generally pretty intuitive.*
- Web-based, or web access – no stand-alone capability? *Airport officials found the system to be highly intuitive and easy to use. The primary obstacle concerns proficiency, as this system is not used on a daily basis.*

## Conclusions

### Web-Based System

- DFW personnel have developed in-house programs that integrate systems already in daily use by the airport to manage operations.
- DFW recently switched from an E Team system to WebEOC. The county provides access to WebEOC through a username and password. This results in a cost savings for the airport.
- DFW personnel informed the IEM team that American Airlines uses WebEOC as part of their operations. One suggestion by a representative we spoke with was for the FAA to mandate and fund the use of a web-based system for all airports. This way information could be relayed to FAA Headquarters through the use of a single system.
    - Have TSA, airlines, and ATC agencies use the same system.
- Best Practices: Proficiency was the biggest constraint to the use of the system. If you are proficient on the system, it becomes easier to use and the airport would use it

more often. In an environment where e-mail, text messages, and phone calls are prevalent, the airport operations center and DFW EOC do not use the system very often. Officials we spoke with believe they have not used an emergency operations system in the past two years.

## Case Study 3b: San Antonio International Airport

### Purpose

The purpose of this trip was to conduct case study 3b, San Antonio (SAT) International Airport supporting ACRP 04-12, task 6. This case study showed how SAT uses web-based emergency management collaboration tools to work with county and state emergency management. We conducted the case study with the support of SAT personnel.

### Key Participants

- Tim O'Krongley, Assistant Aviation Director
- Ryan Rocha, Airport Operations Manager
- Key personnel from SAT Airport to include the Fire Chief and emergency management personnel

### Agenda

- February 28, 2012
- 1000–1300: Discuss characteristics of emergency management procedures and the use of WebEOC within the airport operations center
- 1330: Depart

### Discussion

In support of the ACRP 04-12 project, the IEM team conducted case study 3b, a review of how the SAT International Airport uses WebEOC as their primary emergency management system supporting day-to-day and contingency operations. Results of these studies are summarized below.

## Desired Characteristics of Web-Based Emergency Management Collaboration Tools

### Emergency Management Process

- Would you provide an overview of how the airport conducts emergency management? *San Antonio Airport is owned and operated by the City of San Antonio Aviation Department. SAT has all the resources of the city available to it for day-to-day and emergency operations. SAT has a relatively small EOC with 12 workstations and airport operations center with expansion to the city's primary EOC as required by the incident.*

- Do you have a mobile command center? *The airport does not have a mobile EOC.*
- Do you have access to web-based systems as part of the mobile command center? *The airport does not have a mobile EOC.*

## Key Stakeholders at Airport

- What agencies have a terminal in their work location: *As WebEOC is a web-based system, it is available to all airport personnel with a username and password. It is available from their laptop or desktop computers*
- What are the key stakeholder roles and responsibilities? Who uses the system? *SAT Fire Department, Police, TSA, and the airport operations center (dispatch). Air carrier representatives are brought in to the airport EOC as needed. For larger operations, other city departments provide specific personnel to respond to the airport EOC.*
- Who manages system management (IT) functions? *WebEOC is provided to the airport by the City of San Antonio Office of Emergency Management who handles all system management functions. System is web-based and certain individuals at the airport are assigned system administrator privileges.*

## Internal Procedures

- Does the airport have an internal policy or procedures in place covering emergency operations? *The airport has internal policies concerning what type of information is reportable to* EMAs. *The airport reports information to the city emergency management as determined by the airport operations center.*
- Does the county or state have airport emergency procedures in place (highlighting information they need from airports?) *The City has checklists in place. The airport works closely with the City Emergency Management Agency.*
- Techniques for internal and external communication with airport officials and EMAs? *The airport follows manual checklists and notifies the airport authority, city emergency management or other agencies as the situation dictates.*
- What information do you share with EMAs? *The City and airport share the same emergency management software, so there is no issue with sharing information. Appropriate data elements automatically populate fields within the city system.*

## Integration with Emergency Management Systems

- Is it able to integrate with other emergency management systems (Common Alerting Protocol)? *Yes, both use WebEOC.*
- What is the level of interoperability with other technologies and mutual aid or community partners*? Not Applicable. The city and airport use WebEOC.*
- Is it compatible with other systems used by county or state EMAs? *The State of Texas uses WebEOC to interact with counties and Bexar County Emergency Management and San Antonio Office of Emergency Management both use WebEOC. WebEOC is*

*provided to San Antonio airport by San Antonio OEM so all agencies are on the same system.*

## Internal/External Communications

- What are the techniques for internal and external communication with stakeholders? *Primarily telephone and e-mail. The airport does not normally use WebEOC on a daily basis.*
- What are the data elements and commonly used features and functions of each web-based tool in use at airports? *Airport information available for display on dashboard and on graphical interface system.*
- Is the system capable as a Reverse 911 system? *This is not a feature used by the airport.*
- Does the system contain notification and response (communications) feature? *This is not a feature used by the airport*
- Does the system contain event notification capabilities? *This is not a feature used by the airport. San Antonio airport uses their own DCC system for notifications to stakeholders.*

## Staffing Issues That Include User, System Administration, and Training

- Are there any staffing issues (e.g., manpower savings) that pertain to end user, system administration, and training? *While not used day to day, WebEOC provides enhanced collaboration between the airport and the city emergency management agency*
- Demonstrate how the software helps save resources and time? *See above.*

## Basic Capabilities of System

- How do you use this system day to day? *SAT does not use the system on a daily basis. The airport has one subject matter expert and, though others have been trained, proficiency can be a problem.*
- Is it useful in accidents, emergencies, and disasters? *The airport officials have not had the need to employ this system over the past two years (outside of occasional exercises). It was used by the airport two years ago during an ice storm to provide SITREPS to the city's primary EOC. They believe WebEOC could be useful in collaborating with external agencies or mutual aid partners. Family assistance during aviation incidents or accidents is an area where SAT personnel would like to see enhanced use of web-based software.*
- Is there a dashboard available for airport managers? *Yes.*
- Is there event recording and tracking? *Yes.*
- Can the system receive closed circuit television (CCTV) inputs? *Not currently. CCTV is viewed by direct feed into the airport's EOC.*

- Does the system have a feature to help monitor security gates? *Not currently.*

## GIS Mapping Tools

- Does it have a COP (map, using Esri products)? *The airport uses a stand-alone GIS system.*

## Dashboard

- Is the dashboard capable of tracking and monitoring status information? *Not Observed.*
- Is the dashboard capable of assigning and tracking resources? *Not Observed; the IEM team highlighted features of Web EOC under case study 12.*
- Is the dashboard used to follow up on actions? *Not Observed.*

## Reporting Capabilities of System (Daily Reports and Annual Reports)

- Do you use this system to generate daily, weekly or monthly reports? *Yes, the system has this capability.*
- Do you or can you use this system to track hours and report to FEMA or other agencies? *Yes, though this feature is not currently used.*

## Infrastructure, Physical, and Logical Requirements

- Is there a requirement to install a central server or is this SAAS? *No, SAT has user accounts and passwords provided by the city emergency management agency.*
- Can the software run on existing hardware at the airport? *The system runs on existing hardware platforms. Any device with access to the Internet (and valid username, password).*
    - If not, what would be required to run the software? *Access to the Internet is the only requirement.*
- Do you have examples of network layout (diagram we could have and use)? *SAT does not have a network diagram for their emergency management system.*

## Security

- Is a user name/password required? *Yes*
- Is there security and protection of systems and data information? *Yes*
- Are there liability issues and mitigation measures (e.g., NLETS and various state, local, and tribal variations)? *Yes*

## Updates and Maintenance Plans

- Does the vendor provide periodic updates and version releases (system is configurable)? *Yes, though the airport does not provide funds for this feature.*

- Does the vendor provide a maintenance plan and technical support? *Yes*
- Is there maintenance and system application administration? *Yes*
- Is there system reliability and accuracy of shared data? *Yes*
- Are updates affecting other airports shared with your airport? *Yes*

### Costs, Funding Issues, and Potential Funding Sources

- What are the costs, funding issues, and potential funding sources? *System was purchased by the City Emergency Management Agency.*
- Are there any implementation strategies you can offer to other airports? Lessons learned from multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU? *The SAT Airport did not purchase their system. They have user accounts through the City Emergency Management Agency.*
- Where did funding come from for installation? *City Emergency Management Agency.*
- Where does funding come from to support and annual licenses and other costs? *City Emergency Management Agency.*

### Training Support

- Does the vendor provide training support? *Yes, though they primarily rely on train the trainer instruction. The system is generally pretty intuitive.*
- Is it web-based or web access (no stand-alone capability)? *Airport officials found the system to be highly intuitive and easy to use. The primary obstacle is proficiency, as this system is not used on a daily basis.*

## *Conclusions*

### Web-based System

- SAT uses WebEOC. The City provides access to WebEOC through a username and password. This results in a cost savings for the airport.
- Best Practices/Lessons Learned: Proficiency was the biggest constraint to the use of the system. If the user is proficient on the system, it becomes easier to navigate and the airport would use it more often. The airport has one subject matter expert on the use of WebEOC. In an environment where e-mail, text messages, and phone calls are prevalent, the airport operations center and SAT EOC do not use the system very often. Officials we spoke with believe they have not used an emergency operations system in the past two years.
- Representatives indicated the majority of incidents occurring at SAT were small events that involved internal airport resources only and did not require any systems other than those already in day-to-day use. As mentioned above, SAT personnel used WebEOC only once in the past two years to provide SITREPS to the city's main EOC.

# Case Study 3c: El Paso International Airport

## Purpose

The purpose of this trip was to conduct case study 3c, El Paso (ELP) International Airport supporting ACRP 04-12, task 6. This case study showed how ELP uses web-based emergency management collaboration tools to work with county and state emergency management. The IEM team conducted the case study with the support of ELP personnel.

## Key Participants

- Mr. Terry Sharpe, El Paso Airport Operations Manager
- Deputy Chief Scott Calderwood, Coordinator, El Paso Emergency Management
- Mr. Martin Widtfeldt, Texas Division of Emergency Management, District 4B
- Key personnel from ELP Airport to include the Fire Chief and emergency management personnel

## Agenda

- February 29, 2012
- 1000 - 1300: Discuss characteristics of emergency management procedures and the use of WebEOC within the airport operations center
- 1330: Depart

## Discussion

In support of ACRP 04-12 project, the IEM team conducted case study 3c, a review of how the ELP International Airport uses WebEOC as their primary emergency management system supporting day-to-day and contingency operations. Results of these studies are summarized below.

