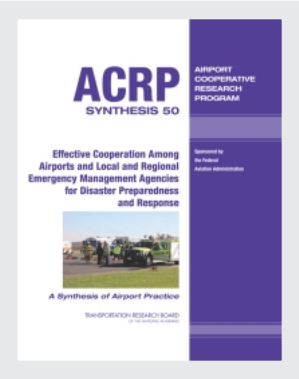

Effective Cooperation Among Airports and Local and Regional Emergency Management Agencies for Disaster Preparedness and Response

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AUTHORS

Smith, James Fielding

AIRPORT COOPERATIVE RESEARCH PROGRAM

ACRP SYNTHESIS 50

Effective Cooperation Among Airports and Local and Regional Emergency Management Agencies for Disaster Preparedness and Response

A Synthesis of Airport Practice

CONSULTANT
James Fielding Smith
Smith-Woolwine Associates Inc.
Floyd, Virginia

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AIRPORT COOPERATIVE RESEARCH PROGRAM

Airports are vital national resources. They serve a key role in transportation of people and goods and in regional, national, and international commerce. They are where the nation's aviation system connects with other modes of transportation and where federal responsibility for managing and regulating air traffic operations intersects with the role of state and local governments that own and operate most airports. Research is necessary to solve common operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the airport industry. The Airport Cooperative Research Program (ACRP) serves as one of the principal means by which the airport industry can develop innovative near-term solutions to meet demands placed on it.

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The ACRP was authorized in December 2003 as part of the Vision 100-Century of Aviation Reauthorization Act. The primary participants in the ACRP are (1) an independent governing board, the ACRP Oversight Committee (AOC), appointed by the Secretary of the U.S. Department of Transportation with representation from airport operating agencies, other stakeholders, and relevant industry organizations such as the Airports Council International-North America (ACI-NA), the American Association of Airport Executives (AAAE), the National Association of State Aviation Officials (NASAO), Airlines for America (A4A), and the Airport Consultants Council (ACC) as vital links to the airport community; (2) the TRB as program manager and secretariat for the governing board; and (3) the FAA as program sponsor. In October 2005, the FAA executed a contract with the National Academies formally initiating the program.

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Primary emphasis is placed on disseminating ACRP results to the intended end-users of the research: airport operating agencies, service providers, and suppliers. The ACRP produces a series of research reports for use by airport operators, local agencies, the FAA, and other interested parties, and industry associations may arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by airport-industry practitioners.

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Cover figure: MMU Airport emergency response exercise, October 2013. *Credit*: DM AIRPORTS, LTD.

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The author wishes to acknowledge the open-handed assistance given by the 67 airports and 35 emergency management agencies that responded to the survey. I also would like to thank the participants in the case examples: Boise International Airport; John Wayne Orange County (California) Airport; Massport–Logan International, Boston; and Western Nebraska Regional Airports and their EM partners. The topic panel and the ACRP project officer throughout provided sound advice and encouragement. The author is especially grateful to Carol White for outstanding editorial advice and guidance.

FOREWORD

Airport administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to the airport industry. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire airport community, the Airport Cooperative Research Program authorized the Transportation Research Board to undertake a continuing project. This project, ACRP Project 11-03, "Synthesis of Information Related to Airport Practices," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an ACRP report series, *Synthesis of Airport Practice*.

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

By Gail R. Staba
Senior Program Officer
Transportation Research Board

This synthesis study is intended to inform airport operators and local and regional emergency management agencies about how airports cooperate effectively with local and regional emergency management agencies for disaster preparedness and response, relationships, structures, and systems (formal and informal) in place among airports and emergency management agencies as well as on the methods for airport operators to coordinate and collaborate with local, state, and federal agencies with jurisdiction at airports during a major disaster. Potential solutions for unique issues and challenges for airport operators during disasters (e.g., local practices, regulatory limitations such as revenue diversion, jurisdictional considerations, operational complexities, airport size) were sought and documented. Four case examples were developed to document effective practices.

Information used in this study was acquired through a review of the literature and interviews with airport operators and industry experts.

James Fielding Smith, Smith-Woolwine Associates, Inc., Floyd, Virginia, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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Note: Many of the photographs, figures, and tables in this report have been converted from color to grayscale for printing. The electronic version of the report (posted on the Web at www.trb.org) retains the color versions.

EFFECTIVE COOPERATION AMONG AIRPORTS AND LOCAL AND REGIONAL EMERGENCY MANAGEMENT AGENCIES FOR DISASTER PREPAREDNESS AND RESPONSE

SUMMARY

Airports frequently cooperate closely with local emergency management (EM) agencies in preparing for, responding to, and recovering from disasters. While crucial to a successful outcome, such coordination presents complex challenges, as a wide array of personnel and materiel must be orchestrated under unpredictable conditions. In preparing to respond to disasters, airport and EM leaders can benefit from understanding how their peers in the field address the issues of cooperation and coordination.

This study began with a literature review regarding collaborative efforts among all sorts of organizations and among airports and EM agencies in particular; that research guided the subsequent selection of participants and the development of on-line surveys. Sixty-seven airports and 35 local or regional EM agencies completed surveys regarding their current policies and practices. Follow-up interviews added depth. From that group, case studies of four airports—a large hub, a medium hub, a small hub, and a commercial service airport—were developed to investigate real-world practices. One case example also includes a reliever airport and a general aviation airport. The response rate was 93% for airports (67 of 72); and 66% of EM agencies (35 of 53). A very high degree of agreement concerning effective policies and benefits was found among airports, among EM agencies, and between the two groups.

Essential elements of successful management practices with respect to collaboration emerged from a synthesis of the literature review, surveys, and interviews. These elements are identified and described to assist airport executives, their governing boards, and personnel in developing effective mutual aid agreements to improve the preparedness and resiliency of airports and their surrounding communities.

In the four case examples, airports and their EM partners focus most strongly on activities required by regulations, at least by regulations applying to the airports. There is also a suggestion that peer reviews are an emerging trend among airports, with the process perhaps more advanced among airports than among EM agencies. Leadership, structural approaches to relationship building, communication, and personal traits were found by the case example partnerships to be essential to developing and sustaining airport-EM agency relationships. The issue of revenue diversion was found to be a concern but not generally an obstacle, to successful collaboration.

CHAPTER ONE

INTRODUCTION

When disasters strike, airports often provide vital resources and functions for their communities. In many cases, they also call on other agencies for help maintaining and restoring operations both during and after emergencies. In order to ensure effective preparedness and response, airport operators and local and regional emergency management (EM) agencies must proactively address the unique challenges they face in managing the complexities of providing and receiving assistance during disasters.

The basic premise underlying this study is that good relationships between airports and their EM partners lead to more effective responses to emergencies and disasters. This is an assertion that this study is not designed to test. The assumption is that the respondents involved in the surveys and case examples believe in the truth of this premise to the extent that they are willing to invest time and effort into building and sustaining the relationships.

This synthesis describes and discusses cooperation between airports and local and regional EM agencies. The study focuses on how airports and their EM partners establish and sustain effective working relationships, and it also examines methods of identifying problems and rebuilding damaged relationships. Airports recognized by peers or researchers as having good relationships with their EM partners were favored in the selection of participants for this study.

This document will be useful to airports of varying governance structures and size in terms of employee depth and functionality; as well as to traditional emergency response mutual aid partners such as local government agencies, private partners, and airlines. It provides airports and their emergency response allies access to a full range of policies, programs, practices, and relationships found effective in establishing and sustaining good working relationships.

TYPES AND MODES OF COOPERATION

In general, cooperation among organizations seeks to achieve "the optimal allocation of such resources as assets, personnel, equipment and technology, etc., and rational distribution of interests by all subjects of cooperation to realize their own value goal under a certain institutional environment" (Feng et al. 2010, p. 97).

Among the possible modes of cooperation, multi-stakeholder cooperation is favored for the management of complex EM situations. Tong et al. (2011) applied evolutionary game theory to compare the behavioral strategies of cooperation and noncooperation, finding that cooperation was the winning strategy. However, they also found that sustaining cooperation required correction of noncooperation and strong supervision by senior managers.

Waugh and Streib (2006) demonstrated that "collaboration is a necessary foundation for dealing with both natural and technological hazards and disasters and the consequences of terrorism" (p. 131). They recommend a number of methods for improving collaborative activities, such as optimizing the use of networks. Their ultimate conclusion is that new leadership strategies are needed that derive impetus from "the transformative power of a compelling vision, rather than from hierarchy, rank, or standard operating procedures" (p. 139).

A number of studies examine various aspects of cooperative EM at airports. *ACRP Report 88: Guidebook on Integrating GIS in EM at Airports* (Barich et al. 2013) describes the use of geographical information systems (GIS) to enhance the effectiveness of EM at airports, including coordination with outside EM agency partners. ACRP Project 04-12, *Integrating Web-Based Emergency Management Collaboration Tools into Airport Operations*, provides a primer for airports on choosing and using web-based systems to enhance internal EM and cooperation with external partners (IEM, Inc., et al. 2013). Smith (2012a) looked at the airport-community partnership for resiliency, finding that close collaboration among stakeholders promotes the resiliency of both parties.

ASYMMETRICAL NATURE OF THE RELATIONSHIP

Airports and some of the EM agencies in this study are first responders who have a responsibility to take action under statutes or regulations. This is true of agencies such as fire departments, law enforcement agencies, and health departments. On the other hand, EMs have the power to convene collaborating agencies (James G. Featherstone, personal communication, Feb. 9, 2011; Fred McCosby, review comments, Oct. 11, 2013). Their role is typically limited to coordination, communication, planning, and training. It is crucial for all members of airport-EM agency partnerships

to recognize this asymmetry and to exploit its benefits as fully as possible.

SCOPE OF THE STUDY

Information regarding the following issues was collected, considered, and synthesized:

- Relationships, structures, and systems (formal and informal) in place among airports and EM agencies
- Methods for airport operators to coordinate and collaborate with local, state, and federal agencies with jurisdiction at airports during a major disaster
- Potential solutions for addressing unique issues and challenges for airport operators during disasters (e.g., local practices, regulatory limitations such as revenue diversion, jurisdictional issues, operational complexities, airport size)
- Case examples of effective practices.

Mutual aid agreements are a major tool in shaping and managing relationships between airports and EM agencies. They are the subject of *ACRP Synthesis 45: Model Mutual Aid Agreements for Airports* (Smith and Kenville 2013), and are therefore outside of the scope of this study.

STUDY METHODOLOGY

This study combined a literature review, results of which were used to select the airports for the survey; the eventual survey of selected airports; and four case examples.

Literature Review

Available literature on 26 topics associated with airport-EM relationships was reviewed using searches in both the open web (using Google.com) and the deep web (using the TRB database, ProQuest, EBSCO, LexisNexis, and LLIS, the Lessons Learned Information Sharing program of DHS/FEMA). Peer-reviewed literature in the field of airport-EM relationships is severely limited, but an aggressive search strategy revealed a number of pertinent documents. Previous ACRP research and synthesis reports provided helpful information. The results of the literature review presented in more detail in chapter two.

Survey

Survey Methodology

A pair of online surveys was devised, one for airports and one for EM agencies. The questionnaires asked parallel questions about tools, methods, policies, and procedures used by the agencies in an effort to determine if the partners agreed on the tools they recommended as well as those they actually used.

Selection of Airports

Based on his professional knowledge, and in consultation with the topic panel, the consultant selected 72 airports. Ten airports were selected in each of the seven National Plan of Integrated Air Systems (NPIAS) categories: large hubs (LH), medium hubs (MH), small hubs (SH), non-hub primaries (NH-P), commercial service airports (CS), relievers (R), and general aviation (GA). Airports in six NPIAS categories (LH, MH, SH, NH-P, R, and GA) were chosen because they are known for strong, productive relationships with their EM partners. For CS airports, the 10 airports were selected to ensure geographical balance, but there were no data regarding the state of their relationships with EM partners. Besides the 70 U.S. airports, two Canadian airports comparable in size to U.S. large hubs, and included as such in Figure 1), were selected to add the perspectives of privatized operators and a non-U.S. operational and regulatory environment. The final rationale for airport selection was likelihood of response.

Table 1 places the samples in the context of the total number of airports in each category. Appendix B lists the airports that participated in the study and shows their NPIAS classifications, airport locations, and FAA regions.

Of the 72 airports whose executives were asked to participate in the online survey, 67 responded (93%). The survey was left open for seven weeks, during which time two follow-up e-mails were sent and one round of follow-up telephone calls were made in an effort to maximize response.

[It should be noted that the airports were selected in May 2013 before the final enplanement data for 2012 was available. As a result of that data, the NPIAS categories of five airports changed from 2011 to 2012. For example, Astoria Regional Airport changed from CS to GA, and Concord Regional Airport began its change from GA to NH-P. The original 2011 classifications were used in this study.]

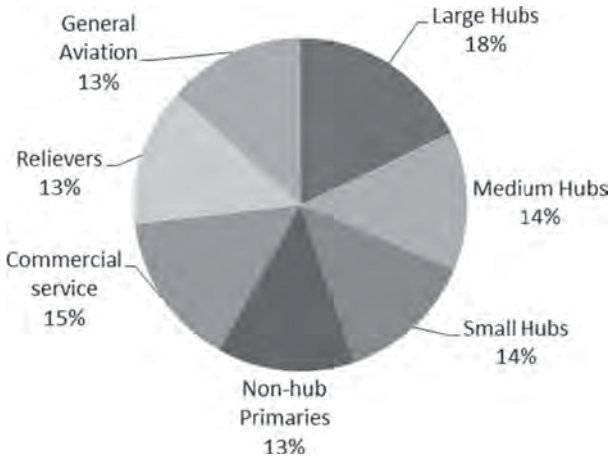


FIGURE 1 Airports by NPIAS category.