# Desired Characteristics of Web-Based Emergency Management Collaboration Tools

## Emergency Management Process

- Would you provide an overview of how the airport conducts emergency management? *The El Paso Airport is owned and operated by the City of El Paso Aviation Department and has all the resources of the city available. ELP has a relatively small EOC and airport operations center. The airport relies on the City EOC as a mutual aid partner.*
- Do you have a mobile command center? *The airport does not have a mobile EOC.*
- Do you have access to web-based systems as part of the mobile command center? *The airport does not have a mobile EOC.*

## Key Stakeholders at Airport

- What agencies have a terminal in their work location? *As WebEOC is a web-based system available to all airport personnel with a username and password, it is available from their laptop or desktop computers.*
- What are the key stakeholder roles and responsibilities? Who uses the system? *ELP Fire Department, Police, TSA, and the airport operations center (dispatch). Air carriers operating out of ELP have their own usernames and passwords and can log onto the system during incidents.*
- Who manages system management (IT) functions? *WebEOC is provided to the airport by the El Paso city and county EMA who handles all system management functions. System is web-based and certain airport individuals are assigned system administrator privileges.*

## Internal Procedures

- Does the airport have an internal policy or procedures in place covering emergency operations? *The airport has internal policies concerning what type of information is reportable to* EMAs. *The airport reports information to the city emergency management as determined by the airport operations center.*
- Does the county or state have airport emergency procedures in place (highlighting information they need from airports?) *The city has checklists in place. The airport works closely with the City Emergency Management Agency.*
- What are the techniques for internal and external communication with airport officials and EMAs? *The Airport follows manual checklists and notifies the airport authority, city emergency management or other agencies as the situation dictates. The airport uses its own DCC system for notifications to various stakeholders.*
- What information do you share with EMAs? *The city and airport share the same emergency management software, so there is no issue with sharing information. Appropriate data elements automatically populate fields within the city system.*

## Integration with Emergency Management Systems

- Is the WBEMCT able to integrate with other emergency management systems (Common Alerting Protocol)? *The airport and El Paso City & County Emergency Management integrate EMTrack (Intermedix EMSystems) with their WebEOC system for patient tracking.*
- What is the level of interoperability with other technologies and mutual aid or community partners*? WebEOC is linked to emergency medical tracking systems used by the city.*
- Is it compatible with other systems used by county or state EMAs? *The State of Texas uses WebEOC to interact with counties, and El Paso City and County Emergency Management use WebEOC and also use it at El Paso airport.*

## Internal/External Communications

- What are the techniques for internal and external communication with stakeholders? *Primarily telephone and e-mail. The airport does not normally use WebEOC on a daily basis; however, the fire department does use it day to day to list red tagged (inoperative) equipment.*
- What are the data elements and commonly used features and functions of each web-based tool in use at airports? *Airport information available for display on dashboard and on graphical interface system.*
- Is the system capable as a Reverse 911 system? *This is not a feature used by the airport. The airport currently uses a manual tree call down method of notification.*
- Does the system contain notification and response (communications) feature? *This is not a feature used by the airport*
- Does it have event notification capabilities? *This is not a feature used by the airport.*

## Staffing Issues That Include User, System Administration, and Training

- Are there any staffing issues (e.g., manpower savings) that pertain to end user, system administration, and training? *While not used day to day, WebEOC provides enhanced collaboration between the airport and the city EMA.*
- Demonstrate how the software helps save resources and time. *See above.*

## Basic Capabilities of System

- How do you use this system day to day? *ELP does not use the system on a daily basis. The airport has one subject matter expert. Though others have been trained, proficiency can be a problem.*
- Is it useful in accidents, emergencies, and disasters? *The airport officials have not had the need to employ this system over the past two years (outside of occasional exercises). They believe WebEOC could be useful in collaborating with external agencies or mutual aid partners.*
- Is there a dashboard available for airport managers? *Yes.*
- Is there event recording and tracking? *Yes.*
- Can the system receive closed circuit television (CCTV) inputs? *Not currently.*
- Does the system have a feature to help monitor security gates? *Not currently.*

## GIS Mapping Tools

- Does it have a COP (map, using Esri products)? *Not observed.*

## Dashboard

- Is the dashboard capable of tracking and monitoring status information? *Not observed.*
- Is the dashboard capable of assigning and tracking resources? *Not observed; see results from Case Study 12 on WebEOC.*
- Is the dashboard used to follow up on actions? *Not observed.*

## Reporting Capabilities of System (Daily Reports and Annual Reports)

- Do you use this system to generate daily, weekly or monthly reports? *Yes, the system has this capability.*
- Do you or can you use this system to track hours and report to FEMA or other agencies? *Yes, though this feature is not currently used.*

## Infrastructure, Physical, and Logical Requirements

- Is there a requirement to install a central server or is this SAAS? *No, ELP has user accounts and passwords provided by the City Emergency Management Agency.*
- Can the software run on existing hardware at the airport? *The system runs on existing hardware platform, that is, any device with access to the internet (and valid username and password).*
    - If not, what would be required to run the software? *Access to the internet is the only requirement.*
- Do you have examples of network layout (diagram we could have and use)? *ELP does not have a network diagram for their Emergency Management System.*

## Security

- Is a username/password required? *Yes*
- Is there security and protection of systems and data information? *Yes*
- Are there liability issues and mitigation measures (e.g., NLETS and various state, local, and tribal variations)? *Yes*

## Updates and Maintenance Plans

- Does the vendor provide periodic updates and version releases (is the system configurable)? *Yes, though the airport does not provide funds for this feature.*
- Does the vendor provide a maintenance plan and technical support? *Yes*
- Is there maintenance and system application administration? *Yes*
- Is there system reliability and accuracy of shared data? *Yes*
- Are updates affecting other airports shared with your airport? *Yes*

### Costs, Funding Issues, and Potential Funding Sources

- What are the costs, funding issues, and potential funding sources? *System was purchased by the El Paso City and county EMA through an UASI grant.*
- Are there any implementation strategies you can offer to other airports, that is, lessons learned from multi-jurisdictional (e.g., UASI region) application of web-based collaboration tools, including a suggested MOU? *The ELP Airport did not purchase their system. They obtained some funds through the UASI region. They have user accounts through the city and county EMA.*
- Where did funding come from for installation? *City and county EMA.*
- Where does funding come from to support and annual licenses and other costs? *City and county EMA.*

### Training Support

- Does the vendor provide training support? *Yes, though they primarily rely on train-the-trainer instruction. The system is generally pretty intuitive.*
- Is it web-based or web access (no standalone capability)? *Airport officials found the system to be highly intuitive and easy to use. The primary obstacle is proficiency, as this system is not used on a daily basis.*

## *Conclusions*

### Web-Based System

- ELP uses WebEOC. The city provides access to WebEOC through a username and password. This results in a cost savings for the airport.
- Best Practices/Lessons Learned: Proficiency was the biggest constraint to the use of the system. If the user is proficient on the system, it becomes easier to navigate, and the airport would use it more often. In an environment where e-mail, text messages, and phone calls are prevalent, the airport operations center and ELP EOC do not use the system very often. Officials interviewed say they have not used an emergency operations system in the past two years.

# APPENDIX I: BEST PRACTICES: SOFTWARE VENDORS

## *Best Practices: Software Vendors*

- DisasterLAN: Highly respected with strong comments from the New York State Department of Emergency Management and Vermont Department of Emergency Management. Only system to have passed all FEMA NIMS STEP testing requirements. Low cost solution for airports to consider. Vendor supports IPAWS notification as well as mass notification system in New York and Vermont. System could be made available to airports within New York and Vermont by contacting those agencies. System is highly configurable, and can be customized to meet user requirements. Operators can access the system through SAAS, through the state, or as a standalone system. DisasterLAN also can send information through social media sites such as Facebook and Twitter and can be accessed from portable devices. Operators or administrators can modify user screens based on requirements.
- E-SPONDER Express; E-SPONDER Enterprise: Software solution consists of numerous application modules: E-SPONDER Express, E-SPONDER Mapping, E-SPONDER Alerts, Risk Center, Mission Center, E-SPONDER Portal. Used during "Super Bowl XLIII (3/1/2009)," in Tampa, FL, and the 2009 Major League Baseball's All Star Game, in St. Louis, MO. The E-SPONDER Express is a Microsoft SharePoint system that integrates with Google Earth, Microsoft Surface, as well as Esri and Bing maps to produce a full-spectrum mapping package as a command and control platform with mission-critical applications. The system is designed to accommodate Microsoft Partners-based systems capabilities, such as Voiceover Internet Protocol (VOIP) to complement the communications aspect of the system. Exceptional ability to provide broad overview of situation affecting an airport, municipality, or nation. Push system allows operators to define spheres of influence and have incidents reported to their desktop, mobile, or smart phone. Access to NIMS forms and ability to track hours and equipment could prove highly beneficial to airports. E-SPONDER Express can provide web-based solution to smaller airports. NC4 has East Coast and West Coast 24/7 incident monitoring center.
- Knowledge Center: Used in most counties throughout the State of Pennsylvania. Used at Pennsylvania Department of Emergency Management. Enhances collaboration and cooperation between Pittsburgh airport, Allegheny airport, and Allegheny County emergency management as it is the incident command system used by all groups. Outstanding graphical user interface; consists of alerts capability; tracks resources and hours used in reporting to FEMA. Web-based capability, so accessible from any computer or smartphone. System is configurable based on user requirements.
- MissionMode: Used during 2008 Democratic National Convention. MissionMode can set up page-based forums—or situation rooms, as it calls them—almost instantly, and offer password-protected access to approved users. Information updates are posted by users, and alerts are sent out by whatever medium the administrator or recipient chooses: SMS text messages, e-mail, fax, or automated voice call. Administrators can require receipt confirmation on messages, and perhaps most importantly, users can

send text or data—such as photographs—back to administrators for posting to the entire group. MissionMode is a highly configurable system, which can be customized to meet user requirements. Strong communications capability and demonstrated ability to assign and track resources as well as document resource utilization. FEMA/NIMS reports are available. It is an entirely cloud-based, database service that functions as a web-based information-sharing and crisis-management tool.