TABLE 1
PUTTING SURVEY AIRPORTS INTO CONTEXT AMONG ALL AIRPORTS IN THEIR CATEGORIES

NPIAS Category	Airports in Survey	Total Airports in Category	Percent of Category Surveyed
Large Hub	10 + 2 Canadian	29 (FAA 2013)	34
Medium Hub	9	33 (FAA 2013)	27
Small Hub	9	76 (FAA 2013)	12
Non-hub Primary	9	239 (FAA 2013)	4
Commercial Service	10	139 (FAA 2013)	7
Reliever	9	268 (FAA 2012b)	3
General Aviation	9	3436 Publicly owned, public use (FAA 2010b)	0.3

TABLE 2
CHARACTERISTICS OF CASE EXAMPLES

	NPIAS Category						
	LH	MH	SH	NH-P	CS	R	GA
Airport coordinates 1:1 with outside agencies	Massport BOS				Western Nebraska Regional BFF		
Airport uses city or county EOC to coordinate		John Wayne SNA	Boise BOI				

Selection of EM Agencies

As part of the airport survey, each airport was asked to identify its primary, most important, or most interesting local or regional EM partner. For this study, an emergency agency could be an agency with EM in its name or mission statement, or it could be a first responder agency or mutual aid partner such as a fire department, sheriff's department, or police department. The criteria were flexible, with the final choice left to the airports.

Fifty-three of the 67 responding airports identified EM partners (79%), and invitations were e-mailed to those contacts. Of the 53 agencies contacted, 35 participated in the online survey, a response rate of 66% (49% based on the 72 airports originally contacted).

Case Examples

As shown in Table 2, the seven NPIAS categories and the two basic approaches—whether the airport facilitates coordination or the airport uses local EM agency to coordinate—yield a matrix of 14 distinct combinations. However, the study design was limited to four case examples. The four selected—Boise International Airport (BOI), John Wayne (Orange County, California) Airport (SNA), Massport [primarily Boston Logan International Airport (BOS), but also Hanscom Field (BED) and Worchester Airport (OHR)], and Western Nebraska Regional Airport (BFF)—reflect the use of data from the surveys and previous studies to attempt to balance the two approaches and to represent different NPIAS categories.

In addition to the four case examples, follow-up interviews on the topic of revenue diversion's being a potential barrier to airport-EM agency collaboration suggested a fifth and more specific comparison of the approaches of two airports, Denver International Airport (DEN) and Jackson–Medgar Wiley Evers International Airport (JAN), to that issue.

Data Analysis

Survey data were organized and analyzed using graphical analysis and thematic content analysis (qualitative analysis). Results are shown in Figures 3 through 6 and Tables 3 through 8, and the data analysis is discussed in chapters three through five. Quantitative statistical analysis was not appropriate, primarily because of the lack of randomization.

CHAPTER TWO

LITERATURE REVIEW

The primary focus of the literature available on relationships between airports and their EM agencies was on background information, successes, and problems with such relationships. The search strategy shown in Figure 2 was followed.

As already noted, this present study does not include airport mutual aid agreements, as they were the subject of *ACRP Synthesis 45: Model Mutual Aid Agreements for Airports* (Smith and Kenville 2013). Airport-to-airport mutual aid, which also has possible consequences for airport-EM agency relationships, is also not included in this literature review, as it was the subject of *ACRP Report 73: Airport-to-Airport Mutual Aid Programs Guidebook* (IEM et al. 2012).

ROLES OF NATIONAL INCIDENT MANAGEMENT SYSTEM AND INCIDENT COMMAND SYSTEM

Federal law requires all state and local entities, including airports, to adopt the National Incident Management System (NIMS) to receive federal preparedness assistance through grants, contracts, or other activities (White House 2003; FEMA 2008). NIMS provides a multi-agency system for coordinated and integrated preparedness, response, and recovery efforts. The Incident Command System (ICS), a major component of NIMS, provides a flexible and scalable system for multiple agencies and disciplines to manage emergencies and planned events. It is used by local, state, and federal agencies to provide a multi-jurisdictional unified effort to manage aircraft incidents, natural disasters, industrial accidents, and pre-planned events such as a large protest or a major sporting event (Arif Alikhan, personal communication, Oct. 11, 2013).

RELATIONSHIP TO AIRPORT EMERGENCY PLANS AND PLANNING

Around 2005, all Part 139 airports (that is, all airports with scheduled service by commercial planes with 10 or more seats) began training efforts to integrate NIMS and ICS fully into their Airport Emergency Plans (AEPs), but NIMS compliance was not mandatory until the issuance of FAA Advisory Circular 150/5200-31C in 2009. The advisory circular also strongly encouraged an inclusive approach to involving stakeholders, especially mutual aid partners, in the planning process.

By July 2011, all such airports had rewritten their AEPs to comply with the advisory circular. However, many of the new AEPs have not yet been fully reconciled with local, regional, and state emergency plans developed and maintained by local and state EM agencies. One of the goals of this present study is to examine the extent of efforts toward reconciling AEPs with the plans of supporting agencies.

RELATIONSHIP TO LOCAL, REGIONAL, STATE, AND NATIONAL PLANS AND PLANNING

The primary national guidance for EM planning is FEMA's 2010 *Comprehensive Preparedness Guide* (*CPG*) *101*. The guide focuses heavily on collaborative planning to prepare communities for natural and manmade disasters. Its methods are directly transferrable to airports and to airport-EM relationships. Three papers by Smith (2010 a, c, 2012a) provide the most complete survey existing of airport emergency planning in the context of local, regional, state, and national plans and planning. Smith (2012a) examined plans involving both local and statewide collaboration.

As of 2012, only a handful of states—Arkansas (2010), Florida (2009), Louisiana (2008), and Washington State (2006, 2011) had any sort of integrated statewide disaster plan that coordinated EM, airports, and air operations.

Perkins (2013) studied airport EM in the context of regional disaster response, recovery, and long-term economic recovery in the San Francisco Bay Area. *ACRP Report 12: An Airport Guide for Regional Emergency Planning for CBRNE Events* (Stambaugh et al. 2009) examined the history of regional and national planning for chemical, biological, radiological, nuclear, and explosive incidents; and recommended improving collaborative planning efforts.

Smith (2012a) concluded that the paucity of top-down initiatives to facilitate coordinated planning between aviation and EM meant that bottom-up collaboration based on community ties was more likely to drive effective collaboration.

NATURE AND LEVEL OF COORDINATION AND COOPERATION

The type and degree of cooperation achieved between airports and their EM partners vary widely. For example, Massport (Boston Logan) and more than 100 local, regional, state, and national agencies (Smith 2010a) have achieved a

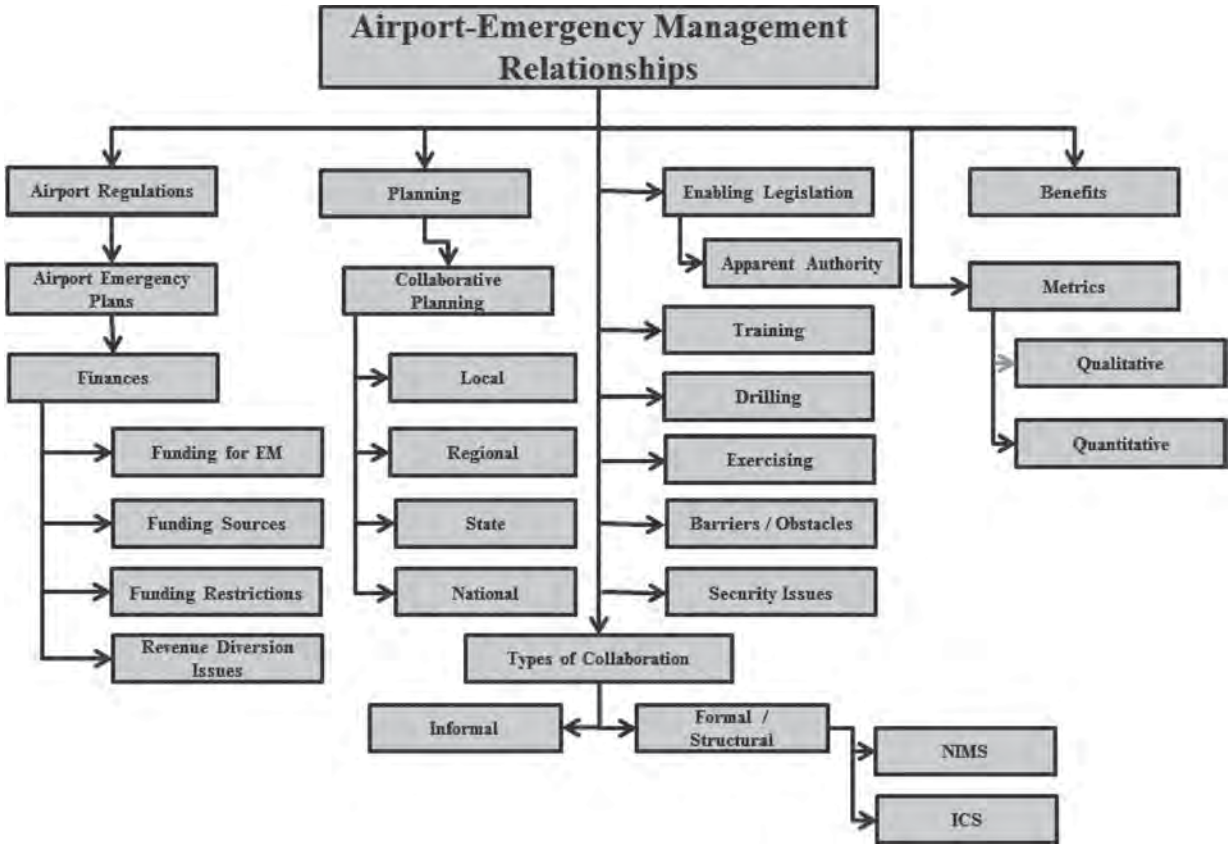


FIGURE 2 Literature map.

very high level of coordination and cooperation. However, a different situation existed between Los Angeles International Airport and its partners prior to 2011 (Los Angeles Mayor's Blue Ribbon Panel Report 2011). Many airports such as Los Angeles historically held the view that they had a unique mission and type of regulation, and that these features prevented close collaboration, or even mutual understanding, with other local agencies. This viewpoint has gradually changed in recent years, with much of the change being driven by Advisory Circular 150/5200-31C (Smith 2010b; Los Angeles Mayor 2011).

An example of effective communication that promotes coordination and cooperation between an airport and its EM agency partners is the monthly PHX EP Bulletin that Phoenix Sky Harbor International Airport shares with its partners and with other airports (PHX 2013). An example of this newsletter is reproduced as Appendix C.

NATURE AND FREQUENCY OF JURISDICTIONAL MEETINGS HELD

The literature search revealed many examples of minutes and agendas for airport boards, local EM boards, emergency operations boards, and similar oversight or coordinative bodies. The frequency of meetings ranged from daily all-stakeholder briefings, like those as Boston Logan International Airport (Smith 2010b), to quarterly meetings. Monthly meetings appeared to be the most common, with weekly meetings the next most common; none of the airport–local agency groups met less frequently than quarterly. Thanks to public records and sunshine laws, most public boards are required to publish meeting announcements, agendas, and minutes.

ENABLING LEGISLATION

The main enabling legislation from the airport side is the body of federal aviation and airport legislation. For commercial airports, the statutes are implemented by federal regulations (14 CFR § 139), which in turn is explained by FAA Advisory Circular 150/5200-31C.

The primary national legislation governing EM is the Stafford Act (Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended). Most other legislation that governs local EM agencies is state legislation, which varies widely from state to state. About half of the states have a mutual aid system or pool that includes all public agencies, which would include airports in the U.S. (Smith and Kenville 2013). Most cities, counties, and other units of local government set policies and procedures by ordinance. Such policies and procedures can regulate the relations between airports and EM agencies when either or both fall

under the jurisdiction. For an example of such policies and procedures, see the Los Angeles Mayor's Blue Ribbon Panel Report (2011, p. 87).

SECURITY ISSUES

Since airports are high-security areas, all airport-EM agency interactions at the airport must satisfy the security requirements of the airport security program and the Transportation Security Administration (TSA) (49 CFR §1542). ACRP Report 73, (IEM et al. 2012) documented various methods used by airports to satisfy airport security requirements when outside agency personnel must enter the airport's secure areas. *ACRP Report 65: Guidebook for Airport Irregular Operations* (*IROPS*) *Contingency Planning* (Nash et al. 2012), provides TSA-compliant procedures for dealing with access and security during irregular operations. *ACRP Report 65* also contains checklists for airports and their partners.

PEER REVIEWS OF PLANS, PROGRAMS, AND PROCEDURES

There are opportunities among airports and among EM agencies to review each other's EM plans, programs, and procedures. This could take the form of a peer review; or it could involve a self-review of an airport's or agency's own emergency procedures in light of an actual incident at another airport (Arif Alikhan, personal communication, Oct. 11, 2013).

FUNDING IMPLICATIONS

Most of the measures supporting airport-EM agency relationships are inexpensive compared to the other types of operating and capital costs of both types of organizations (Los Angeles Mayor 2011). The main funding aspect that applies to these relationships is revenue diversion. The FAA's revenue diversion policy (FAA 1999) clearly restricts the use of airport revenues to activities directly supporting the aviation mission of the airport. The policy allows the "expenditure of airport funds for support of community activities . . . if such expenditures are directly and substantially related to the operation of the airport" (FAA 1999, p. 7718). Interpretation and enforcement of this policy is left up to the FAA regional offices. *ACRP Legal Research Digest 2: Theory and Law of Airport Revenue Diversion*, examines the full range of issues with revenue diversion, not just those with EM (Dempsey 2008).

The literature review uncovered no instance in which the FAA's interpretation interfered with collaborative work between an airport and an EM partner, even in cases where airport equipment and personnel were employed away from the airport for non-aviation purposes. This issue was also examined in *ACRP Report 73: Airport-to-Airport Mutual Aid Program Guidebook* (IEM et al. 2012).

IMPLICATIONS FOR EQUIPMENT

Concerns regarding equipment related to airport-EM agency relationships fall into two categories. Both categories are created by regulations incumbent on the airport. The first concern is the Aircraft Rescue and Fire Fighting (ARFF) Index of the airport, and the absolute requirement that the index be met if the airport is to be open for operations. An airport's index depends on the largest size of commercial airliner regularly scheduled at that airport. For each of the five levels of index, a specific level of manpower and equipment must be present on the airport and capable of reaching the farthest point on any runway within three minutes. IEM et al. (2012) examined the restriction that this requirement puts on an airport that might otherwise wish to dispatch specialized equipment or personnel off-airport for a non-aviation incident in support of a local EM agency partner.

The second concern is revenue diversion, as discussed in the preceding section.

TRAINING, DRILLING, AND EXERCISING

The primary training requirement related to airport-EM collaboration is the combination of NIMS and ICS training. There is no national standard for EM training.

The main determinant of drill and exercise schedules involving airports are the requirements of 14 CFR §139 for an airport to remain certified for commercial passenger operations. The minimum requirement is that airports conduct annual reviews of their AEP and a tabletop exercise with a full-scale functional exercise ("recertification or triennial exercise") once every three years. The triennial exercise now almost always includes a mass casualty component.

BARRIERS

No sources were uncovered that dealt with barriers to airport-EM agency collaboration or relationships. Literature was found that discussed barriers in other industries such as education (USDE n.d.) and hospitals (Center for Studying Health System Change 2012). In those cases, the primary barrier to collaboration was the pressure of normal operations, which excluded or diminished attention to preparation for rare events such as disasters.

BENEFITS

Smith et al. (2007, 2008a, b) looked at the potential benefits to airports in terms of operational sustainability or resiliency from concerted collaboration with EM partners. Smith (2012a) documented the benefits of close working relationships between GA airports and their communities. Babun and Smith (2013a, b, c) examined the benefits of close collaboration between airports,

EM agencies, other agencies, and airlines; and cataloged the benefits based on a pilot study at Las Americas International Airport in Santo Domingo.

Tanger and Clayton (n.d.) examined the benefits to airports from achieving resilience through collaboration with all their stakeholders including EM agency partners. The major advantages of collaboration are clearly defined roles and responsibilities; coordinated management of passenger welfare; and effective allocation of operational equipment and resources. Their study was based on consultative assessments of 30 major airports worldwide. Dunaway and Shaw (2010) investigated the influence of collaborative partnerships on private sector preparedness and continuity planning, but did not define or measure benefits.

METRICS USED FOR AIRPORT–EMERGENCY MANAGEMENT AGENCY RELATIONSHIPS

No literature proposing or documenting quantitative metrics for the effectiveness of airport-EM agency relationships was found.

CHAPTER THREE

SURVEY RESPONSES

Sixty-seven (67) airports completed the initial surveys. Table 3 illustrates the geographical distribution of responding airports, which represent 33 states in all regions of the United States except Hawaii and Alaska, as well as two provinces in Canada. Thirty-five (35) local or regional EM agencies in 22 states across all regions of the United States except Hawaii and Alaska also responded. Table 4 shows the distribution of the respondents among the nine FAA regions. Figure 3 shows the states that are in each FAA region.

Figure 4 illustrates the type of EM position by NPIAS category of respondent. As with all results in this study, it is important to remember that the airports in all NPIAS categories except CS were selected in the expectation that they had good working relationships with their local and regional EM agency partners. This pre-selection most likely indicates that the results shown in Figure 4 are skewed towards having some sort of dedicated EM position on the airport staff.

Interesting patterns emerged from the initial analysis. Large and medium-hub airports (LH and MH) are more likely to have a full-time emergency manager. Small hubs are considerably less likely, perhaps because they are more sensitive to pressure from airlines regarding rates and charges and the related need to justify positions (Bonnie Wilson, personal communication, Sep. 6, 2013). The large number of full-time emergency managers at reliever and GA airports is accounted for by the inclusion of six very busy airports (e.g., Morristown Municipal Airport) in the sample. The close relationship between GA airports and their local partners documented in Smith (2012a) probably also explains the "None" responses reported for R, CS, NH-P, and perhaps SH. Clearly, a combination of financial constraints and local trust influences actual practice.

MODE OF COORDINATION WITH OUTSIDE RESPONDERS

The airport survey asked respondents to identify the airport's main point of contact for coordinating with local agencies. As can be seen in Table 5, nearly half (48%) the airports reported that an emergency manager or emergency operations center (EOC) coordinates one-to-one with the various outside response partners; almost the same number (46%) use a local EM agency to coordinate on behalf of the airport. In some cases, the outside coordinating agency is the local fire department, especially when the ARFF station for the airport belongs to the local fire department rather than to the airport itself.

Considering whether to have a full-time emergency manager or someone with EM as a major collateral duty (20%–50% of full time) is related to the choice of coordination mode, as airports with a full-time emergency manager have a strong tendency to handle their own multi-agency coordination. Airports with part-time emergency managers or no dedicated emergency manager position tend to use a local or regional EM agency for coordination. As seen in Table 5 and Figure 3, larger airports are more likely to have full-time emergency managers. A large airport is also more likely to have an extensive, highly capable EOC of its own. These two factors most likely account for the tendency for such airports to coordinate one-to-one with outside agencies rather than employing an independent agency for coordination. The eight airports that indicated "Other" for this question apparently have not experienced formal coordination. Most likely, they coordinate directly with outside agencies, but this cannot be tested with the data gathered in this study.

The mode of collaboration is sometimes conditioned by state law or statewide mutual aid arrangements. An example of this occurs in California, where the Standardized EM System (SEMS) was created pursuant to the California Emergency Services Act. SEMS prescribes the general shape of collaboration among public agencies in the state, including cities, counties, airports, and independent public agencies. A few other states have similar arrangements, and about half have statewide mutual aid compacts or pools for emergency response (Smith 2012a; Smith and Kenville 2013).

SATISFACTION WITH THE RELATIONSHIP

Both surveys asked the respondents to rate their satisfaction with the relationship between the local EM agency and the airport:

1. Highly unsatisfactory
2. Somewhat unsatisfactory
3. Uneven
4. Somewhat satisfactory

TABLE 3
GEOGRAPHIC DISTRIBUTION OF SURVEY RESPONSES

State or Province	Responding Airports	Responding EM Agencies	State or Province	Responding Airports	Responding EM Agencies
Alabama	1	0	New Hampshire	1	0
Arizona	4	2	New Jersey	1	1
California	8	4	New Mexico	1	1
Colorado	2	2	Ohio	3	2
Florida	3	2	Oregon	2	0
Georgia	1	1	Pennsylvania	1	1
Idaho	2	1	South Dakota	1	0
Illinois	1	0	Tennessee	2	1
Louisiana	2	1	Texas	8	4
Massachusetts	3	2	Utah	1	0
Michigan	2	0	Virginia	2	2
Minnesota	4	2	Washington	1	1
Missouri	2	1	West Virginia	1	0
Mississippi	1	0	Wyoming	1	0
North Carolina	1	0	Alberta	1	1
North Dakota	1	1	Ontario	1	1
Nebraska	1	1	Total	67	35

Source: J.F. Smith.

TABLE 4
FAA REGIONS OF SURVEY RESPONSES

	Airports	EM Agencies
Alaskan	0	0
Central	3	2
Eastern	5	3
Great Lakes	12	6
New England	4	2
Northwest Mountain	9	5
Southern	11	4
Southwest	11	6
Western-Pacific	12	5
Non-FAA (Canada)	2	2
Total	67	35

Source: J.F. Smith.

5. Highly satisfactory
6. No opinion.

Figures 5 and 6 display the distribution of responses for airports and EM agencies, respectively. Both groups are highly satisfied with their relationships, but airports report a higher level of satisfaction than do EM agencies (81% vs. 68%). However, this difference nearly disappears if the responses "highly satisfactory" and "somewhat satisfactory" were conjoined, which would produce a 93% satisfaction for airports and 91% satisfaction for EM agencies. The similarity of opinions is striking.

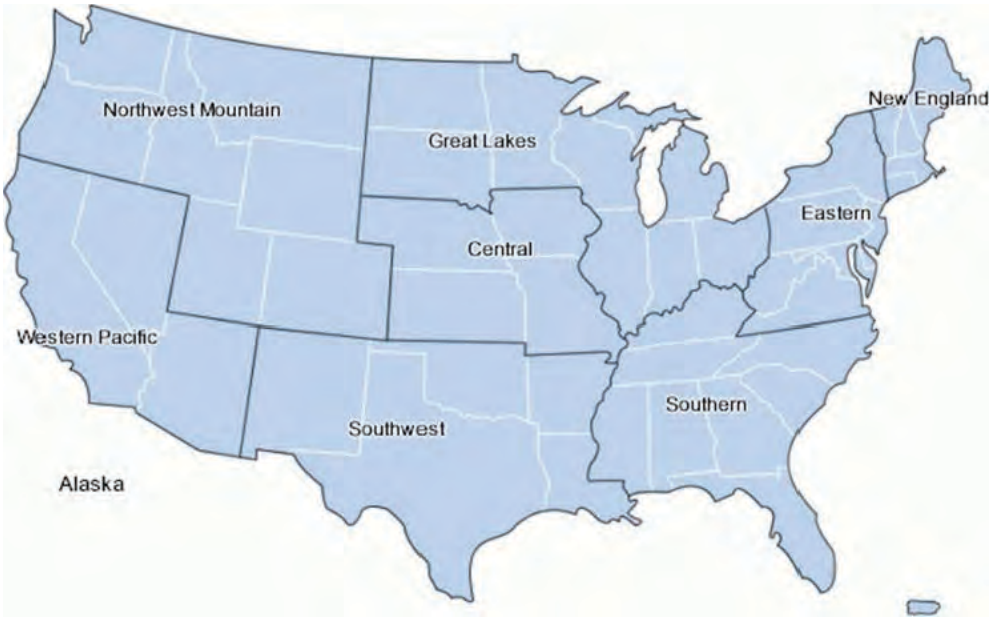
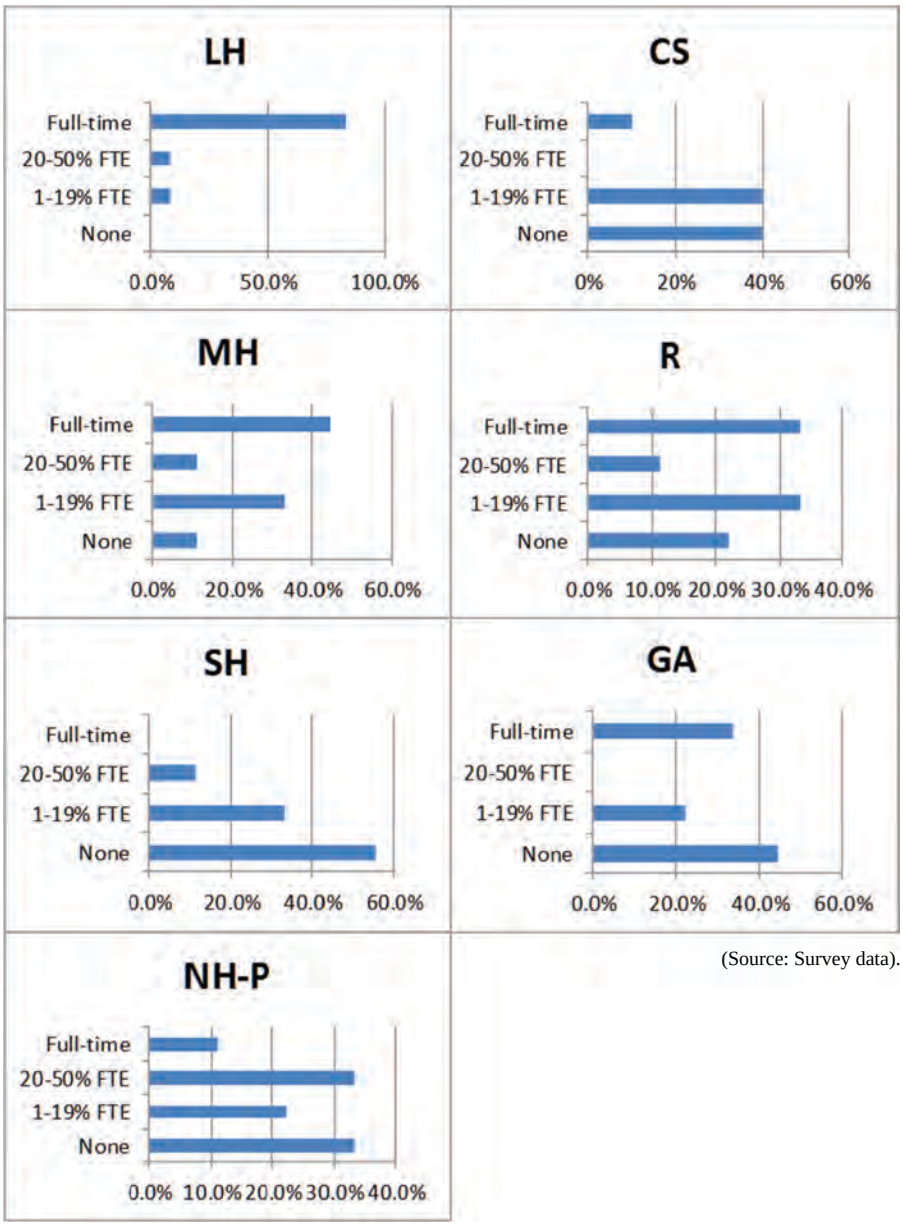


FIGURE 3 FAA regions (*source*: www.globalair.com).