- OpsCenter: System used in State of Oregon Department of Emergency Management. Used to assign and track resources. Track tasks based on timestamp, unique tracking number, as well as comprehensive automatic journaling of actions and tasks initiated during an event. Consists of alert notification system capable of sending text or voice message to home, work, or mobile devices as determined by operator. System currently interfaces with NLETS data.
- RESPONSE MIS: Despite numerous efforts to contact PSSI, they appeared unwilling to participate in this case study.
- NICE Situator: Emergency management software tailored to airports. Supports browser, thin client, mobile client, multi-screen application. Key features include its ability to integrate with multiple airport systems. Incorporates and works with airport CAD software, can work with Google maps, and can track aircraft and vehicles as long as they can get a GPS feed. Incorporates weather data and can interface with EMA. When a customer signs up for maintenance support, integration with other systems is covered. This is important when a different system upgrades their software. NICE will ensure integration needs are still in place. Graphical interface with ability to view cameras, alarms, vehicles; the system will generate incidents and automatically open checklists.
- Virtual Agility: Features customized and configurable dashboard for tracking incidents and assigning resources. System can be web-based, server based, or SAAS. Consists of smart links to numerous third party systems. Mapping supports various formats depending on user requirements. Can accept feeds from weather data, video, Radio Frequency Identification (RFID), and a number of other sources. Highly configurable and capable system. Takes emergency operations plans and breaks them down to subsections or checklists as defined by customer. Interfaces with FEMA forms. This system is designed as a ready-to-run, out of the box, crisis management tool and set up to operate on local systems or more broadly through a cloud-based technology. It is used by governmental agencies, including the U.S. Departments of State, Defense, and Homeland Security, as well as large commercial companies and nongovernmental organizations. Virtual Agility's technology partners include IBM and Cisco and they have collaborated in deploying large-scale solutions in the U.S., Canada, South Africa, and Brazil. The system's geospatial capabilities work with widely established open source and commercial mapping products. The system integrates social media into a single source that bridges the public/private community.
- WebEOC *Air* was designed specifically for airline and aircraft operators to deal effectively with all the information gathering and personnel management needs that confront a company after an aviation disaster. WebEOC *Air* provides support in three main areas: real-time incident management, passenger and family data management,

and team resource management. WebEOC has been selected as the standard emergency information management system within the U.S. Department of Energy (DOE). NASA also selected WebEOC as the standard with multiple installations at Kennedy Space Center, Jet Propulsion Labs, Ames Research, and Dryden. Features impressive mapping capability with ability to input numerous airport icons to track airport incidents. Developed for airlines and can be customized to support airport operations. Can be used to assign and track resources and hours for documentation. Status boards are configurable to meet needs of airport operations. Provides the ability for airlines to work with airport operations, as there are features that support both groups. Can support multiple incidents; stand-alone simulation and exercise capability available.

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# APPENDIX J: RESULTS OF LITERATURE AND DOCUMENT REVIEW

## Introduction

As required by the RFP for the ACRP 04-12 project, the IEM team completed Task 1, which was to conduct a review of relevant literature, information, pertinent research, published guidance, and other appropriate material on the web-based collaboration tools that provide a COP for airport and non-airport community incident management and day-to-day operations.

This document provides a listing and summary of sources that were found related to web-based emergency management collaboration tools in use at airports and in other industries for incident management and normal day-to-day operations. IEM researched existing COTS applications and those in development. The review highlights best practices, especially those that focus on the crossover from steady-state to response operations.

## Methodology

In order to conduct a thorough review of the available literature, research, and guidance related to web-based emergency management collaboration tools as they relate to airport operations, the IEM team conducted comprehensive key word (see Table 6) searches of several databases, of which Google and Google Scholar were the primary vehicles for discovery. Additionally, various meta-search engines, such as the Naval Postgraduate School Homeland Security Digital Library, were also accessed. These efforts were significantly supplemented by personal contact with relevant parties, where appropriate, as well as media monitoring of current, relevant events in order to ensure that the results contained in this review were as comprehensive and timely as possible.

Standard online and library search techniques were used, and search terms were developed from the RFP and amplified work plan (AWP). Initial search terms were derived from the task descriptions set forth in the RFP, but terms were added as the research progressed to reflect concepts and terminologies present in the IEM team's initial findings. In addition, person-to-person contacts were made in an effort to locate sources that might not have been indexed by the search engines.

In order to generate final search terms, the terms in Table 6 were combined with each of the following categories:

- Airports
  - Commercial
  - General aviation
  - Military

  - Joint use
  - Overseas
- Client list
- Press release
- Case studies
- Bibliographies or catalogs
- Commercial entities, such as Wal-Mart, Target, FedEx, UPS, or Home Depot

Documents found by the searches were distributed among team members. The principal investigator made specific assignments for review. Any source with a bibliography received elevated consideration.

Each document was analyzed according to the requirements of the RFP and the approved AWP for pertinence, currency, validity, and suitability as a basis for further data collection and potential as a case study. Sources of particular usefulness were presented as a literature map (see Figure 1) to show their relationships to one another and were individually summarized with analytical comments. All applicable documents were listed in the bibliography at the end of this summary report.

## Previous Studies

The literature search resulted in the discovery of five previous studies on point.

**Analysis and Recommendations for Developing Integrated Airport Information Systems ACRP Project 01-03**

Aero Tech Consulting, Inc.'s (ATCI) summary report documents the efforts of its team in response to an RFP issued by ACRP. This RFP detailed the challenges facing airport managers when attempting to integrate many disparate systems, software applications, and financial and operational activities at airports today. The ATCI team sought to illustrate the "big picture" through extensive research, interviews with airline executives and information technology professionals, and analysis of several aviation systems. The team developed a list of best practices and validated all of its findings through a systematic series of phased interviews. When necessary, the team leveraged its own understanding of the industry, developed over many decades of experience as airline, airport, and information technology executives. This study resulted in the description of a typical airport organization, the completion of a comprehensive handbook for the integration of existing systems, as well as several recommendations for an approach to future efforts. "Throughout the research effort, the team defined and refined a list of best practices for the efficient operation and integration of existing airport systems. The team also described a 'manager's dashboard' that was designed to organize and optimize disparate systems on an airport manager's desktop, giving them immediate access to the information they would need." There were also many elements of infrastructure for consideration, including a central website, several software packages, and additional

practices designed to improve efficiency in operation. This summary report detailed the team's collaborative approach to the research (Aerotech Consulting, Inc., 2008).

**Commercial Emergency Management Software: Evaluation Methods and Findings**

This study was designed and executed to address an overwhelming outpouring of frustration with the lack of a standardized technology solution to provide Air Force installation commanders reliable, accurate, and dynamic situational awareness for emergency response, management, and recovery. "The results of this evaluation effort did not lead to a definitive solution, but rather highlighted the operational complexity of emergency response, the absence of accurate functional and technical requirements, and hopefully offered a sound methodology to gaining consensus for an Air Force solution" (Robillard, J., Scott, L., Bolish, S., Sambrook, R., 2007).

**Crisis Information Management Software (CIMS) Feature Comparison Report**

This report highlights the Crisis Information Management Software (CIMS) Test Bed Project, which was implemented by the U.S. Department of Justice (DOJ), National Institute of Justice (NIJ)/Office of Science and Technology (OS&T), in support of its Critical Incident Technology Program (CITP). "CIMS, the software found in emergency management operation centers, supports the management of crisis information and the corresponding response by public safety agencies. The primary goal of the CIMS Test Bed Project was to assist emergency management agencies (EMAs) in comparing and contrasting commercially available CIMS software. Source selection was not a goal of this project" (United States Department of Justice, 2002).

**Integrating Airport Information Systems ACRP Report 13 Project 01-03**

This handbook, one of the products of the ACRP 01-03 project, provides the basis for an airport to integrate information systems successfully. "Chapter by chapter, this handbook provided the guidance needed to develop the level of integration required to ultimately develop a computer desktop interface to access the information and metrics that would create a big-picture mosaic of the airport—the manager's dashboard of the future. Good decision making is facilitated by good information. At an airport with integrated information systems, senior managers could access desired information from their desktops by use of a dashboard, which the managers have customized to provide the level of information needed to efficiently and effectively address the most business-critical decisions of that airport. The following information could be available and reviewed at will on the manager's dashboard: the airport's current financial picture; current operational issues and the immediate effect on the budget; return on investment analyses for alternative development proposals; projected arriving and departing passenger counts by hour, day, and week; percentage gate usage by airline; current and forecasted airfield conditions; and percentage delays by terminal. Senior managers could identify metrics of business-critical information calculated from key data. The ability to review the chosen metrics as desired would be coupled with the ability to drill down to the level of detail

required for any analysis needed to assess the effect of business decisions before they would be made" (Aerotech Consulting, Inc., 2009).

**Lessons Learned from Leveraging WebEOC in Support of the Haitian Relief Effort**

This abstract summarized the lessons learned from the use of WebEOC in support of relief efforts following the Haitian earthquake in 2010. The magnitude-7.0 earthquake was a devastating disaster for the small country (U.S. Geological Survey [USGS] 2010). They were not alone in that crisis, however: when the earthquake struck, thousands of U.S. citizens responded by donating money, resources, people, and time to aid in the disaster relief. To respond to the incident and create a secure information-sharing environment, the Florida Miami-Dade County and State Emergency Operations Centers (EOCs) were activated. The main information system in use at the Miami-Dade EOC was WebEOC, a web-based crisis information management system that aided in secure coordination and collaboration among EOC staff, liaisons, and emergency managers. As a result of the earthquake response efforts using this system, the authors identified seven main needs from lessons learned with respect to crisis information management software.

- **The need for on-demand boards, that is, boards that can be built on-the-fly.**
  "Crises, by definition, are rare events, and the best laid plans sometimes need tweaking. In its incident management preparation, the EOC did not anticipate the need for additional boards in the middle of a crisis. With WebEOC, the EOC was able to build the needed boards quickly and import data to those boards quickly as well. This greatly contributed to the success of the relief operations."
- **The need for web-accessible boards that can be accessed from any computer, anytime, anywhere.**
  "During this crisis, the EOC did not anticipate the need for additional logins for individuals who were not assigned to the EOC to access WebEOC and input data. Although it was not anticipated, the EOC was able to quickly provide individuals at Homestead Air Reserve Base and partner agencies restricted access to the system in order to coordinate the relief efforts."
- **The need for intuitive, easy-to-use software that can be learned in a matter of minutes and the ability to provide different levels of access controls to various users.**
  "The individuals who needed access to the transportation board were not regular liaisons at the EOC. They had never used WebEOC before and had to learn how to input and view the data they needed to share with the Miami-Dade EOC. The short learning curve of WebEOC enabled these new liaisons to accomplish this. Because the EOC allowed non-EOC personnel to use its system, it also needed to have various read-only access permissions to allow the individuals to see the same data that the staff and lead agencies were seeing. Even within the EOC, various branches needed write access while restricting others from modifying the data."
- **The need for the ability to jump from day-to-day operations to an incident quickly as well as the ability to separate day-to-day and emergency data quickly and easily.**
  "Unlike some events, like hurricanes, the earthquake struck Haiti with little notice.

The EOC needed the ability to change from day-to-day operations to the incident in a matter of minutes. It also needed the ability to separate the incident space from day-to-day data and from other incidents in the system."

- **The need for the ability to recover from failure quickly.**
  "Luckily, there was not a software failure during this incident. However, the rush of the relief operations dictated that if there were a failure, the EOC would need to access its backup system within minutes of the failure. With WebEOC, it is estimated to take approximately 30 minutes to bring the backup system online. Additionally, if the EOC was not able to recover a backup database, or if the backup database was not recently synchronized with the current database, then the EOC would not be able to access the data that previously had been entered into the system. The entire COP would have been lost."
- **The need for the ability to integrate the crisis information management system with a geographic information system (GIS).**
  "In the case of the Haiti relief efforts, there was data for which it was useful to geocode and map. One example was the location and operating hours of all of the public donation drop-off points in the county. Although the WebEOC administrator was able to import this information into the board and geocode it to share with others, there was no direct link between the crisis information management system and the GIS software, and this would have been beneficial."
- **The need for the ability to create various reports.**
  "The transportation board had a number of fields that were being entered. However, when displaying a list of each record side-by-side, it was not practical to view all of the fields. Therefore, the EOC needed a way to create various reports quickly and easily that would print out the fields it was interested in" (Nikolai, C., Johnson, T., Becerra-Fernandez, I., Madey, G., 2010).