(Source: Survey data).

FIGURE 4 Type of airport emergency management position by NPIAS category.

TABLE 5
DEDICATED AIRPORT EMERGENCY MANAGEMENT POSITIONS AND COORDINATION MODES

	Coordination Mode		
Type of EM Position	Airport EM or EOC coordinates 1:1 with outside agencies	Airport uses local or regional EM agency to coordinate	Other
Full-time Airport EM	16	5	1
EM as Major Collateral Duty	2	6	0
EM as Minor Collateral Duty	8	10	0
No Dedicated Position	5	11	3
Total	31	32	4

Source: J.F. Smith.

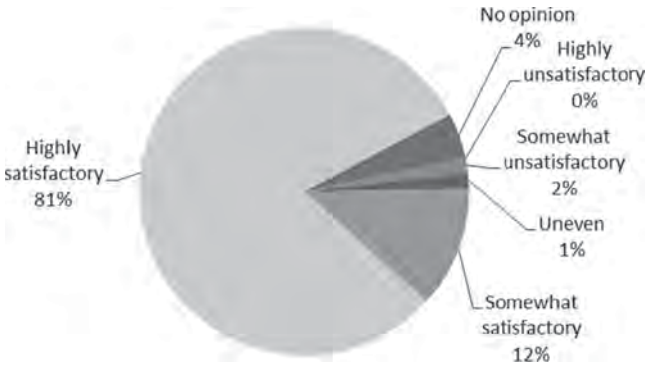


FIGURE 5 Airport satisfaction with relationship (*source:* J. F. Smith).

The data summarized in Figures 4 and 5 strongly suggest that the intention of selecting airports that have productive working relationships was achieved, making it more likely that the strategies and approaches revealed in the closed-ended and open-ended questions in the surveys do indeed work to build and sustain solid relationships.

PRACTICES, TOOLS, METHODS, AND POLICIES ACTUALLY USED

The surveys asked the airports and EM agencies if they used 27 specific practices, tools, methods, or policies to promote good working relationships. The same list of 27 practices was used in both surveys. The surveys also asked respondents to list any other practices that they have used. Table 6 illustrates the responses of the airports and of their EM partners. The percentages for airports are based on all 67 airport responses; the percentages for EM agencies are based on the 35 emergency agency responses. Examination of the raw data indicated no reason to exclude airports for which there was no EM response. Percentages were used to put both sets of responses on the same basis. The practices are listed in descending order of reported use by the airports.

The airport and EM agency responses are similar as would be expected from the intense effort to professionalize the theory and practices of EM in the past 30 years (Britton 1999; Drabek 2007). The general promulgation of NIMS in 2003 and its explicit extension to airports in 2009 have intensified the sharing of professional approaches between airports and EM agencies. Here, too, the similarity of responses can also be expected based on the judgment that the partners have excellent working relationships.

There are, however, some significant differences in the responses of airports and EM agencies. In Table 6, practices for which reported use rates differ by 10% or more are indicated by the shaded box in the "Difference" column. For example, the greater emphasis placed by EM agencies on joint drilling reflects their reliance on drills to prepare for rare events, whereas airports are bound by FAA regulations that require regularly scheduled drills and exercises. Similarly, the lower reported use of triennial exercises by the EM agencies may reflect the long time between such drills and the effect drill scenarios have on which EM agencies participate in them. EM agencies also appear to be less interested than airports in having a dedicated liaison person from the airport. Similarly, EM agencies are less interested in having an airport representative present (actually or virtually) in the EOC.

According to the survey responses, airports are clearly further along in utilizing peer review for plans and programs than the EM agencies airports designated as their most important, frequent, or illustrative partners. EM agencies are far more interested in periodic evaluations of the effectiveness of the relationship. This may be the result of airports viewing operations as their primary mission, whereas EM agencies overwhelmingly focus on relationships, coordination, and communication.

Of particular interest are the differences related to EM positions at airports. Far more EM agencies want dedicated airport emergency managers than do airports themselves.

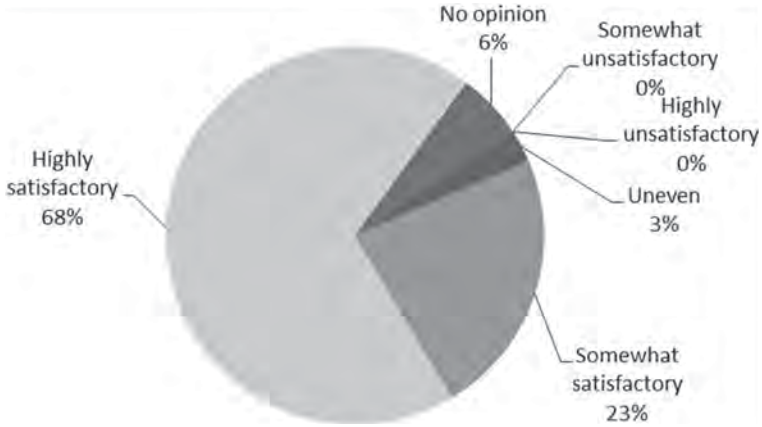


FIGURE 6 Emergency management agency with relationship (*source:* J. F. Smith).

TABLE 6
PRACTICES, TOOLS, METHODS, AND POLICIES ACTUALLY USED BASED ON CLOSED-ENDED SURVEY QUESTIONS

Practice, Tool, Method, or Policy	Airports %	EM Agencies %	Difference
Tabletop exercises	78	72	–6
Joint drilling	69	88	+19
Functional exercises including full-scale exercises	67	75	+8
Joint planning	66	63	–3
Regular meetings with partners	64	59	–5
ICS training	57	56	–1
NIMS training	55	53	–2
EM agency observing airport exercises	55	50	–5
EM agency participation in triennial exercises	55	34	–21
Airport has designated liaison person to EM agency	51	34	–17
Physical or virtual presence in each other's EOC	48	38	–10
Airport-specific training for EM agency personnel	46	44	–2
Airport observes EM agency exercises	42	44	+2
Airport participates in regional emergency or disaster coordination effort	39	47	+8
EM agency-specific training for airport personnel	36	44	+8
EM agency has designated liaison person to airport	29	28	–1
Peer review of plans by other airport or EM agency	22	19	–3
Peer review of programs by other airport or EM agency	22	3	–19
Airport has dedicated EM position on airport staff	19	53	+34
Airport and EM agency periodically evaluate effectiveness of relationship	19	44	+25
Joint participation at outside functional training provided by state, university, or federal agency	19	25	+6
Airport has EM assigned as major collateral duty to mid-level or senior manager	18	28	+10
Formal EM accountability system to mayor, board, or other sponsor or owner of airport	15	0	–15
Airport knows FEMA regional representative and has written procedure for contacting FEMA	13	22	+9
Airport knows EMAC procedure and contacts	13	19	+6
Peer review of training by other airport or EM agency	12	3	–9
Airport has EM assigned as major collateral duty to lower level manager	3	0	–3

Source: J.F. Smith.

This may reflect a desire for an easier way to connect through shared professional knowledge, or it may reflect the effects of recent budgetary constraints on EM agencies that cause those agencies to seek help from the airports. The EM agencies are even more emphatic than airports that the airport emergency managers be mid-level or senior executives. Lastly, 15% of airports reported having a formal accountability system to report on EM issues to the mayor, board, or other sponsor or owner of the airport; none of the 35 EM agencies reported having any formal accountability system.

In addition to data on the 27 listed practices, airports reported 23 other practices in the closed-end portion of the survey. EM agencies reported five such practices, all of which were also on the airports' lists. Similar responses were aggregated when it did not result in loss of meaning. Table 7 summarizes the data from the open-ended question.

Although the percentages of airports that reported each of the practices in Table 7 are as low or lower than all but one of the practices in Table 6, greater weight can reasonably be given to them, since the airport manager responding to the survey took the extra time and effort to type in an answer to the open-ended question.

The column for EM agencies is probably meaningless, as the percentages are very low; 3% indicates that only one agency mentioned the practice. However, since the airports in this study were chosen in expectation of outstanding relationships with their EM partners, it is reasonable to conclude that these practices work and are mutually beneficial even if the EM agencies did not report them.

A final observation is that Table 7 includes a number of personal and philosophical traits, which were not directly addressed among the 27 practices included in the surveys.

RECOMMENDED PRACTICES VERSUS ACTUAL PRACTICES

The surveys asked which of the 27 practices the airport recommended to promote good relationships and which they actually used. Figure 7 shows the results aggregated for all 67 airports and for each of the seven NPIAS categories.

TABLE 7
PRACTICES, TOOLS, METHODS, AND POLICIES ACTUALLY USED BASED ON OPEN-ENDED SURVEY QUESTION (other measures not listed in survey)

Practice, Tool, Method, or Policy	Airports %	EM Agencies %
Constantly update information about capabilities and resources	12	3
Regularly communicate and share information	12	0
Build and maintain personal relationships	12	0
Have a seat on the local emergency planning board	9	3
Work face-to-face	9	0
Have airport take leadership in outreach	7	0
Respect each other's professional skills and knowledge	7	0
Have airport personnel volunteer with the community EM agency	6	0
Clearly outline roles and responsibilities	6	0
Maintain copies of each other's plans and procedures	4	0
Focus on shared missions and mutual benefits	4	0
Conduct airport familiarization tours	4	0
Focus on finding solutions, not just on problems	3	3
Do not rely totally on formal or structural aspects of relationships	3	0
Review each other's plans	3	0
Include EM agencies in AEP preparation	3	0
Educate local EM agencies about airport-to-airport mutual aid including EMAC procedures	1	3
Have substance in agendas for joint meetings	1	3
Foster community partnership	1	0
View each other as stakeholders	1	0
Use each other as exercise evaluators	1	0
Be honest and open about strengths and weaknesses of organizations	1	0
Involve EM agencies in operations as full partners	1	0

Source: J.F. Smith.

The most important insight that can be gleaned from Figure 7 is that airports generally practice what they preach. According to the survey, the average airport practices 77% of the measures it recommends. The range across the seven NPIAS categories is 72% to 87%. The pattern among the Part 139 airports roughly fits the size of their budgets and staffs—the larger the airport, the more practices it appears to use. The surprisingly high values for reliever and GA airports appear to come from the six very active airports included in the survey for those two categories.

REVENUE DIVERSION AS AN ISSUE

Of the 67 airports, five responded that concern over the issue of revenue diversion had at some time influenced decisions within the framework of collaboration with EM agency partners.

Follow-up conversations with the six airports revealed a spectrum of level of anxiety over revenue diversion and a concomitant range of resolutions. The positions and actions of Denver International Airport (DEN) and Jackson–Evers

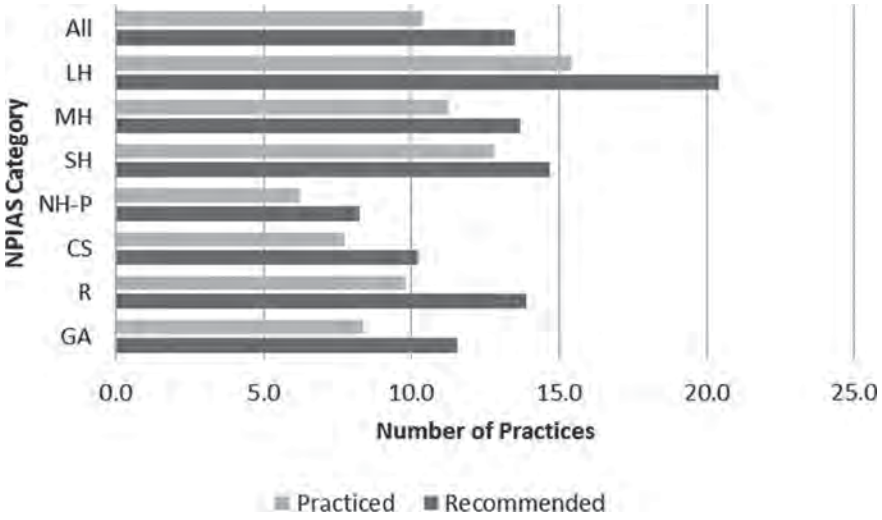


FIGURE 7 Recommended and actual practices by airports (*source:* J. F. Smith).

International Airport (JAN) illustrate the opposite ends of this spectrum. (Note that both airports consulted with their own legal counsel; DEN also consulted with the FAA Northwest Mountain Regional Office before acting.)

Several times, Denver Airport examined the issue and decided that sending assistance off-site was acceptable as long as it did not interfere with the airport's ARFF Index (i.e., having the right amount of the right sort of equipment and staff to deal with aircraft emergencies). Here are two examples of incidents where DEN provided aid:

> This summer, there were significant forest fires in Colorado. Because of the firefighting operations, the small Pagosa Springs airport that normally handles very few operations each day had constant traffic. They needed to provide ARFF protection that they didn't have. The State OEM through Denver OEM asked for help with ARFF. When initially asked, there were some individuals concerned about revenue diversion. Our Manager of Aviation and Airport Legal team both supported the effort, and we sent a truck and crew for about 2 full weeks.
>
> During the fire in Colorado Springs last year, we were asked for fire trucks to support protection of structures at the edge of Colorado Springs. Again, some people were adamant that providing that non-airport support could be revenue diversion. The Manager of Aviation was ready to direct the airport to send the support if needed, but the need was filled faster through other municipalities. The argument for sending the resource was that we rely on mutual aid to come help us regularly and it should work in both directions when we can provide the support without reducing the airport below our required capabilities (Stephen Lee, personal communication, Sep. 6, 2013).
>
> One other example that we had was for the Columbine school shooting response. We sent officers, explosive detection K-9s, and light plants. I have yet to hear anyone threaten us with a complaint for sending those types of resources off airport for a real emergency.
>
> I can see where the decision could go either way. Our EM partners are all aware of the issue ahead of time, so they are ready to receive a "no" when they make a request. But they know we are part of the community and will do our best.
>
> When we make the decision to send help, we understand that we could be stuck with the penalty. However, we believe it is the right thing to do and we have our arguments ready. When we look at the amount of mutual aid we receive from off airport, it exceeds the amount we give (Stephen Lee, personal communication, Sep. 9, 2013).

In contrast, while Jackson–Evers Airport faced similar issues, it decided to adhere to a narrower interpretation, based on its history of dealing with regional disasters:

> Revenue diversion becomes an issue when airports are asked to participate in multiparty response programs which require them to expend funds/equipment/supplies/personnel at other airports or in support of unrelated governmental entities or in regional partnerships with emergency response agencies if such expenditures do not directly support the air operations at the airport where the revenue was initially generated.
>
> In general, airports are required to be self-supporting and must offer leases and services at assessed fair market value and to ensure that rates and charges applied to aviation operations are substantiated by historical records of costs incurred. If costs are allocated off airport in support of other entities, this may have an impact on those determinations.
>
> Certain materials and or equipment may be declared surplus (no monetary value) and provided to another location accordingly. Mississippi has a specific statute allowing government entities to sell surplus for nominal sums to other government entities. We routinely provide surplus vehicles, telecommunications/computers, and other equipment to small and rural entities within Mississippi under this provision. It is important to note that this procedure does not apply to out of state entities.
>
> Airports can 'buy' fire fighters, trucks, engines, and EMT/EMS personnel if they can prove they are required to meet the ARFF index for the facility as established by 14 CFR Part 139. The same applies for sworn police officers to support TSA requirements for arrest authority at checkpoints as required under 49 CFR 1542. If this arrangement was between two airports, the receiving airport would be required to pay for such services at the market value/direct cost incurred. This type of buy-what-you-need program is routinely undertaken by small airports for both emergency response (ARFF and or emergency medical services) as well as for more routine non-emergency situations such as general law enforcement support by contracting for services with the local, county or municipal agencies (Bonnie Wilson, personal communication, Sep. 9, 2013).

As for the issue of revenue diversion, nearly all airports appear to help their neighbors when there is clear need and then deal with the fallout, if any, after the fact. However, short of an extreme emergency, no airport will compromise its ARFF Index and ability to fulfill its aviation mission by sending personnel and equipment off airport. Should an airport's ARFF Index be violated, the airport would normally consult with the FAA regional office and issue a Notice to Airmen (NOTAM).

SUMMARY OF COMMON THEMES FROM SURVEY RESPONDENTS

When the data in Tables 6 and 7 are viewed together, the most salient point that emerges is the development and maintenance of positive personal relationships between the organizations. Candor and mutual respect are essential to developing the degree of trust necessary to help an airport-EM agency relationship work smoothly.

The next most important practices are regular meetings and steady communication. Meetings that have clear agendas and broad stakeholder representation were reported as being more effective, as were those that focus on seeking solutions, not just stating problems. Effective communication was described as including updating information about each other's needs, capabilities, and resources, as shown in the example in Appendix C. The case examples further suggested a recurring agenda item concerning joint examination of the effectiveness of the relationship would be beneficial.

Mutual awareness and understanding are critically important. In an effective partnership, the airport takes the initiative to provide education on the special features, needs, and requirements of airport operations; and the EM agency simi-

FIGURE 8 Tag cloud of airport practices.

FIGURE 9 Tag cloud of emergency management agency practices.

larly educates the airport about its capabilities, especially for communication and coordination in complex emergencies and disasters. At its most effective, a partnership requires extreme clarity of roles and responsibilities, as well as honesty about the strengths and weaknesses of organizations. Airport tours and EOC tours and demonstrations can help build solid foundations for understanding.

Joint drilling and exercising are currently the dominant practices, reflecting the regulatory requirements on airports and the traditional emphasis of EM agencies. Tabletop exercises were the most favored activity because they are relatively inexpensive to execute, highly efficient within time requirements, and can be easily and quickly designed to respond to specific needs or identified gaps in capabilities or preparedness. A beneficial addition to drilling and exercising is having the EM agency and the airport observe each other's exercises or even serve as observers or evaluators.

A constellation of training-related themes stand out in the data. Specifically, these include joint training, ICS training, NIMS training, airport-specific training for emergency agency personnel, and emergency agency-specific training for airport personnel. Joint planning is viewed as essential for productive relationships. Mutual review of each other's emergency plans is helpful, as is maintaining current plans on site for each other. One effective practice is for an airport to involve its EM partner or partners in the development of its AEP.

In addition to regular meetings, one formal or structural practice in promoting good relationships is the airport's participation in regional emergency or disaster coordination efforts, such as a county emergency operations board or an Urban Area Security Initiative (UASI) board. Another formal practice is to have a designated liaison to the EM at the airport agency, and vice versa. A third such measure is the presence of an airport representative in the EM agency's EOC.

One way to visualize common themes is to use tag clouds to show what words were used most frequently in responses. The actual practices of airports and of EM agencies were entered in separate word cloud analyses using Tag Crowd software. The words "airport" and "agency" were suppressed. Figures 8 and 9 show the results.

It is unsurprising that the two tag cloud patterns are very similar. Both the airports and the EM agencies included (in descending order of frequency) "exercises," "training," "em," "joint," and "refresher" in their responses. The largest difference appears with "designated," which may reflect the much more highly regulated nature of airports and the consequent greater attention to written designation of persons to perform specific functions. The tag cloud results should not, however, be over-interpreted, as they are easily influenced by the frequency of the words used in the questions on the surveys.

CHAPTER FOUR

CASE EXAMPLES

The two study surveys gathered detailed data on practices, policies, and tools actually used by airports and their EM partners, as well as qualitative assessments of the strengths and benefits of the relationships. Case examples developed through open-ended questions posed during conference call interviews provided both nuance and historical depth in interpreting the dynamics between airports and their EM agency partners. As shown in Table 2, airports in four NPIAS categories were selected for the case studies:

- Large hub—Boston Logan International Airport (BOS)
- Medium hub—John Wayne Airport (SNA)
- Small hub—Boise International Airport (BOI)
- Commercial service—Western Nebraska Regional Airport (BFF).

In addition, four distinct types of EM partners were included in the case examples:

- State EM agency—Massachusetts EM Agency (MEMA)
- Law enforcement—Orange County Sheriff's Department (OCSD)
- Fire department—Boise Fire Department (BFD)
- Regional EM agency—Nebraska Region 22 EM (REG 22)

Lastly, in two cases (BOI and SNA), airports manage their own coordination one-to-one, while in the other two cases (BOS and BFF), airports rely on EM agency partners to handle coordination.

BOISE INTERNATIONAL AIRPORT (BOI)

BOI is a small hub airport that relies on its primary local EM agency for multi-agency coordination. BOI's emergency manager has a major collateral duty, representing 20%–50% of one full-time employee. BOI is a municipal department of the city of Boise, as is the Boise Fire Department (BFD), its primary local EM partner. BFD provides ARFF services to BOI. The interview for this case example was conducted on September 3, 2013 with airport Deputy Director of Operations Sarah Demer and Boise Fire Department Division Chief of Special Operations Paul Roberts.

History of Relationship

Historically, BOI and BFD did not get along; they were almost adversarial. There was very little interaction beyond the bare minimum required for ARFF functions. The perceived causes were poor interpersonal relationship skills, undervaluation of teamwork, and the creation of bureaucratic "silos."

Now, however, following the retirement and replacements of the fire chief and senior managers at the airport, the relationship is markedly improved. The new leaders share a vision based on the importance of leadership by example and teamwork—a major paradigm shift in the partnership. Today, both departments seek cooperation and accountability, building on mutual knowledge and strengthening respect through training and cooperation. Tangible dividends and mutual understanding have resulted, as exemplified here:

- There had been conflicts over open/closed runways after an aircraft incident that resulted from two representatives of separate agencies calling the control tower. This has been resolved by assigning the airport operations department the responsibility to make any call regarding runway status and writing that designation into airport and fire department plans and procedures.
- Updating the AEP in response to FAA Advisory Circular 150/5200-31C in 2009–2010 allowed reexamination of the relationship. BOI made BFD a full partner in the effort along with other stakeholders. The process reinforced awareness of the importance of clarifying responsibilities and reviewing AEP roles.

The fire department participates in the weekly airport operations meeting. This meeting is the major formal venue for communication within the relationship, but many informal channels are also used, ensuring a beneficial flow of communication and information.

The city of Boise has an Incident Management Team (IMT) led by the BFD. The airport Deputy Director of Operations is a full member. For most incidents at the airport, the IMT serves as IC, with strong input from airport operations; for major incidents, the IMT becomes a Unified Command that will include airport operations if an aircraft or the airport is involved.

Since the changes in leadership, the relationship has continued to improve. The positive results of BOI's triennial recertification exercise in May 2013 demonstrate the effectiveness of

the BOI-BFD effort, as was the handling of a gear-up landing in August 2013.

To sustain and nurture the relationship, the Airport Emergency Operations Team was created, which meets quarterly. The regular participants are the airport, fire department, and police department, but representatives of other departments and agencies often attend even when they have no items on the agenda, just to maintain contact. Each meeting has a formal agenda but also includes time for informal discussion. There is a focus on defining and finding solutions for actual or foreseeable problems.

Goals for Each Side of Relationship

The airport's goals for the relationship are:

1. Safety of passengers, employees, and community
2. Joint planning based on dialogue
3. Clarity of mission
4. Mutuality of relationship.

The fire department's goals for the relationship are:

1. Safety of passengers, employees, and community
2. Open and honest communications
3. Regular communications
4. Focus on teamwork
5. Keeping agencies in perspective (clarity of roles, how roles fit together).

Advice on Starting and Sustaining a Good Relationship

- Exchange education on missions, procedures, roles, and responsibilities. Boise calls these "ARFF 101" and "Ops 101." Reciprocal visits between airport operational and ARFF personnel are highly effective. The goal is to get everyone on a first-name basis: The resulting trust and familiarity pays off greatly in emergency situations, as it did during incidents such as the gear-up landing incident in August 2013.
- Remember and execute the goals listed in the previous section.
- Obtain support from senior leadership all around.
- Build mutual respect.
- Identify who experts are and establish access to them.
- Maintain good communications. Keep the dialogue open.
- Celebrate variety of experience.
- Be sensitive to local culture and build on what is already there.
- Be willing to drop old bad habits and move forward.
- Learn from new incidents: Learn together, grow together.
- Remember that some improvement leads to more improvement.
- Perform comprehensive, timely after-action reviews that involve senior management.

Advice on Fixing a Damaged Relationship

- Recognize the problem. Lack of collegiality is a clear symptom of a need for change.
- Convert a negative domino effect into a positive domino effect. Let one success lead to another.
- Be honest.
- Talk.
- Start building relationships.

Question: If you wanted a quantitative metric of the success of your relationship, what could you imagine it being?

After noting the difficulty and possible inappropriateness of quantifying relationships, Demory and Roberts suggested three potential metrics:

1. Numeric measurement of trends within the fire department related to the necessity of drafting firemen for service in ARFF. Before the change in leadership and the subsequent improvement in the relationship, firemen were mostly drafted for ARFF duty. Now, most ARFF slots are filled by volunteers. This measure can be quantified, but it probably only applies when the ARFF station belongs to an outside agency and is contracted to the airport, as is the case in Boise.
2. After-exercise reviews. While the magnitude of problems revealed is a qualitative measure of the effectiveness of the relationship, the number of action items to follow up the exercise is a potential quantitative metric.
3. How well do we do when we respond to real incidents? Most people are able to "measure" the answer to this question with statements such as "very well," "not so well," etc. Even though this measure is purely subjective and qualitative, it is the most salient for both BOI and BFD.

Actual Reported Practices

Table 8 summarizes actual practices reported in the surveys by BOI and BFD. There is a notable degree of consonance between their actual practices, which is to be expected given the closeness of the relationship. Since the BFD provides multi-agency coordination for the airport, it is natural that the airport sends a representative to the city's EOC, which is run by the fire department.

JOHN WAYNE AIRPORT (SNA)

SNA is a medium hub airport, a department of Orange County, California, with a full-time emergency manager who is part of the airport's operations department. The airport depends on its primary local EM partner, the Orange County Sheriff's Department, for multi-agency coordination.