## Open Source and Open Protocols

The literature search resulted in the discovery of several open source software applications (i.e., those in which the source code is open for programmers to use and modify to meet their requirements). Systems such as WebEOC, E Team, and E-SPONDER all listed their software as open source. The IEM team researched this area in the evaluation of software applications and documented those software vendors that are open source, open protocol (i.e., allows for data exchange), or proprietary (i.e., the source code is not open for programmers).

## Emergency Management Applications in Use by Airports or Aviation-Related Business

The IEM team identified 12 software applications in use by a number of airports based on this literature review. The following is a summary of these software applications. In each section, the applications are listed in alphabetical order.

## Airport-Specific Applications

### ADMS

http://trainingfordisastermanagement.com/

Advanced Disaster Management Simulator (ADMS) is a virtual simulation system that trains emergency management staff for the coordination, planning, and development of incident command exercises. Users can select incident sites, buildings, and vehicle positions to create scenarios. The incident details can be recorded to support observation in the review processes.

**Deployment**: No information was found on the company's website.

**Airport Client List:** The ADMS website lists the following aviation-related clients: Baltimore-Washington International Airport, El Paso International Airport, Grantley Adams International Airport–Barbados, Laredo International Airport, Memphis-Shelby International Airport, Metropolitan Nashville Airport Authority, Minneapolis-St. Paul International Airport, Ottawa International Airport, Plattsburg International Airport, Royal Netherlands Air Force, and Sanford/Orlando International Airport.

### PASSUR Airport Monitor

http://www.passur.com/

PASSUR software is built to support aviation systems and requirements. It comes with a database that consolidates an array of aviation data. Airport Monitor provides an interactive display of air traffic and flight information in and around the terminal airspace, designed for airport websites. The flight tracking dashboard presents metrics of historical situations, decisions, and air operation analytics. The live operation control assists with flight tracking, situational awareness, airspace or airport performance, and customer activity data.

**Deployment**: It is provided as a subscription-based SAAS or web-hosted.

**Airport Client List:** PASSUR provides predictive analytics and cost-saving solutions to over 50 airports and more than 200 corporate aviation customers, as well as the FAA and TSA.

### Sensis ASDE-X

http://www.saabsensis.com/docs/128/

Airport Surface Detection Equipment-Model X (ASDE-X) is a traffic management system for airport surface that provides coverage and aircraft identification to air traffic controllers. The integration of these sensors provides data to assist airport safety in all weather conditions. This system also features conflict detection and alerting technology called Safety Logic, which uses algorithms to alert controllers of potential aircraft and/or vehicle incursions.

**Deployment:** Sensis ASDE-X is an FAA-funded project and not available for general purchase.

**Airport Client List:** According to the company's website, the FAA has identified 35 airports as candidates to receive the ASDE-X System.

## General Emergency Management Applications

### CISCO Software EOC

http://cisco-ps.com/eoc/

CISCO EOC is a system used by emergency operators for disaster planning. It identifies and reports evacuation zones, where the user can add further information and generate data reports on the zone areas. The communication module of the system allows messaging between the various agencies involved in the management of the crisis.

**Deployment:** All installations have their startup procedure customized to their specific environment. Installations are normally performed by a CISCO-trained installer, who provides the agency with startup instructions. Some additional features for UNIX/Linux and Windows systems may be added following the installation. Software updates are shipped with installation instructions specific to the operating system.

**Airport Client List:** No information was found on the website.

### Command Core

http://www.commandcore.net/about/about_cc.aspx/

Command Core is a COP system that is designed to aggregate all supported system components (e.g., notifications, visual analytics, incidents, computer-aided dispatch (CAD), information sharing, GIS, and databases) into a single dashboard to manage critical information in real time.

**Deployment**: No information was found on the company's website.

**Airport Client List:** No client list was found on the website.

### E Team (NC4)

http://www.nc4.us/ETeam.php/

NC4 E Team is a resource management tool and COP system that works with a large collaborative platform suite. The tool provides several features that allow the user to prevent, respond to, and recover from incidents or disasters. NC4 E Team is an Everbridge partner.

**Deployment**: There is a turn-key solution that includes hardware, software, installation, and licensing. There is also support for an MS SQL or Oracle database.

**Airport Client List:** No list of representative clients or customers was found on the website.

### E-SPONDER

http://www.e-sponder.com/

E-SPONDER is a web-based system built on top of Microsoft SharePoint that allows first responders to collaborate. E-SPONDER works as a type of incident management system where the user can use SharePoint to collaborate, manage resources, and handle reporting.

**Airport Client List:** No client lists were found.

### Everbridge

http://www.everbridge.com/

Everbridge is an incident communication system that incorporates features serving separate purposes for the user. The first is Everbridge Aware that allows the user to connect with people during crisis situations through e-mail, text, personal data assistants (PDAs), instant messaging, phone, fax, pager, or BlackBerry. Another feature is the Everbridge Matrix, which automates, organizes, and time stamps communication procedures for a given incident. Also, Everbridge has incorporated a GIS mapping platform, which has an interactive map-based communication tool.

**Deployment:** Everbridge is handled as a SAAS delivery model on a cloud infrastructure with multiple data centers.

**Airport Client List:** The Everbridge website lists the following representative aviation industry client: AirTran Airways. Los Angeles International Airport uses Everbridge Aware (J. F. Smith, personal communication, August 19, 2011).

### Knowledge Center

http://www.Knowledge Center.com/

Knowledge Center is a COP system that allows emergency managers to prepare, respond, and recover from incidents through a ICS (Incident Command System) component. Knowledge Center also allows integration with external standard data sources to support collaboration between emergency managers and third-party systems through standard protocols.

### MissionMode

http://www.missionmode.com/

MissionMode allows the user to monitor threat notifications and emergency alerts. The user can assign teams to manage, monitor, and respond to these notifications using real-time status messages, voice messages, texts, conference calls, pictures, and video.

**Deployment:** Tools can also be licensed for in-house installation, and either in-house or hosted configurations can use live assistance or enable a user to staff an internal assistance center. In-house installations can use internal telephone networks or may use distributed web services.

**Airport Client List:** MissionMode's website lists the following representative aviation industry clients: Airbus, Alaska Airlines, Allegiant Air, Atlantic Southeast Airlines, EasyJet, FedEx, Monarch, and Virgin America.

### OpsCenter/Alert Technologies

http://www.opscenter.com/
http://www.opscenter.com/mini/Automated_Emergency_Notification.htm

For government response organizations and agencies, OpsCenter allows the user to prepare for, respond to, and recover from natural disasters and other disastrous events. Information entered into OpsCenter is made available to all users. Users can perform various tasks, including viewing status boards that are updated to reflect the current status of resources; creating filtered reports that can pull different sources of information to provide comprehensive answers to specific questions; and accessing maps that provide a visualization of the emergency that are also updated when information changes.

**Deployment**: OpsCenter is built for the Windows platform.

**Airport Client List:** No lists were found on the company's website.

### Send Word Now

http://www.sendwordnow.com/

Send Word Now is an incident management application that allows users to manage events, incidents, tasks, and alerts, all of which users can share with emergency responders. Information can be managed through a central consol.

**Deployment:** "Send Word Now's platform builds on the alerting service to offer emergency management officials an invaluable set of tools to coordinate their responses during crisis situations." The website highlights features to send alerts, communicate internally, and coordinate relief and rescue efforts.

**Client List:** The company's website lists over 140 clients, including Wal-Mart, which is part of IEM's web-based research.

### WebEOC

http://www.esi911.com/esi/index.php?option=com_content&task=view&id=14&Itemid=30

WebEOC is an incident management system built to enable users to manage incidents, view daily events, assign mission tracks, and provide incident reports. WebEOC comes with a collaboration tool that creates a COP for first responders to manage incident information with status boards.

**Deployment**: WebEOC requires a Windows standard web and database server 2003 or higher, and SQL server 2005 or 2008. It can run in a virtual environment, provided the dedicated resources meet required specifications.

**Airport Client List:** WebEOC lists among its clients the following airports: Chattanooga Metropolitan Airport, Reno-Tahoe Airport Authority, and Salt Lake City Airport.

It also lists the following Air Force Bases (AFBs) under the aegis of the U.S. Department of Defense (DoD): 325 CES/CEX, Tyndall AFB; 332 AEW, Balad Air Base; 437 CES Charleston AFB; 47 CS, Laughlin AFB; 45 SW, Patrick AFB; Altus AFB; Andrews AFB; Arnold AFB; Lackland AFB; Luke AFB; Randolph AFB; and Vandenberg AFB.

WebEOC also lists the following airlines: AeroMexico, Air New Zealand, AirTran Airways, American Airlines, British Airways, Delta Airlines, Malaysia Airlines, Qantas Airways, Royal Brunei Airlines, U.S. Airways, and Virgin Atlantic Airlines.

## Airport-Specific Web Search Results

The following search results are listed in alphabetical order by system name.

### ADMS™ + Airport Term Search–Google and Google Scholar

ADMS™ Training with Miami International Airport's ARFF Drivers

This article highlighted Environmental Tectonics Corporation's (ETC) use of the ADMS™ High Reach Extendable Turret (HRET) simulator to train 10 airport rescue fire fighting (ARFF) drivers on the vehicle operation of an ARFF truck including HRET at Miami International Airport's (MIA) fire department. Training with the ADMS™ simulator allowed drivers to become familiar with the vehicle's operations and controls, thus allowing a positive transfer of training once they sat down on the actual vehicle (Hemming Fire, 2010).

An Analysis of the Implementation of ADMS™ at Baltimore/Washington International Airport (BWI) for Disaster Response Training

This report was an evaluation by Dr. Richard Anderson and his team of the ADMS™ software at use in the BWI airport. Dr. Anderson and his team spoke very highly of the simulation capability (CATSS UCF, 2005).

ETC's Completion of Virtual Training at BWI Airport

This article listed the following airports as users of ADMS™: Chicago O'Hare International Airport, Metropolitan Nashville Airport Authority, Minneapolis/St. Paul International Airport, and Orlando/Sanford International Airport. It also highlighted a third training accomplished at the BWI airport (DSS Resources, 2005).

ETC's Delivery of the Fourth ADMS™ Exercise to BWI Airport

This article highlighted the fourth ADMS™ exercise with BWI by ETC training staff. The Maryland Aviation Administration contracted ETC to develop and conduct a series of ADMS™ training sessions to prepare relevant BWI personnel in several different areas of airport disaster response, including a mass casualty airline crash, a terrorist-related hazardous material (HazMat) incident, and, in the most recent exercise, a fuel spill and fire at the terminal. These week-long training sessions helped BWI response personnel acquire valuable experience through hands-on exercises. ADMS™ was used to train over 100 airport first responders, mutual aid responders from the surrounding areas, and airport operations executives (ETC Simulation, 2006).