SNA also sends teams to learn from incidents at other airports. Most recently, a team went to San Francisco Inter-

TABLE 8
SUMMARY OF CASE EXAMPLE ACTUAL PRACTICES

Practice	Airports				Emergency Management Agencies			
	BFF	BOI	BOS	SNA	BFD	MEMA	OCSD	REG 22
Regular meetings	X	X	X	X	X		X	
Joint planning		X	X			X	X	X
Joint drilling and exercising		X	X		X	X	X	X
Physical or virtual presence in each other's EOC		X	X			X	X	X
Airport-specific training for EM agency personnel		X	X	X	X	X	X	X
EM-specific training for airport personnel		X	X		X	X	X	X
NIMS training and refresher training	X	X	X	X	X		X	X
ICS training and refresher training	X	X	X	X	X	X	X	X
EM agency participation in Part 139 triennial (recertification) exercises		X	X	X	X		X	
Table top exercises	X	X	X	X	X	X	X	X
Functional exercises including full-scale exercises	X	X	X	X	X	X	X	X
Peer review of programs by other airport or EM agency		X	X	X			X	
Peer review of plans by other airport or EM agency		X	X				X	
Peer review of training by other airport or EM agency		X	X				X	
Airport observing EM agency exercises		X	X		X		X	X
EM agency observing airport exercises		X	X			X	X	X
Airport having designated liaison person to EM agency		X	X	X	X		X	
EM agency having designated liaison person to airport		X	X		X	X	X	
Airport having dedicated emergency manager (full-time or major collateral duty of middle-level or senior manager)		X	X	X	X	X	X	X
Joint participation in outside state, university, or federal agency training	X	X					X	X
Airport participates in regional emergency or disaster coordination effort								X
Airport and EM agency periodically evaluate effectiveness of relationships			X				X	
Formal EM accountability system to mayor, board, or other sponsor or owner			X				X	
Airport knows EMAC procedure and has written procedure for contacting EMAC			X			X	X	X
Airport knows FEMA regional representative and has written procedure for contacting FEMA			X				X	

Source: J.F. Smith.

national Airport (SFO) to learn from the July 2013 crash of an Asiana Airlines that killed three passengers. After making observations at SFO, SNA began a comprehensive review and revision of its emergency plans and procedures. In this effort, SNA is working with its EM partners, including the Orange County Sheriff's Department.

The interview for this case example was conducted by on September 5, 2013, with Airport Emergency Manager Jim Ellis, Orange County Emergency Manager Victoria Osborn, and Orange County Sheriff's Department (OCSD) Airport Operations Division Administrative Officer Charles Volkel.

History of Relationship

Going back to 1980, there were walls around individual jurisdictions. Since then, California automatic mutual aid has steadily improved the situation. Orange County EM Organization (OCEMO) grew out of SEMS. All agencies meet monthly, and strong relationships are growing stronger. SNA joined the county EM council in 2012.

Goals for Each Side of Relationship

The airport's goals for the relationship are:

1. Engagement
2. Mutual awareness of developments
3. Information sharing with stakeholders (SNA provides daily reports to county and state)
4. Building and sustaining personal relationships
5. Keeping a bridge between EM and operations.

The sheriff's department's goals for the relationship are:

1. Coordination in planning
2. Sustained communication
3. Collaboration in all phases of EM: preparedness, response, recovery, and mitigation
4. Realistic threat assessment as the basis for planning and action
5. Resource identification and allocation
6. Coordination of mutual aid
7. Joint exercises and training that are realistic and productive.

Advice on Starting and Sustaining a Good Relationship

- Consider the negative effects of a lack of a good relationship.
- Get to know each other.
- Acquaint each other with capabilities and needs.
- Be willing to invest effort to sustain relationships.
- Be willing to listen and ask questions.
- Be humble.
- Focus on collaboration.
- Be willing to reach out and grow the network.
- Engage senior management and get senior management/leadership support.
- Create and use a strong structural (formal) relationship such as OCEMO and the Emergency Management Council. SNA is an active voting member of both groups, and the OCSD manages both groups.
- Communicate.
- Share information. The notification system and interconnection of notification systems are critically important to sustaining the relationship and its information flows.
- Make NIMS and ICS implementation as seamless as possible. SNA and OCSD have long used SEMS, which is analogous to NIMS.

Advice on Fixing a Damaged Relationship

- Reopen lines of communication.
- Be humble.
- Focus on building personal relationships.
- Recognize the problem.
- Focus on finding solutions.

Question: If you wanted a quantitative metric of the success of your relationship, what could you imagine it being?

As in the Boise case example, the John Wayne–Orange County interviewees questioned the suitability of quantitative metrics for evaluating relationships. Furthermore, Ellis et al. agreed that all the mandates obscure the ability to construct usable metrics. This is probably truer for a highly regulated organization, such as an airport, than for an EM agency, even when it is a law enforcement agency. The operational, safety, emergency, and security regulations to which an airport is subject essentially force all or nothing compliance. The consensus of Ellis et al. was that it is much better to focus on following recommended guidelines for developing relationships.

Actual Reported Practices

Table 8 summarizes the actual practices reported in the surveys by SNA and OCSD. The sheriff's department reports using more practices, which is to be expected as it provides the larger share of the coordinative function, especially in multi-agency situations.

MASSPORT—BOSTON LOGAN INTERNATIONAL AIRPORT (BOS)

The Massachusetts Port Authority operates three airports: Logan, a large hub airport; Hanscom Field (BED), a very busy general aviation airport; and Worchester Regional Airport (OHR), which was another busy GA airport at the time of the study and has since resumed scheduled commercial

passenger flights. Logan's EM is provided by a full-time emergency manager in Massport, which owns and operates the airport. Massport coordinates one-to-one with its various EM partners and does not depend on an outside agency for coordination except as noted in this case example.

The interview for this case example was conducted on August 29, 2013, with Massport ARFF Chief Robert Donahue and Massport Emergency Manager Shayleen Schutz.

History of Relationship

Massport at Logan International Airport has an extraordinarily effective relationship with its EM partners. This relationship was previously documented (Smith 2010c), but has notable features worth repeating here. The centerpiece of the partnership at BOS is the daily morning operational briefing, which includes the heads of all airport departments and the heads of all the other stakeholders at the airport—local agencies, state agencies, federal agencies, airlines, and concessionaires. Mutual aid partners frequently attend to observe. The Mayor's Office of Emergency Preparedness, MEMA, and the Boston Department of Public Health often participate. The meeting is typically very short, with a fixed agenda that allows each unit to describe and discuss special conditions and events. It is a powerful means of sharing information, and it nurtures strong organizational and personal relationships.

A second notable practice at BOS is an aggressive approach to drills and exercises so that the fullest possible array of emergency partners is involved in the planning, execution, and after-action review. Another method is Massport's practice of inviting in peer reviewers for programs and plans and of sending Massport "go teams" to learn lessons first hand from incidents at other airports. After the July 2013 crash at SFO, BOS sent a go team comprised of senior managers from operations, EM, ARFF, and the airport police (Massachusetts State Police). Based on the team's observations at the incident and response at SFO, Massport did an exhaustive review of its own emergency plans and procedures. BOS and Massport keep themselves on the cutting edge of airport EM through these and other practices.

In the case example interview, Massport's Schutz said that her primary duty was to identify the action items from actual responses, drills, and exercises, and to pursue resolution of those action actions.

In developing and sustaining its relationships with EM partners, Massport has an advantage in being itself a state agency. By statute, the MEMA director is a member of the Massport board. Moreover, that person also heads the state homeland security department, giving Massport and BOS yet another productive tie. Massport and BOS are strongly linked into and active in the state and federal coordination centers for homeland security intelligence.

Goals for Each Side of the Relationship

The airport's goals for the relationship are:

1. Safety of passengers, employees, tenants, and community
2. A good match of roles, resources, and responsibilities
3. Mutual awareness and education of roles, responsibilities, capabilities, and needs. BOS calls its outreach "Airport 101," which sounds very much like BOI's "Ops 101."
4. Robust relationships.

The EM agency's goals for the relationship are not available, as MEMA did not participate in the teleconference.

Advice on Starting and Sustaining a Good Relationship

- Establish and maintain mutual awareness; for example, "Airport 101" and "Emergency Management Agency 101."
- Involve stakeholders, treating them as full partners and taking them seriously. Work hard at being inclusive.
- Put everything into full regional context, especially the economic context.
- Share information.
- Develop and maintain connectivity.
- Exercise savvy: Use every training, drilling, and exercising opportunity to test and improve the entire team's ability and to reinforce the relationships, a tabletop exercise to test new quarantine and health arrangements and procedures when CDC closed the Quarantine Office at BOS and put BOS under the quarantine office at JFK International Airport.
- Use the power of invitations. Keep the airport and the relationship in the forefront of all partners' minds.
- Have a full-time emergency manager on the airport staff. Massport views this position as essential and believes it should be at the corporate level.
- Plan jointly.
- Use special events to practice cooperation and collaboration and to test plan integration.
- Be proactive.
- Use partners' capabilities.
- Focus on intelligence, maintaining the strongest possible vertical and horizontal flows of information within the allowable scope of security restrictions.
- Optimize interoperability.
- Identify and use liaison persons in both directions in relationships.
- Involve senior leadership in exercises, since top-down influence is powerful in shaping organizational behavior (Kenville and Smith 2013).

Advice on Fixing a Damaged Relationship

- The airport should take the initiative.
- Conduct airfield tours.

- Perform outreach to agencies and other stakeholders.
- Be persistent.
- Develop case studies and share them. This is one of the methods used by Massport's go teams.
- Do not be afraid to change.

Question: If you wanted a quantitative metric of the success of your relationship, what could you imagine it being?

Donahue and Schutz suggested two metrics to apply to the relationships:

1. Are the goals and objectives of exercises met? For this type of assessment to work, exercises must be very carefully devised with clearly stated goals and objectives.
2. The percentage of agencies that embrace the proactive, collaborative philosophy. This might be very hard to measure, or it might be as simple as determining what percentage of senior managers who are invited to an exercise actually show up.

Actual Reported Practices

Table 8 summarizes the actual practices reported in the surveys by BOS and MEMA. There is a good degree of consonance between their actual practices, particularly in the areas of joint planning, training, drilling, and exercising. BOS is familiar with Emergency Management Assistance Compact (EMAC) procedures from its volunteer work through the Southeast Airports Disaster Operations Group, or SEADOG, in the wake of Hurricane Katrina in 2005.

WESTERN NEBRASKA REGIONAL AIRPORT (BFF)

BFF is a commercial service airport that does not have a dedicated EM position. However, the airport manager and director of operations coordinate with the airport's EM partners one-to-one and do not rely on its primary local EM agency for multi-agency coordination. BFF's primary EM agency partner is the Nebraska Region 22 Emergency Management Agency. Therefore, among the four case studies, BFF is the only one that identified a regional agency as its primary partner.

The telephone interview for this case example was conducted on August 26, 2013, with Airport Director of Operations Raul Aguallo and Nebraska Region 22 EM Director Jerry Bretthauer.

History of Relationship

The relationship between BFF and Nebraska EM Region 22 is very strong and has been since at least 2005, when the current partnership of Aguallo and Bretthauer began. The small size of the community enhances personal relationships and provides opportunities for both formal and informal interactions.

Goals for Each Side of Relationship

The airport's goals for the relationship are:

1. Safety
2. Community service
3. Information sharing
4. Strong personal relationships.

Region 22's goals for the relationship are:

1. Safety
2. Efficiency
3. Collaboration
4. Strong personal relationships
5. Effective preparedness through training, drilling, and exercising.

Advice on Starting and Sustaining a Good Relationship

- Build friendships.
- Interact.
- Take a true interest in each other's agency and lives.
- Educate each other.
- Respect each other.
- Maintain mutuality of goals.
- Focus on interoperability.

Advice on Fixing a Damaged Relationship

- Care about fixing broken relationships.
- Hold a nonjudgmental stakeholder meeting to identify problems and begin finding solutions.

Question: If you wanted a quantitative metric of the success of your relationship, what could you imagine it being?

Aguallo and Bretthauer suggested two metrics for judging the health of an airport-EM agency relationship:

1. The ability to utilize NIMS in normal operations, drills and exercises, and emergencies. This is basically a yes/no measure but could conceivably be converted into some sort of numeric grade. This proposed metric is similar to the Boise interviewees' suggestion of using the number of action items identified in an after-exercise review as a metric.
2. The proportion or percentage of appropriate responders that show up for an exercise (also similar to a Boise suggestion).

Actual Reported Practices

Table 8 summarizes the actual practices reported in the surveys by BFF and Region 22. The amount of difference in the two columns is the greatest of any of the four case examples, but this is probably not significant given the extraordinary degree of cooperation and interdependence evident in this partnership.

SUMMARY OF THE CASE EXAMPLES

The most striking impression made by the four case studies was the depth of commitment and enthusiasm the informants have for their EM roles and responsibilities and for the relationships they have forged with their partners.

History of Relationship

In all four case examples, the partnerships now have sound relationships based on mutual respect, mutual understanding, friendship, frequent communication, and full use of both formal (e.g., regular meetings) and informal collaborative tools.

Goals for Each Side of Relationship

The goals of the airports and their EM partners largely overlap.

Advice on Starting and Sustaining a Good Relationship

The interviewees in all four case examples agreed that the same measures will both build and sustain good relationships. They all focused on friendships, frequent interactions, not wasting one another's time, educating each other, mutual respect, clarity of goals, clear communications, and joint planning, training, drilling, and exercising.

Advice on Fixing a Damaged Relationship

Two main points concerning repairing damaged relationships stood out in the case examples. First, the focus cannot be solely on identifying problems but also on finding and implementing solutions to the problems. The second may be to examine personnel characteristics and behavior, making changes when necessary. A variation of this is to take advantage of retirements or general reorganizations to make changes in EM personnel and roles.

Question: If you wanted a quantitative metric of the success of your relationship, what could you imagine it being?

The case example interviewees suggested a wide range of potential metrics for measuring the effectiveness or success of their partnerships. These included:

1. Numeric measurement of trends within the fire department concerning the necessity of drafting firemen for service in ARFF as opposed to depending on volunteers
2. Determining whether the goals and objectives of exercises have been met
3. The number of action items to follow up the exercise
4. How well agencies perform when responding to real incidents
5. The percentage of agencies that embrace the proactive, collaborative philosophy
6. The ability to utilize NIMS in normal operations, drills and exercises, and emergencies. This is basically a yes/no measure but could conceivably be converted into some sort of numeric grade.
7. The proportion or percentage of appropriate responders that show up for an exercise.