ETC Simulation Division Contract for ADMS™ Airport Driver Simulator Upgrade

This press release acknowledged that "ETC's Simulation Division won a new contract from existing customer Minneapolis-St. Paul International Airport to upgrade its ADMS™ Driver Simulator" (Weirauch, 2010).

ETC Simulation and its Enhancement of Virtual Reality for Training First Responders

This news and feature story indicated that Goodfellow Air Force Base was an ADMS™ client. The article stresses the importance of realistic simulation to enhance training. Additionally, the ability to replay and review a scenario can be beneficial (Kaplan, 2011).

Training for Disaster Response in Vehicles

This article described Minneapolis-St. Paul's application of ADMS™. ETC was contracted to develop a disaster management simulator that allowed drivers to respond to a simulated disaster scene in their vehicles. What resulted was a standalone driver simulator based on ETC's ADMS™, a training tool airports used to coordinate first-responder actions in a simulated airport environment complete with modeled behavior for fires and victims. The ADMS™ database included a 3D virtual model of the airport generated by compiling photorealistic satellite imagery and local features like trucks and cars that might be found on the tarmac (Croft, 2005).

Validation of the Effectiveness of Simulation as a Training Tool for Safety Training and Vehicle Operations at Baltimore Washington International Airport (BWI)

This was a final report from the University of Central Florida concerning the use of ADMS™ at BWI (CATSS UCF, 2005).

### Alert Technologies + Airport Term Search–Google and Google Scholar

Project Planholders List for Emergency Notification System–Denver

Alert Technologies was listed within this project planholders list for Denver International Airport's Emergency Notification System (as were MissionMode and Everbridge) (Business Fly Denver, 2011).

### E Team + Airport Term Search—Google and Google Scholar

Airport Disaster Preparedness in a Community Context

In this 2009 report, Dr. Jim Smith highlighted the use of E Team at the Orlando Airport and within the county. He highlighted that FL-Regions 5 and 6 already had E Team incident management software in place, and it would be available to the airports within the region should they want to use it. Some airports, such as Orlando, already had seats on both city and county E Team systems (Smith, 2009).

### E-SPONDER + Airport Term Search–Google and Google Scholar

E-SPONDER Quarterly Newsletter, December 2010

In this quarterly newsletter, E-SPONDER highlighted its support of St. Louis hospitals and listed a new client spotlight: Los Angeles World Airports (E-SPONDER, 2010).

### Everbridge + Airport Term Search–Google and Google Scholar

Houston City Council Agenda–July 6, 2011

This council meeting agenda indicated that Everbridge would be purchased for the Houston Airport System: "EVERBRIDGE, INC. for Emergency Notification System, Implementation and Training from the General Services Administration Schedule 70 contract through the Cooperative Purchasing Program for the Houston Airport System–$134,500.00–Enterprise Fund" (Houston, TX, 2011).

Project Planholders List for Emergency Notification System–Denver

Everbridge was listed within the project planholders list for Denver International Airport's Emergency Notification System (as were MissionMode and Alert Technologies) (Business Fly Denver, 2011).

### MissionMode + Airport Term Search–Google and Google Scholar

Project Planholders List for Emergency Notification System

Just like the previously listed Everbridge contact, a MissionMode representative was listed within the project planholders list for Denver International Airport's Emergency Notification System (Business Fly Denver, 2011).

### NC4 + Airport Term Search—Google and Google Scholar

No relevant search results were found.

### OpsCenter + Airport Term Search–Google and Google Scholar

No results were relevant to the topic at hand; however, there were multiple references to operations centers in general, as well as the Barco visualization software.

### OpsCenter Software + Airport Term Search–Google and Google Scholar

iJET Travel Risk Management Deploying Alert Technologies Incident Management Software

In this article, "Alert's OpsCenter software was chosen by the Dallas-Ft. Worth International Airport Department of Public Safety to manage emergency response and track recovery progress using state-of-the-art technologies to achieve the level of robustness required by mission-critical applications" (Business Wire, 2003).

### PASSUR + AirportMonitor Term Search–Google

Airport Monitor (San Diego)

In this letter, the airport authority president responded to concerns from an individual over a number of topics, including the accuracy of the PASSUR Airport Monitor Program (PCPB, 2010).

Fresno Yosemite International Airport Profile

In an overview of the Fresno Yosemite Airport, this source highlighted the airport being the first airport in the nation to install the PASSUR flight information system to list active flight arrivals and departures (Airport-Technology, 2010).

Letter by/between Sea-Tac International Airport and Seattle Council on Airport Affairs (SCAA)

In this letter, the SCAA requested that Sea-Tac International Airport consider implementing a system such as PASSUR Airport Monitor. The airport replied that it would try to include money for such a system in its budget (Seattle Council Network, 2002).

Louis Armstrong New Orleans International Airport Noise and Emissions Regulations–Boeing Profile

This Boeing website highlighted the ability of residents living near the Louis Armstrong New Orleans International Airport to monitor aircraft flight tracks on the web using the PASSUR Airport Monitor System. This system could be accessed through the airport's website at http://www.flymsy.com (Boeing, 2011).

Statement from the Nantucket Airport Commission Noise Advisory Committee on Airplane Noise

This document was a one-page background paper for citizens to report concerns on noise at the Nantucket airport. This paper mentioned the use of PASSUR, used by the airport to track aircraft flight patterns (Nantucket Airport Commission Noise Advisory Committee, 2002).

### Sensis ASDE-X + Airport Term Search–Google

ASDE-X for Airport Stakeholders

This presentation is on the Airports Council International-North America (ACI-NA) website. It covered various aspects of the ASDE-X Program, including deployment schedule, data distribution, and expansion (Sensis Corporation, 2008).

ASDE-X Wikipedia Entry

This Wikipedia entry describes the ASDE-X as a runway safety tool that would enable air traffic controllers to detect potential runway conflicts by providing detailed coverage of movement on runways and taxiways. By collecting data from a variety of sources, ASDE-X was able to track vehicles and aircraft on airport surfaces and obtain identification information from aircraft transponders (Wikipedia, n.d.).

Commentary on ASDE-X

Two separate articles highlighted future enhancements to the ASDE-X system. The executive travel article was published in 2008, and the airport improvement article was published in 2010 (Glab, 2008).

Departure Taxi Time Predictions Using ASDE-X Surveillance Data

This abstract on departure taxi time predictions was presented by two Sensis Corporation representatives at the 26th International Congress of the Aeronautical Sciences (Legge, J. and Levy, B., 2008).

FAA Presolicitation

The Federal Business Opportunities website highlighted the FAA's intent to standardize the ASDE-X system (FedBizOpps, 2005).

JFK Airport Case Study: Benefits of Virtual Queuing at Congested Airports Using ASDE-X

This source was an abstract and briefing highlighting the benefits of ASDE-X in supporting virtual cueing (Bhadra, D., Knorr, D., and Levy, B., 2011).

Preventing Runway Incursions and Improving Air Traffic Management

This white paper identified Sensis ASDE-X as a leading provider of air traffic control, airline and airport operations management, and data integration and distribution systems (Wohl, 2008).

Saab's Acquisition of Sensis that will Broaden Swedish Company's Air Traffic Management (ATM) Portfolio

In this Aviation International News (AIN) online report, Saab added to its portfolio a ground surveillance system deployed at major U.S. airports, with the planned acquisition of Sensis Corporation of Syracuse, New York. Sensis has brought a legacy in civil ATM that includes a decade rolling out the ASDE-X system to 35 major U.S. airports, a deployment completed this year with all systems commissioned by the FAA. ASDE-X integrated data from surface-movement radar, multi-lateration of transponder replies, and automatic dependent surveillance-broadcast (ADS-B) transmissions to provide air traffic controllers with real-time surveillance of aircraft and vehicles on the airport surface. (Carey, 2011).

Sensis' Development of Airport Surface Alerting

This article described how Sensis would develop new approaches to detecting and resolving airport surface-traffic conflicts under a two-year research contract from the National Aeronautics and Space Administration (NASA). The advanced conflict detection and resolution algorithms could eventually find their way into the company's ASDE-X airport surface detection system, which the FAA will have deployed at 35 airports by mid-2011 (Warwick, 2010).

Sensis' Upgrading of New York Kennedy's ASDE-X for Environmental Trials

This article indicated the Department of Transportation's (DOT) intent to upgrade the ASDE-X runway incursion system, enabling the airport to better track aircraft on the ground (Croft, 2007).

Spin-off Technology: Low-cost Ground Surveillance

Under a low-cost ground surveillance, the FAA awarded Sensis a contract to demonstrate proposed solutions at one airport. Sensis would be deploying its initial system to Long Beach Airport, Long Beach, California. In a related article on the Syracuse.com website, they highlighted the FAA-awarded contract to Sensis as part of a pilot program to reduce runway incursions at small- and medium-sized airports (Sensis Corporation, 2009).

### WebEOC + Airport Term Search–Google and Google Scholar

Airport Disaster Preparedness in a Community Context

In this report, Dr. Jim Smith highlighted how county EOCs were a key link between airports and emergency management partners (Smith, 2009).

Caribbean Disaster Emergency Response Agency

This source provided an article describing the features of WebEOC, which was used by the airport EOC (Fuller, 2008).

Horry County (South Carolina) Emergency Support Function (ESF) #1 (Transportation) Emergency Operations Plan (EOP)

This EOP called for the Horry County Department of Airports to use WebEOC for systematic information sharing and documentation efforts (Horry County, 2009).

North Carolina Division of Emergency Management's Geospatial and Technology Management Newsletter

In a newsletter by the North Carolina Division of Emergency Management, one of the articles highlights the use of and enhancements to WebEOC (North Carolina Division of Emergency Management, 2010).

Office of the Chief Secretary, Tobago Emergency Management Agency (TEMA) WebEOC Training

This website highlights training for the Airport Authority Emergency Committee data clerks (Tobago Emergency Management Agency, 2008).

Texas Engineering Extension Service (TEEX) Helping Texas in Preparing For Hurricanes

This press release highlights TEEX, a member of Texas A&M University, and its work with the State of Texas to prepare for the hurricane season. This press release describes exercise participants (including Dallas-Ft. Worth Airport personnel) getting hands-on experience with the statewide WebEOC software (Texas Engineering Extension Service, 2010).

Transportation Security Administration's (TSA) ID Requirements

This source is an information page regarding ID requirements for passengers. The TSA used WebEOC to collect information about incidents at airport checkpoints (Transportation Security Administration, 2008).

### Port of Seattle + WebEOC

WebEOC on the Move

Presented in July 2011 by the Washington Military Department, Emergency Management Division, this briefing outlines how 36 or 39 counties in the State of Washington were using WebEOC. The briefing describes the features of WebEOC (Washington Military Department, Emergency Management Division, 2011).

## Emergency Management Software for Non-Airport Users Web Search Results

### ETeam + Police

Michigan's Deployment of E Team for Statewide Emergency Response System

This press release highlights E Team's announcement that the Michigan State Police Emergency Management Division, in cooperation with the Department of Information Technology (DIT), selected the E Team crisis management software solution for its statewide enterprise emergency response and preparedness information management system (California Technology Ventures, 2004).

### WebEOC + Fire

Washoe County, Nevada

This website highlights WebEOC as "a crisis information management software purchased by Washoe County for use by agencies and jurisdictions region-wide during times of crisis" (Washoe County, n.d.).

### WebEOC + Police

Indiana Department of Homeland Security

This informational document highlights WebEOC as being "a daily operational tool to share real-time information among key Federal, state, county, and local partners. The Indiana Department of Homeland Security Watch Desk was staffed 24/7 to ensure that critical information was shared. Some information, such as weather alerts, earthquakes, and 911 information, was fed directly into WebEOC. Many counties also used the system as a daily operational tool, to share information with other public safety partners, including schools, major corporations, and transportation offices" (Indiana Department of Homeland Security, n.d.).

## General Emergency Management Application Web Search Results

Three non-airport enterprises—FedEx, Target, and Wal-Mart—were considered for their use of web-based emergency coordination systems.

### FedEx

MissionMode's website lists FedEx as a representative client. No further information (e.g., news stories and case studies) could be found (MissionMode, n.d.).

The Potential of ASDE-X

This article highlights the potential of ASDE-X, stating that "while the airport and the airlines [have been] benefitting from the safety enhancements provided by the FAA's installation of ASDE-X, the same technology [could] be used to address efficiency and capacity issues. Currently, FedEx in Memphis and UPS in Louisville are using the technology to gather operational data" (Airport Business Magazine, 2011).

*WebEOC + FedEx; ESponder software + FedEx; NC4 +FedEx; ETeam +FedEx; MissionMode +FedEx; Everbridge + FedEx; OpsCenter + FedEx; CommandCore + FedEx; ADMS + FedEx; Sensis + FedEx; PASSUR + FedEx; FedEx + emergency communications; FedEx + emergency notification; FedEx + "emergency management software"; FedEx + "emergency software"*

### Target

MissionMode's website also included Target on its client list (MissionMode, n.d.).

Description of Target's Global Crisis Management Strategy

This website presents "an overview of Target's SharePoint-based incident management system used in the command center, demonstrating an example of how Microsoft SharePoint [could] be used 'out of the box' as an incident management system" (Secure 360, 2011).

*WebEOC + Target; WebEOC + Target Stores; ESponder software + Target; NC4 +Target; ETeam +Target; MissionMode +Target; Everbridge + Target; OpsCenter + Target; CommandCore + Target; ADMS + Target; Sensis ASDE + Target; PASSUR + Target; Target + emergency communications; Target stores + emergency communications; Target + emergency notification; Target stores + emergency notification; Target + asset protection; Target stores + CIMS; Target + "emergency management software"; Target + "emergency software"; Target stores + COP. Bryan Strawser + target + presentation*

### Wal-Mart

Presentation on Emergency Management in the Private Sector

According to this presentation, Wal-Mart has used an internally developed web-based application for maintaining a COP during disasters. According to slide 18, this application was similar to WebEOC or E Team. For emergency communication and notifications, Wal-Mart has used Send Word Now, which was also web-based (McDonald, n.d.).

## Send Word Now

Beyond Business Continuity Basics at Wal-Mart

This article discusses Wal-Mart's crisis command center. For emergency notification, Wal-Mart uses Send Word Now. "It's been a great success for us," says Wal-Mart's Director of Emergency Management Jason Jackson. 'We are able to reach out to people all over the world quickly and easily.' Wal-Mart also uses weather-related services from EarthSat, WeatherBug, Hurricane Consulting Inc., and PC Weather" (Rojas, 2006).

Case Study on the Wal-Mart Tornado

This case study presents a scenario of a tornado striking a Wal-Mart store: "On February 17, 2008, an F-3 tornado struck the Wal-Mart store in Prattville, Alabama. The store suffered significant damage; however, no lives were lost, thanks to the advance warning the store received from Send Word Now's WeatherBlast, allowing safety protocols to be carried out in time" (Send Word Now, 2009).

Client Testimonial

This client testimonial reflects satisfaction with Send Word Now: "We are very pleased to have the Send Word Notification Service included in our arsenal of emergency management tools. We believe these tools are necessary to generate warnings to our 3,800 stores on local weather conditions. A quicker notification time allows maximum time for proper preparations, which minimizes life safety concerns and mitigates impact to our bottom line" (Send Word Now, n.d.).

Options in the Emergency and Mass Notification Software Market

This article highlights the various products that emerged as a result of an increased demand for mass notification solutions. Among these products, "the most fundamental requirement remains ease of use. 'Our hope is that people can use the system without any training,' says Michael Gambacorta, online marketing specialist at Send Word Now. Simplicity means speed. He cites an example: in 2008, Wal-Mart used Send Word Now's WeatherBlast service to alert staff in Alabama that a tornado was heading their way. 'That meant they were able to get everyone under cover, so when the tornado then actually hit the store and did a lot of damage, no staff or customers were hurt" (Adams, 2010).

*Searches: WebEOC + Walmart; ESponder software + Walmart; NC4 + Wal-Mart; ETeam + WalMart; MissionMode + Walmart; Everbridge + WalMart; OpsCenter + Walmart; Command Core + WalMart; WalMart + ADMS; Walmart + emergency management software; WalMart + Sensis ASDE; WalMart + Passur; Walmart + Send Word Now; Walmart + crisis management software*

Wal-Mart's System as a Key to Communication in a Crisis

This article discusses Wal-Mart's implementation of a service called Send Word Now, which enables the company to immediately notify select personnel in case of an crisis—a service that the company found valuable when a tsunami hit Thailand in late 2004. The benefits of the Send Word Now system were many, but the prompt delivery of urgent messages stood out (Daniels, 2006).

## Airport-Specific Media Release Results

Allegiant Air Deploying MissionMode For Operational, Emergency, and Crisis Management

This press release from MissionMode announced that it signed with Allegiant Air, LLC to provide emergency notification and crisis management software to the airline (MissionMode, 2008).

Boston Logan International Airport's 19th Site Operational With Sensis ASDE-X

This press release announced Boston Logan International Airport's 19th site using Sensis ASDE-X (Sensis, 2009).

BWI Thurgood Marshall Airport's Contract for a Suite of PASSUR Solutions

This press release announced that BWI contracted for PASSUR Aerospace, Inc. to deliver revenue optimization and operational efficiency, safety, and cost effectiveness for key airport users (PASSUR Aerospace, Inc., 2010).

Cleveland Hopkins International Airport's Contract for PASSUR Solutions

This press release announced that the Cleveland Hopkins International Airport contracted for PASSUR Aerospace, Inc. airport information solutions designed to optimize airfield management (PASSUR Aerospace, Inc., 2010).

Colorado Springs Airport's Contract for PASSUR Revenue and Operations Optimization Solutions

This press release announced that Colorado Springs Airport contracted for the PASSUR flight and airspace visualization tools to optimize operational safety, efficiency, and cost effectiveness for airlines and the traveling public (PASSUR Aerospace, Inc., 2011).

Contract Extension with the FAA and TSA

This press release announced the award of a contract extension with the FAA for PASSUR's program, which provided air traffic management and aviation security solutions in support of the FAA's joint role with the TSA (PASSUR Aerospace, Inc., 2011).

EasyJet's Implementation of MissionMode

This press release announced that EasyJet, a low-cost airline based in the United Kingdom, implemented MissionMode Solutions for rapid communications and incident management (MissionMode, 2005).

ETC's Contract Award from El Paso International Airport for the Purchase of ADMS™

This press release highlights ETC's contract award for the purchase of ADMS™ (Environmental Tectonics Corporation, 2010).

ETC's Contract Award to Provide Advanced Disaster Management Simulator Training Services for the Tennessee Air National Guard

This press release highlights ETC's contract award for the purchase of ADMS™ supporting the Tennessee Air National Guard (Environmental Tectonics Corporation, n.d.).

Everbridge and Clients Urged Preparedness beyond National Preparedness Month

This press release highlights efforts by Everbridge and its clients to promote emergency preparedness beyond National Preparedness Month. "Everbridge Aware® and SmartGIS™ were the technologies used to assist cities like Galveston, Texas, in successfully evacuating the entire community during Hurricane Ike and the solution used by Dallas-Ft. Worth Airport in issuing crucial customer communications during Texas' severe winter weather of 2009" (Everbridge, 2010).

FAA and Sensis' Receipt of the 2011 Jane's ATC Global Runway Safety Award

This press release announced that the FAA and Sensis Corporation received the *Jane's Airport Review* Runway Safety Award at the 2011 ATC Global Exhibition and Conference in Amsterdam, the Netherlands. The award recognized the FAA's deployment of ASDE-X technology at 35 major U.S. airports, including five of the world's ten busiest airports (Sensis Corporation, 2011).

FAA's Order of 11 Additional ASDE-X

This press release mentions that Sensis' multi-lateration technology was also in use at London Heathrow Airport, and was being installed at Amsterdam Airport Schiphol (The Netherlands); Brussels Airport (Belgium); Charles de Gaulle Airport (France); Frankfurt Airport (Germany); Geneva International Airport (Switzerland); Vienna International Airport (Austria); and Zurich Airport (Switzerland) (Sensis Corporation, 2004).

Fort Lauderdale Executive Airport's Contract for PASSUR Airspace Monitoring Solution

This press release announced that the Fort Lauderdale Executive Airport contracted for the collaborative version of PASSUR® Airport Monitor™, a web-based airspace education tool for airport communities (PASSUR Aerospace, Inc. 2010).

Fort Lauderdale-Hollywood International Airport's Use of Sensis ASDE-X

This press release highlights Fort Lauderdale-Hollywood International Airport's fifteenth airport using Sensis ASDE-X (Sensis Corporation, 2009).

George Bush Intercontinental Airport's Use of Sensis ASDE-X

This press release highlights George Bush Intercontinental Airport's use of Sensis ASDE-X (Sensis Corporation, 2009).

John F. Kennedy International Airport's Use of Sensis ASDE-X

This press release highlights John F. Kennedy International Airport's use of Sensis ASDE-X (Sensis Corporation, 2009).

Los Angeles International Airport's Use of Sensis ASDE-X

This press release highlights Los Angeles International Airport's use of Sensis ASDE-X (Sensis Corporation, 2009).

Miami International Airport's Use of Sensis ASDE-X

This press release highlights Miami International Airport's use of Sensis ASDE-X (Sensis Corporation, 2009).

MissionMode's Partnership with Aviation Industry Leader PRISM

This press release announced MissionMode's partnership with PRISM, the leader in Safety Management Systems (SMS) for the aviation industry. PRISM customers would have access to MissionMode's web-based emergency notification and crisis management software (MissionMode, 2011).