Actual Reported Practices

Table 8 summarizes the actual practices reported by all four case example airports and their EM agency partners. A key point is that all four partnerships focus most strongly on activities required by regulations, at least by regulations applying to the airports. There is also a suggestion that peer reviews are an emerging trend among airports, with the process seemingly more advanced among airports than among EM agencies.

The most pertinent information in the case studies deals with the roles of leadership, structural approaches to relationship building, communication, and personal traits. These aspects from the case studies will be given the heaviest weight in identifying effective methods for developing and sustaining airport-EM agency relationships.

One theme that runs through all four case studies, as well as the comments by Denver's Lee on revenue diversion, is that airports will try to do the right thing to help their partners even when statutory or regulatory authority is absent or unclear. This is an example of *apparent authority* (Winmark 2013). Apparent authority, as applied to an emergency situation, means that one or more of the responding parties act within their capabilities or historical actions but without explicit authorization. This use of apparent authority will depend on how reasonable the senior managers and beneficiaries of the action are (Stephan Parker, personal communication, Oct. 15, 2013).

CHAPTER FIVE

CONCLUSIONS

Synthesis of both survey and interview responses reveals the contours of effective practices for creating and sustaining productive relationships between airports and their local and regional emergency management (EM) partners. The synthesis responses are reinforced and extended by survey and interview results in related studies (Smith 2010a, c, 2012b, 2013; Kenville and Smith 2013; Smith and Kenville 2013). As noted in chapters three and four, information from the case examples was given the greatest weight in identifying effective practices, with practices and concepts volunteered in response to the open-ended question in the surveys given next greatest weight, and information from the closed-ended questions in the survey given relatively less weight. Regardless of weight, however, all information gathered in all parts of the study has been analyzed and synthesized and is explained here.

BENEFITS

Nearly all of the 67 airports and 35 EM agencies reported positive benefits from effective working relationships. When asked if their organization had experienced benefits from good working relationships, 60 airports (90%) and 32 EM agencies (91%) said "Yes." One in each group said "No," and the rest replied either "Don't know" or "Too soon to tell."

When asked if they measured the benefits in any way, 16 airports and 10 EM agencies said "Yes." However, follow-up inquiries revealed that all of these measures were qualitative, usually subjective assessments of whether the relationship was satisfactory or recent exercises were successful, or both. This qualitative focus was reflected in the four case examples, where the participants had to labor to imagine quantitative metrics for the effectiveness of airport-EM agency relationships.

Although the safety of passengers, employees, tenants, and communities is the main focus of the relationships, airports can benefit from the special skills and capabilities of EM agencies in such areas as contracting, procurement, multi-agency coordination, NIMS and ICS training, access to federal homeland security and EM funding, communications, and sheltering (Los Angeles Mayor 2011).

The number of actual practices (see Tables 6 through 8) strongly indicates that both airports and EM agencies see enough benefits to safety, operations, efficiency, and other outcomes to justify the investment of time and staff in building and sustaining good working relationships with their partners. Even if a successful relationship tends to beget more success, it still requires consistent backing from senior management to continue the investment in the relationship. This respect for strong leadership was highly evident in the four case examples.

BARRIERS AND HOW THEY CAN BE OVERCOME

The primary barriers to effective working relationships between airports and EM agencies are the lack of personal relationships and the lack of mutual understanding of roles, responsibilities, constraints, and capabilities. A secondary barrier, cited by seven airports (10%), is a concern about revenue diversion.

The two main barriers can be overcome by example through the leadership of senior management; mutual outreach and education efforts; realistic and inclusive training and drilling programs; and effective use of formal and informal opportunities for direct personal interaction. An emphasis on finding practicable solutions to problems is essential.

The revenue diversion issue must be resolved by each individual airport, acting both on the initiative of its senior leadership and in concert with its FAA regional office. No examples were found of an airport being penalized for using airport staff or equipment in support of an EM partner, but then airports have been scrupulous in maintaining their Airport Research and Firefighting Index. Airport leadership can ensure acceptance of a higher degree of collaboration in the use of airport staff and equipment by working closely with the airport's airlines so that they understand the exact impact on rates and charges issues.

DESIRABLE ELEMENTS IN AIRPORT–EMERGENCY MANAGEMENT AGENCY RELATIONSHIPS

An inventory of 72 characteristics of successful relationships, and the processes for creating and sustaining these partnerships, evolved from a literature review in tandem with the surveys and case example interviews. This list was developed to assist airport executives, their governing boards, and personnel involved in deploying written mutual aid agreements to improve the preparedness and resiliency of the airport and its community.

Airports' EM agency partners may also employ the list in the process of developing and sustaining effective relationships and outcomes. The 72 elements are incorporated in the checklist for fostering good airport–EM agency relationships, and are cited in Appendix D; the checklist can serve as a flight plan for the establishment, maintenance, management, and repair of such relationships. The elements in the checklist are classified as "Essential (E)," "Desirable (D)," or "Context-Sensitive (C)." In general, the context-sensitive elements would apply in special cases where the parties are dealing with a barrier or a broken relationship.

SUCCESSFUL MANAGEMENT PRACTICES

Review of the data obtained during this study indicates that the following elements are essential to successful management of cooperative efforts:

- Strong personal relationships based on respect, trust, and information exchange
- Support from airport senior management
- An airport emergency manager in a full-time position or major collateral duty, senior enough in the organization to have visibility and influence
- Regular meetings with a focused agenda, ideally at least once per month
- Periodic assessment of the effectiveness of the relationship
- Mutual education
- Clarity regarding roles and responsibilities
- Open and honest communication
- Designation of liaison persons within both parties
- A focus on finding solutions, not just on identifying problems
- A high degree of inclusion
- A willingness to learn from each other and from exercises and incidents
- Consistent use of National Incident Management System and Incident Command System
- Consistent updating of information regarding roles, responsibilities, resources, capabilities, and constraints
- Joint training, drills, and exercises that are realistic and challenging enough to test procedures and relationships
- Charting of the rate of personnel turnover and the performance of joint exercises, with an exercise frequency sufficient to meet a target percent turnover as set by the airport and its partners
- Effective after-exercise and after-action reviews
- Joint planning
- Airport community and general community awareness of the strong link between EM and business continuity planning
- Active airport participation in local and regional emergency and disaster organizations or boards.

In addition, several management practices might be useful, even highly useful, in some relationships, depending on the exact circumstances:

- Peer review of programs, plans, and exercises (at airport or at EM agency, or both)
- Joint team training at an outside facility run by a state, university, or federal agency
- Use of qualitative metrics
- Use of quantitative metrics
- Work with airlines and the FAA to resolve any potential revenue diversion issues.

AMBIGUITIES OF INTEREST OR CONCERN

A very high degree of agreement was found among airports, among EM agencies, and between the two groups. This is unsurprising, as 62 of the original 72 airports were chosen because it was believed they had effective relationships with their EM agency partners. There are some subtle indications of divergent opinions in EM agencies about whether airports should become more knowledgeable about such procedures as Emergency Management Assistance Compact (EMAC) mission numbers; or whether airports could rely on their local or regional partners to handle specialized EM procedures and approvals. In either case, the airports need to be aware of the capabilities of the EM agencies to handle complex arrangements for procurement, transportation, and reimbursements.

EVALUATING EFFECTIVENESS OF RELATIONSHIPS

Senior management from airports and EM agencies would benefit from meeting periodically to assess the clarity and effectiveness of their relationship and of the responses to actual incidents.

Measuring the overall effectiveness of the relationships between airports and EM agencies could prove difficult, as many pertinent variables are difficult to quantify. For example, overall effectiveness might relate to the response and recovery from an incident or to the results of an exercise. Therefore, it would be difficult to measure efficacy during normal operating periods, and the evaluation of the relationship during a crisis would be especially difficult.

In general, most evaluations of the relationships have been qualitative and subjective. As seen in the four case examples, there may be some potential for imaginative quantitative metrics; but there are doubts that a relationship can be quantitatively evaluated with any degree of success. In considering metrics, airports and their partners may need to seek a productive balance of qualitative and quantitative measures both of the relationship and of performance.

SUGGESTIONS FOR FURTHER RESEARCH

Seven areas were identified for further research:

1. Funding methods for EM collaboration
2. Approaches to reconciling the rates and charges aspect

of the revenue diversion issue in airport-EM agency collaboration
3. Metrics for measuring effectiveness of airport-EM agency relationships in terms of the impact of relationships on emergency responses
4. Identification of practices that are the most effective for promoting good emergency responses at airports
5. Role of state structures and statutes in shaping collaboration between airports and their EM agency partners
6. Empirical validation of expert opinion on "effectiveness" and "success" when applied to the effect of airport-EM agency relationships on response quality
7. Objective testing of the relationship of good airport-EM relationships (independent variable) to improved responses to disasters and emergencies.

Beyond the types of metrics suggested in the four case examples, further research under research area 3 could include:

- Testing the strength of level of trust. Do people tell managers about a problem before making official notification?
- How fast can contact be made with the right person to take action or make decision?
- What is the interaction between rate of personnel turnover and the joint exercise rate? The result of this research might help airports and their EM partners set a personnel turnover rate trigger for exercise frequency.
- How many items in the after-action improvement plan have been successfully resolved or are repeats from a preceding plan review?
- What is the most effective balance between qualitative and quantitative metrics and how can they best be used together?

The sixth suggested area of research is particularly interesting, as the primary type of validity in this present study is expert validity. In the present study, the experts asked to judge validity were the same persons who served as the informants surveyed or interviewed for the study. Proposed research areas 3 (metrics) and 6 (empirical validation) are closely related.

The seventh suggested area of research addresses the fundamental assumption made in the present study. It is closely related to research area 6 (empirical validation). The empirical validation of such terms as "effectiveness," "success," and "improvement" is a necessary precursor to this research; in other words, research area 6 must be accomplished before research area 7 or be addressed as the first phase of a combined research effort.

GLOSSARY

Agency—A division of government with a specific function offering a particular kind of assistance.

Airport emergency plan (AEP)—A concise planning document developed by the airport operator that establishes airport operational procedures and responsibilities during various contingencies.

Aircraft rescue and fire fighting (ARFF)—Specialized fire fighters, rescuers, procedures, and equipment to deal with aircraft accidents at an airport.

Airport security program—A security program approved by TSA. It describes requirements for security programs, including establishing secured areas, air operations areas, security identification display areas, and access to control systems.

ARFF Index—The minimum aircraft rescue and firefighting personnel and equipment required for an airport as determined by the length of the longest air carrier aircraft for which there is an average of five or more daily departures. When there are fewer than five average daily departures of the longest air carrier aircraft serving the airport, the Index required by the airport will be the next lower Index group than the Index group prescribed for the longest aircraft.

Continuity of business—Practices that provide the focus and guidance for the decisions and actions necessary for a business to prevent, mitigate, prepare for, respond to, resume, recover, restore, and transition from a disruptive (crisis) event in a manner consistent with its strategic objectives.

Continuity of operations—An effort within an organization to ensure that its primary mission essential functions continue during a wide range of emergencies, including localized acts of nature, accidents, and technological or attack-related emergencies.

Commercial service airport—A public airport receiving scheduled passenger service and having 2,500 or more enplaned passengers per year.

Community—A political entity with the authority to adopt and enforce laws and ordinances for the area under its jurisdiction. In most cases, the community is an incorporated town, city, township, village, or unincorporated area of a county. However, each state defines its own political subdivisions and forms of government.

Disaster—An occurrence of a natural catastrophe, technological accident, or human-caused event that has resulted in severe property damage, multiple injuries, and/or deaths.

Drill—A coordinated, supervised activity usually used to test a single specific operation or function in a single agency.

Emergency—Any occasion or instance that warrants action to save lives and to protect property, public health, and safety.

Emergency Management (EM)—The coordination and integration of all activities necessary to build, sustain, and improve the capabilities to prepare for, respond to, recover from, or mitigate against threatened or actual disasters or emergencies, regardless of cause.

Emergency Management Assistance Compact (EMAC)—The congressionally ratified organization that provides a fast and flexible response system through which states send requested personnel and equipment to help disaster relief efforts in other states.

Emergency operations center (EOC)—A protected site from which emergency officials coordinate, monitor, and direct response activities during an emergency.

Enplanement—The boarding of a revenue passenger at an airport.

Exercise—A planned, staged implementation of the critical incident plan to evaluate processes that work and identify those needing improvement.

Fixed-base operator—A commercial entity providing aeronautical services such as fueling, maintenance, storage, ground and flight instruction, etc., to the public.

Full-time equivalent employee (FTE)—A measure of work equivalent to one employee who works approximately 2020 hours per year, as compared to a part-time employee.

General aviation (GA) airport—An airport that does not meet the criteria for classification as a commercial service airport may be included in the NPIAS as a general aviation airport if they account for enough activity (having usually at least 10 locally based aircraft) and are at least 20 miles from the nearest NPIAS airport.

Hub—A very busy commercial service airport.

Incident—An occurrence or event, natural or manmade, that requires a response to protect life or property.

Incident Command System (ICS)—A standardized organizational structure used to command, control, and coordinate the use of resources and personnel that have responded to the scene of an emergency.

Incident Commander—The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources.

Incident Management Team (IMT)—An Incident Commander and the appropriate Command and General Staff personnel assigned to an incident; the level of training and experience of the IMT members, coupled with the identified formal response requirements and responsibilities of the IMT, are factors in determining "type," or level, of IMT.