Mosaic ATM Teaming Agreement

This press release announced a broad teaming agreement whereby PASSUR would bring solutions for Departure Metering, Networked Surface Management, and Integrated Traffic Management, which will combine PASSUR's airline and airport solutions capabilities with Mosaic's surface management technology (PASSUR Aerospace, Inc., 2011).

NC4's Introduction of ActivTravel™ to Travel Managers at NBTA

This press release announced that the "Kansas City Aviation Department successfully implemented Everbridge Matrix® at both the Kansas City International Airport and the Charles B. Wheeler Downtown Airport." According to this press release, "notifications to airport responders that formerly took more than 20 minutes now would take less than two" (Everbridge, 2011).

Newark Liberty International Airport's Use of Sensis ASDE-X

This press release highlights Newark Liberty International Airport's use of Sensis ASDE-X (Sensis Corporation, 2009).

Omniflight Helicopters, Inc.'s Selection of MissionMode for Incident Management and Emergency Notification

This press release announced that Omniflight Helicopters, Inc. selected MissionMode Solutions' Alert and Situation Center as its virtual command center and alert notification platform for both daily operations and crisis and incident management and emergency notification (MissionMode, 2009).

PASSUR Aerospace and Flight Safety International's Delivery of Corporate Flight Coordination Solutions

This press release announced that PASSUR Aerospace, Inc. was selected as an inaugural partner for Flight Safety International's new Extended Advantage Program, a preferred offering of solutions from leading aerospace providers, which augmented Flight Safety's core mission of supporting safe, efficient, and high-quality flight operations (PASSUR Aerospace, Inc., 2010).

Phoenix Sky Harbor International Airport's Use of Sensis ASDE-X

This press release explains that, apart from the Phoenix Sky Harbor International Airport, Sensis ASDE-X was also operational at the following 13 airports: Bradley International Airport, Charlotte Douglas International Airport, Chicago O'Hare International Airport, Detroit Metropolitan Wayne County Airport, General Mitchell International Airport, Hartsfield-Jackson Atlanta International Airport, Lambert-St. Louis International Airport, Louisville International Airport, Orlando International Airport, Seattle Tacoma International Airport, Theodore Francis Green Airport, Washington Dulles International Airport, and William P. Hobby Airport (Sensis Corporation, 2008).

Philadelphia International Airport's Use of Sensis ASDE-X

This press release highlights Philadelphia International Airport's use of Sensis ASDE-X at Charlotte/Douglas International Airport and Detroit Metro Wayne County (Sensis Corporation, 2010).

Rick Husband Amarillo International Airport's Contract for PASSUR Solutions

This press release announced that the Rick Husband Amarillo International Airport contracted for PASSUR airport information solutions designed to optimize airfield management (PASSUR Aerospace, Inc., 2010).

Salt Lake City International Airport's Contract for a Suite of PASSUR Solutions

This press release announced that Salt Lake City International Airport contracted for PASSUR airport solutions to deliver revenue optimization and operational efficiency, safety, and cost effectiveness for key airport users. Specific solutions included the PASSUR Field Condition Reporting Program, including Electronic Notices to Airmen (eNOTAMs) Integration Product (PASSUR Aerospace, Inc., 2010).

San Diego International Airport's Launch of a New Collaborative Version of PASSUR Community Relations Software

This press release announced that the San Diego International Airport became the first customer to launch the new collaborative version of PASSUR® Airport Monitor™, the airport industry's leading web-based airspace education tool for airport communities (PASSUR Aerospace, Inc., 2007).

Seattle-Tacoma as the Tenth Airport to Use PASSUR Field Conditions Reporting Solution

This press release announced that the Seattle-Tacoma Airport contracted for an additional PASSUR airport solution designed to deliver operational efficiency, safety, and cost effectiveness for key airport users. PASSUR OPSnet was mentioned as a family of web-based solutions that included field condition reporting with eNOTAM integration (PASSUR Aerospace, Inc., 2010).

Sensis' On-Time Deployment of ASDE-X at 32 Airports

This press release mentions John F. Kennedy International Airport as one of the airports using ASDE-X (Sensis Corporation, 2010).

WebEOC's Use by Federal, State, and Local Agencies to Conduct a National-level Exercise

This press release identifies WebEOC users, including the Kentucky National Guard, Kentucky Air National Guard, state agencies (e.g., transportation, health, and agriculture), 11 regional emergency managers, and many county emergency managers (ESi Acquisition, Inc., 2011).

## Airport-Specific Case Study Results

Everbridge–AirTran Airways

This case study highlights AirTran's use of Everbridge Aware's mass notification system. AirTran Airways has now reached thousands of people to dispatch information about on-time performance, weather, delays, crew scheduling, and maintenance with just a few simple steps. Company-wide, the airline has received positive feedback about the system's ease of use, particularly with sending messages, reporting, and member uploads. AirTran Airways has depended on Everbridge Aware as a critical asset in its emergency response program (Everbridge, 2011).

Runway Status Lights Program

This fact sheet highlights the capabilities of the Sensis runway status lights solution. This capability has worked seamlessly with the ASDE-X system (Sensis Corporation, 2011).

San Diego International Airport's Implementation of Airport Monitor

PASSUR aerospace describes on its website how the SAN Airport uses AirportMonitor to communicate to residents in real time about conditions that may be affecting noise level and quality. AirportMonitor provides an interactive display of air traffic and flight information in and around the terminal airspace. It enables residents to view traffic in "near-live" and replay mode.

Note: A number of airports provided testimonials about PASSUR "products," which may or may not have referred to Airport Monitor. These airports included the following: Alaska International Airports System (no specific program noted), Atlanta International (no specific program noted), Dallas-Ft. Worth International (no specific program noted), Dallas Love (no specific program noted), Denver International (PASSUR OPSnet), Detroit Metro (PASSUR Pulse), Greater Orlando Aviation Authority (no specific program noted), Las Vegas (no specific program noted), Massachusetts Port Authority (PASSUR Pulse), Milwaukee International (no specific program noted), Richmond International (no specific program noted), and San Antonio International (PASSUR landing fee management program) (PASSUR Aerospace, Inc., 2011).

TBI Corp's Deployment of MissionMode to Improve Operations and Crisis Management

This fact sheet highlights how TBI Corp selected MissionMode as the incident management system for London Luton, Belfast International, and Cardiff International (all owned or operated by TBI Corp) (MissionMode, n.d.).

U.S. Airport Surface Detection Equipment, Model X

This fact sheet highlights how ASDE-X has improved ground air traffic control (Sensis Corporation, 2011).

# Social Media and Airport Emergency Management Tools

## Airport + Social Media

Using Social Media during a Crisis

This article from the Akron-Canton Airport website highlights how the media was able to quickly follow the status updates concerning flooding at the airport through the use of Twitter and Facebook (Akron-Canton Airport, 2011).

## Airport + Twitter

Airports and Twitter–A Perfect Match or Passing Fad

Updating Twitter during contingencies has been one way to inform the public about the status of airport operations. "The possibilities [have been] endless, and there [has been] much to learn from an audit of airports that have Twitter accounts and are currently having online dialogues to communicate a wide variety of issues. A review of Twitter accounts from passenger airports who tweet many thousands of messages include tweets about airport delays, road closures, employment opportunities, award recognitions, traffic advisories, restroom closures, weather delays, and publicity results" (Huff, 2011).

Airports on Twitter: Travel Tweet Directory

There are a growing number of airports with Twitter accounts. This website, current as of 2011, contained links to 16 U.S. airports with active Twitter accounts (Travel Notes, 2011).

BWI Thurgood Marshall Airport's Introduction of Twitter Service

This press release highlights BWI's use of Twitter service to inform passengers about airport information during the 2009 winter storms (BWI Thurgood Marshall Airport, 2009).

Twitter Time–Airport World

This article highlights the success of Akron-Canton and Richmond Airports in using Twitter for various purposes: "Where Akron-Canton and Richmond [have been] true pioneers is in their use of Twitter to gather customer feedback, according to Frischling of International Analysis Group. Teams at both airports consistently searched for customer comments regarding their airports and, where appropriate, responded quickly where they found ongoing issues. This [has] set them apart from the many airports which, so far, [have] only [used] Twitter as an alerts service for bad weather warnings and marketing messages" (Twentyman, 2010).

The research also evaluates an airport's use of social media for emergency management. An airport's use of social media tools (e.g., Facebook, Twitter, and YouTube) have become more prevalent recently. What started off as an airport tool to inform the public

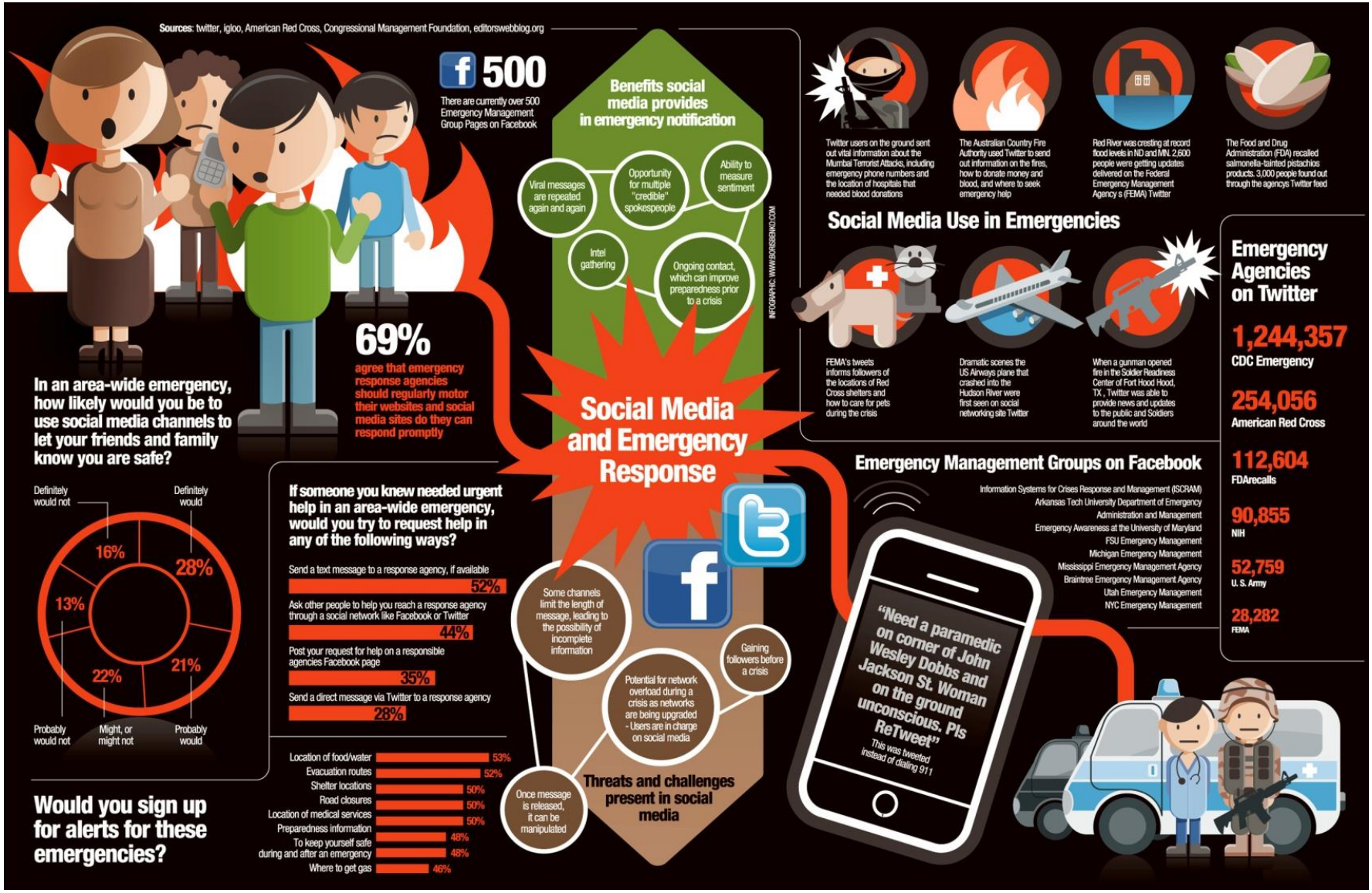
of airport outages and flight delays has now evolved to include marketing and other uses. Airports can reach out to their customers and offer discounts at stores, flight updates, and special events within the airport. Passengers can book flights through Facebook and even enter contests. Some airports have employed social media teams to quickly respond to tweets posted to airport accounts. From an emergency management perspective, these tools can be effective during irregular operations to quickly inform the growing number of individuals who follow and airport on Facebook or Twitter, including the local media that would normally have to wait for a press release during an incident or emergency situation. There are no indications that these social media tools are used to update county or state emergency management systems, although county or state EOCs could look at the airport tweets to obtain updates on the status of the airport.

## Social Media and External Stakeholders

The research team identified numerous software vendors who claimed to have the ability to share emergency management data through the use of smartphones and tablets as well as the ability to relay information through systems such as Facebook and Twitter.

Airport personnel need to recognize what information is presented on Facebook and Twitter and understand the differences in audience, formatting requirements, and text limitations. Often times emergency management messages will be sent on Twitter, then followed up with links to airport websites. When tweeting, it is important to look at the communication from recipients to control misinformation about an incident. Airport personnel should continue to engage with their target audience as incidents unfold and are resolved.

Social media is quickly becoming the first way people find out about an incident. From the aircraft crash in the Hudson River, to FEMA sending out “tweets” on shelter locations, airports can benefit from sending out the right message quickly through the use of social media. As depicted on the figure below, reprinted with permission from CreditLoan.com, social media messages can go viral, increasing visibility of an incident in a short amount of time. More and more federal agencies are using Facebook and Twitter to relay emergency management information (and misinformation) in order to keep the community informed.


Sources: twitter, igloo, American Red Cross, Congressional Management Foundation, editorswebblog.org
500
There are currently over 500 Emergency Management Group Pages on Facebook
69%
agree that emergency response agencies should regularly motor their websites and social media sites do they can respond promptly
In an area-wide emergency, how likely would you be to use social media channels to let your friends and family know you are safe?
Definitely would not
Definitely would
16%
28%
13%
22%
21%
Probably would not
Might, or might not
Probably would
Would you sign up for alerts for these emergencies?
If someone you knew needed urgent help in an area-wide emergency, would you try to request help in any of the following ways?
Send a text message to a response agency, if available 52%
Ask other people to help you reach a response agency through a social network like Facebook or Twitter 44%
Post your request for help on a responsible agencies Facebook page 35%
Send a direct message via Twitter to a response agency 28%
Location of food/water 53%
Evacuation routes 52%
Shelter locations 50%
Road closures 50%
Location of medical services 50%
Preparedness information 48%
To keep yourself safe during and after an emergency 48%
Where to get gas 46%
Benefits social media provides in emergency notification
Viral messages are repeated again and again
Opportunity for multiple "credible" spokespeople
Ability to measure sentiment
Intel gathering
Ongoing contact, which can improve preparedness prior to a crisis
INFOGRAPHIC: WWW.BORISSIMCO.COM
Social Media and Emergency Response
Some channels limit the length of message, leading to the possibility of incomplete information
Potential for network overload during a crisis as networks are being upgraded - Users are in charge on social media
Gaining followers before a crisis
Once message is released, it can be manipulated
Threats and challenges present in social media
Twitter users on the ground sent out vital information about the Mumbai Terrorist Attacks, including emergency phone numbers and the location of hospitals that needed blood donations
The Australian Country Fire Authority used Twitter to send out information on the fires, how to donate money and blood, and where to seek emergency help
Red River was cresting at record flood levels in ND and MN. 2,600 people were getting updates delivered on the Federal Emergency Management Agency s (FEMA) Twitter
The Food and Drug Administration (FDA) recalled salmonella-tainted pistachios products. 3,000 people found out through the agencys Twitter feed
Social Media Use in Emergencies
FEMA's tweets informs followers of the locations of Red Cross shelters and how to care for pets during the crisis
Dramatic scenes the US Airways plane that crashed into the Hudson River were first seen on social networking site Twitter
When a gunman opened fire in the Soldier Readiness Center of Fort Hood Hood, TX , Twitter was able to provide news and updates to the public and Soldiers around the world
Emergency Agencies on Twitter
1,244,357
CDC Emergency
254,056
American Red Cross
112,604
FDArecalls
90,855
NIH
52,759
U. S. Army
28,282
FEMA
Emergency Management Groups on Facebook
Information Systems for Crises Response and Management (ISCRAM)
Arkansas Tech University Department of Emergency Administration and Management
Emergency Awareness at the University of Maryland
FSU Emergency Management
Michigan Emergency Management
Mississippi Emergency Management Agency
Braintree Emergency Management Agency
Utah Emergency Management
NYC Emergency Management
"Need a paramedic on corner of John Wesley Dobbs and Jackson St. Woman on the ground unconscious. Pls ReTweet"
This was tweeted instead of dialing 911

### Table 8: Checklist for Airports Looking to Improve Use of Social Media

| Action | Responsibility | Complete |
|---|---|---|
| **Daily Activities** | | |
| Assign individual to establish and maintain Twitter and Facebook sites | Airport Director or designee | ☐ |
| Determine requirements for emergency message boards | Airport Director and Airport Senior Management | ☐ |
| Develop emergency management message boards | Airport Designee | ☐ |
| Inform stakeholders of flight delays (working with airlines) | Airport Designee | ☐ |
| Inform stakeholders of traffic delays | Airport Designee | ☐ |
| Inform stakeholders of security delays (working with TSA or security) | Airport Designee | ☐ |
| Inform stakeholders of parking concerns | Airport Designee | ☐ |
| Respond to stakeholder comments, queries or tweets; correct misinformation | Airport Designee | ☐ |
| Incorporate the use of web-based systems into Social Media Policy | Airport Designee | ☐ |
| Other stakeholder concerns | Airport Designee | ☐ |
| **Pre-Disaster** | | |
| Keep airport status updated | Airport Designee | ☐ |
| Inform stakeholders of planned emergency action preparedness activities | Airport Designee | ☐ |
| Identify airport shelter locations | Airport Designee | ☐ |
| Identify and report airport requirements | Airport Designee | ☐ |
| Respond to stakeholder comments, queries or tweets; correct misinformation | Airport Designee | ☐ |
| **During Disaster Response** | | |
| Keep airport status updated, as able | Airport Designee | ☐ |
| Report shelter locations; status of shelter | Airport Designee | ☐ |
| Respond to stakeholder comments, queries or tweets; correct misinformation | Airport Designee | ☐ |
| **Post Disaster Response** | | |
| Keep airport status updated, as able | Airport Designee | ☐ |
| Report shelter locations; status of shelter | Airport Designee | ☐ |
| Identify and report airport requirements | Airport Designee | ☐ |
| Respond to stakeholder comments, queries or tweets; correct misinformation | Airport Designee | ☐ |

## Funding Airport Emergency Management Applications

### FAA Airport Improvement Program

The Airport Improvement Program (AIP) is a capital improvement grant program. Guidelines exist that usually forbid an airport to access its entitlement or discretionary grant monies for ongoing (daily) or maintenance items for the airport. Items that are currently funded are the actual purchase of plant and equipment for operations (i.e., ARFF equipment) and no personnel or training costs (Kendall Ball, personal communication, August 15, 2011). In a cursory review of some of the large hub airports mentioned earlier, it appears that those airports have used their own revenue streams to purchase emergency management software systems, and those systems are most likely tied into the larger jurisdiction in which the airport is located. Inquiries to two FAA Airport District Offices (ADOs) indicate there has been no funding for such systems to date. However, it would seem that if these systems were AIP-eligible, the smaller airports (non-hub and general aviation) would be able to link to their jurisdiction or state EOCs.

### Houston Airports System

Houston Airports System, as previously noted, bought an Everbridge system using HAS' enterprise fund (Houston, TX, 2011). This was the only specific reference to a funding source found in the searches.

## How TBI Corp Reduced the Cost of Operational Disruptions

This case study investigated how TBI Corp overhauled the way it tracked track day-to-day incidents that ranged from routine malfunctions to full emergencies. It needed a way to streamline time-consuming processes, give decision makers accurate real-time information, and quickly respond when troubles arose. TBI Corp operated eight international airports that needed to keep detailed logs of daily incidents, as well as crisis situations. Operations and management staff relied on this information to ensure that operations were running smoothly and risks were being managed properly. The airports were able to reduce costs and improve operational effectiveness when they implemented MissionMode's incident management and notification system (MissionMode, 2011).

# *Gaps in the Literature*

The IEM team found a good number of resources in this literature review. The team reviewed data from multiple sources to include web-based and non-web-based sources. Some gaps in this literature review were found:

- There was no coherent single place for an airport to go in order to know how to choose a system.
    - There was lack of direction on this issue from the FAA. FAR Part 139 covered airport emergency planning, as well as Advisory Circular (A/C 150/5200-31C). These documents did not specifically indicate any type of systems that an airport should employ to assist in the management of the event. They only indicated that an airport was required to manage the incident.

- There was no tool, user-friendly or not, to help an airport analyze its need for such a system.
- There was very little information on how airports have funded web-based collaboration tools.
- Few sources addressed open protocol systems.
- Security considerations were not addressed in the literature. This included privacy, continuity, and cyber attack vulnerability information.
- Software portability was not generally addressed for the systems.

## Summary of the Literature

Based on a review of the literature, there was no single web-based emergency management collaboration tool or software solution that satisfied all requirements for all airports. Some software applications were useful for tracking aircraft on the ground. Some satisfied requirements for relaying emergency management information required by county or state EOCs. Most states did not have guidelines for the use of emergency management web-based tools to relay airport status information. In some cases, the source code was open, while in other cases, it was proprietary. The IEM team will continue to evaluate these software applications and others as they become known.