Interoperability—The ability of systems, personnel, and equipment to provide and receive functionality, data, information and/or services to and from other systems, personnel, and equipment, between both public and private agencies, departments, and other organizations, in a manner enabling them to operate effectively together.

Irregular operations (IROPS)—Those actions taken to adjust for and recover from the impacts of disrupted airline schedules such as aircraft accidents, security incidents, crew absences, mechanical failures, and bad weather.

Large hub airport—An airport that accounts for at least one percent of total U.S. passenger enplanements.

Mass care—The actions taken to protect evacuees and other disaster victims from the effects of a disaster.

Medium hub airport—An airport which accounts for between 0.25 percent and 1 percent of total U.S. passenger enplanements.

Mutual aid—Reciprocal assistance by emergency services under a predetermined plan.

National Incident Management System (NIMS)—A systematic, proactive approach guiding government agencies at all levels, the private sector, and nongovernmental organizations to work seamlessly to prepare for, prevent, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and reduce harm to the environment.

National Plan of Integrated Airport Systems (NPIAS)—A national airport plan prepared by the FAA in accordance with Section 47103 of Title 49 of the United States Code; the plan includes primary and commercial service airports, all general aviation airports designated as reliever airports by the FAA, and selected general aviation airports.

Part 139 airport—An airport that serves scheduled and unscheduled air carrier aircraft with more than 30 seats, serves scheduled air carrier operations in aircraft with more than 9 seats but less than 31 seats, and that the FAA Administrator requires to have a certificate for operation.

Primary airport—Public airports receiving scheduled passenger service and having more than 10,000 annual passenger enplanements.

Non-hub primary airport—An airport that enplanes less than 0.05 percent of all commercial passenger enplanements but has more than 10,000 annual enplanements.

Non-primary commercial service airport—A public airport receiving scheduled passenger service and having 2,500 or more enplaned passengers per year but fewer than 10,000 annual passenger enplanements.

Reliever airport—A high-capacity general aviation airport in a major metropolitan area; such airports must have 100 or more based aircraft or 25,000 annual itinerant operations; the FAA officially designates reliever airports.

Small hub airport—An airport that enplanes 0.05 percent to 0.25 percent of total U.S. passenger enplanements.

Tabletop exercise (TTX)—An activity that involves key personnel discussing simulated scenarios in an informal setting. This type of exercise can be used to assess plans, policies, and procedures; or to assess the systems needed to guide the prevention of, response to, and recovery from a defined incident. TTXs typically are aimed at facilitating understanding of concepts, identifying strengths and shortfalls, and achieving changes in attitude. Participants are encouraged to discuss issues in depth and develop decisions through slow-paced problem solving, rather than the rapid, spontaneous decision making that occurs under actual or simulated emergency conditions.

Unified Command—The Unified Command organization operating within NIMS consists of the Incident Commanders from the various jurisdictions or organizations operating together to form a single command structure.

ACRONYMS

AEP	Airport emergency plan
AK	FAA Alaska Region
ANG	Air National Guard
ARFF	Aircraft rescue and fire fighting
ASP	Airport security program
BCP	Business continuity planning
BFD	Boise Fire Department
BFF	Western Nebraska Regional Airport
BOI	Boise International Airport
BOS	Boston Logan International Airport
CBP	Customs and Border Patrol
CBRNE	Chemical, biological, radiological, nuclear, and explosive
CDC	Centers for Disease Control and Prevention
CE	FAA Central Region
CI/KR	Critical infrastructure/key resource
COB	Continuity of business
COOP	Continuity of operations
CS	Commercial service airport
EA	FAA Eastern Region
EM	Emergency management
EMAC	Emergency Management Assistance Compact
EMC	Emergency Management Council
EOC	Emergency operations center
FBI	Federal Bureau of Investigation
FBO	Fixed-base operator
FTE	Full-time equivalent employee
GA	General aviation airport
GL	FAA Great Lakes Region
IC	Incident Commander
IMT	Incident Management Team
IROPS	Irregular operations
LE	Law enforcement
LH	Large hub airport
Massport	Massachusetts Port Authority
MEMA	Massachusetts Emergency Management Agency
MH	Medium hub airport
NE	FAA New England Region
NH-P	Non-hub primary airport
NIMS	National Incident Management System
NM	FAA Northwest Mountain Region
NPIAS	National Plan of Integrated Air Systems
OCEMO	Orange County Emergency Management Organization
R	Reliever airport
REG 22	Nebraska Region 22 Emergency Management
SEMS	State Emergency Management System (California)
SH	Small hub airport
SNA	John Wayne Airport
SO	FAA Southern Region
SP	State police
SW	FAA Southwest Region
UASI	Urban Areas Security Initiative
UC	Unified Command
USAF	U. S. Air Force
USCG	U. S. Coast Guard
WP	FAA Western Pacific Region

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APPENDIX A

Questionnaires

AIRPORT QUESTIONNAIRE USED IN SURVEY

When there is an incident, emergency, accident, or disaster actually or potentially involving the airport, what is the airport's main point of contact to coordinate with local agencies?

( ) a. The local (city, county, or local multi-county regional) EM agency
( ) b. The state EM agency
( ) c. A federal agency
( ) d. The airport's EOC or emergency manager acting 1:1 with all outside agencies
( ) e. Something else
( ) f. None of the above
( ) g. Don't know

If you answered a, b, c, or e, please specify what agency is the airport's main point of contact? (open-ended)

In a brief paragraph, please describe the overall balance of relations with all EM and related agencies, on-airport and off-airport. What relationships are most basic for what types of incidents? (open-ended)

The following questions pertain to relationships with off-airport agencies.

On a scale of 1 to 5, how would you rate your satisfaction with the relationship between the local EM agency and the airport?

(1) Highly unsatisfactory
(2) Somewhat unsatisfactory
(3) Uneven
(4) Somewhat satisfactory
(5) Highly satisfactory
(6) No opinion
(7)

What are the major factors that contribute to the rating you gave the relationship? (open-ended)

What benefits does the airport see from good working relationships between airports and local or regional EM agencies? (open-ended)

Does your airport quantify such benefits in any way?

( ) Yes
( ) No
( ) Don't know

If yes, please describe how you measure, describe, or report such benefits? (open-ended)

Which of the following methods do you recommend for promoting strong working relationships between airports and local or regional EM agencies?

( ) Regular meetings
( ) Joint planning
( ) Joint drilling
( ) Joint exercising
( ) Presence in each other's EOC or DOC
( ) Airport desk in agency's EOC
( ) Airport-specific training for agency personnel
( ) EM-specific training for airport personnel
( ) NIMS training
( ) ICS training
( ) NIMS refresher training
( ) ICS refresher training
( ) Cross-training
( ) EMA participation in part 139 exercises
( ) Table top exercises

( ) Functional exercises
( ) Peer-review of programs by other airport or EMA
( ) Peer-review of plans by other airport or EMA
( ) Peer-review of training by other airport or EMA
( ) Airport observing EMA exercises
( ) EMA observing airport exercises
( ) Airport having designated liaison person to EMA
( ) EMA having designated liaison person to airport
( ) Airport having dedicated EM position(s)
( ) Airport having EM assigned as a major collateral duty to mid-level or senior manager
( ) Airport having EM assigned as a major collateral duty to a lower level manager
( ) Joint participation in outside functional training such as TEEX
( ) Airport and EMA periodically evaluate effectiveness of relationship
( ) Formal accountability system to mayor, board, or other sponsor or owner
( ) Airport participates in regional emergency or disaster coordination effort
( ) Airport knows EMAC procedure and has written procedure for contacting EMAC
( ) Airport knows FEMA regional representative and has written procedure for contacting FEMA
( ) Other(s) (Please specify.)

Which of the following methods do you actually use for promoting strong working relationships between airports and local or regional EM agencies?

( ) Joint planning
( ) Joint drilling
( ) Joint exercising
( ) Presence in each other's EOC or DOC
( ) Airport desk in agency's EOC
( ) Airport-specific training for agency personnel
( ) EM-specific training for airport personnel
( ) NIMS training
( ) ICS training
( ) NIMS refresher training
( ) ICS refresher training
( ) Cross-training
( ) EMA participation in part 139 exercises
( ) Table top exercises
( ) Functional exercises
( ) Peer-review of programs by other airport or EMA
( ) Peer-review of plans by other airport or EMA
( ) Peer-review of training by other airport or EMA
( ) Airport observing EMA exercises
( ) EMA observing airport exercises
( ) Airport having designated liaison person to EMA
( ) EMA having designated liaison person to airport
( ) Airport having dedicated EM position(s)
( ) Airport having EM assigned as a major collateral duty to mid-level or senior manager
( ) Airport having EM assigned as a major collateral duty to a lower level manager
( ) Joint participation in outside functional training such as TEEX
( ) Airport and EMA periodically evaluate effectiveness of relationship
( ) Formal accountability system to mayor, board, or other sponsor or owner
( ) Airport participates in regional emergency or disaster coordination effort
( ) Airport knows EMAC procedure and has written procedure for contacting EMAC
( ) Airport knows FEMA regional representative and has written procedure for contacting FEMA
( ) Other(s) (Please specify.)

Consider the airport's activities in the most recent two years:

( ) The airport has dispatched emergency equipment off-airport to support a mutual aid partner or sister department
( ) The airport has dispatched emergency personnel off-airport to support a mutual aid partner or sister department

Consider the local or regional EM agency's activities in the most recent two years:

( ) The EMA has dispatched emergency equipment to the airport
( ) The EMA has dispatched emergency personnel to the airport

Please describe briefly one incident, accident, emergency, or disaster in which cooperation and coordination between the local or regional EM agency and your airport could be described as a solution. (open-ended)

The following questions pertain to relationships with on-airport agencies.

What non-airport, on-airport agencies are involved in emergency planning and/or response at the airport? Please mark all that apply.

( ) Airlines
( ) Customer service providers (wheelchairs, carts, skycaps)
( ) Concessionaires
( ) FBO
( ) Tank farm operators/fueling contractors
( ) Security contractors
( ) Architects and engineers
( ) ARFF that is a tenant rather than an organic part of the airport's organization
( ) LE that is a tenant rather than an organic part of the airport's organization
( ) FAA
( ) TSA
( ) CBP
( ) FBI
( ) CDC
( ) ANG, USAF, or other military joint use on airport
( ) U.S. Marshals
( ) Air Marshals

EMERGENCY MANAGEMENT AGENCY QUESTIONNAIRE USED IN SURVEY

When there is an incident, emergency, accident, or disaster actually or potentially involving the airport, what is the airport's main point of contact to coordinate with local agencies?

( ) a. The local (city, county, or local multi-county regional) EM agency
( ) b. The state EM agency
( ) c. A federal agency
( ) d. The airport's EOC or emergency manager acting 1:1 with all outside agencies
( ) e. Something else
( ) f. None of the above
( ) g. Don't know

If you answered a, b, c, or e, please specify what agency is the airport's main point of contact? (open-ended)

Is your agency the one named in the preceding question?

( ) Yes
( ) No

In a brief paragraph, please describe the overall balance of relations with all EM and related agencies, on-airport and off-airport. What relationships are most basic for what types of incidents? (open-ended)

On a scale of 1 to 5, how would you rate your satisfaction with the relationship between the local EM agency and the airport?

(1) Highly unsatisfactory
(2) Somewhat unsatisfactory
(3) Uneven
(4) Somewhat satisfactory
(5) Highly satisfactory
(6) No opinion

What are the major factors that contribute to the rating you gave the relationship? (open-ended)

What benefits does the EM agency see from good working relationships between airports and local or regional EM agencies? (open-ended)

Does your agency quantify such benefits in any way?

( ) Yes
( ) No
( ) Don't know

If yes, please describe how you measure, describe, or report such benefits? (open-ended)

Which of the following methods do you recommend for promoting strong working relationships between airports and local or regional EM agencies?

( ) Regular meetings
( ) Joint planning
( ) Joint drilling
( ) Joint exercising
( ) Presence in each other's EOC or DOC
( ) Airport desk in agency's EOC
( ) Airport-specific training for agency personnel
( ) EM-specific training for airport personnel
( ) NIMS training
( ) ICS training
( ) NIMS refresher training
( ) ICS refresher training
( ) Cross-training
( ) EMA participation in part 139 exercises
( ) Table top exercises
( ) Functional exercises
( ) Peer-review of programs by other airport or EMA
( ) Peer-review of plans by other airport or EMA
( ) Peer-review of training by other airport or EMA
( ) Airport observing EMA exercises
( ) EMA observing airport exercises
( ) Airport having designated liaison person to EMA
( ) EMA having designated liaison person to airport
( ) Airport having dedicated EM position(s)
( ) Airport having EM assigned as a major collateral duty to mid-level or senior manager
( ) Airport having EM assigned as a major collateral duty to a lower level manager
( ) Joint participation in outside functional training such as TEEX
( ) Airport and EMA periodically evaluate effectiveness of relationship
( ) Formal accountability system to mayor, board, or other sponsor or owner
( ) Airport participates in regional emergency or disaster coordination effort
( ) Airport knows EMAC procedure and has written procedure for contacting EMAC
( ) Airport knows FEMA regional representative and has written procedure for contacting FEMA
( ) Other(s) (Please specify.)

Which of the following methods do you actually use for promoting strong working relationships between airports and local or regional EM agencies?

( ) Regular meetings
( ) Joint planning
( ) Joint drilling
( ) Joint exercising
( ) Presence in each other's EOC or DOC
( ) Airport desk in agency's EOC
( ) Airport-specific training for agency personnel
( ) EM-specific training for airport personnel
( ) NIMS training
( ) ICS training
( ) NIMS refresher training
( ) ICS refresher training
( ) Cross-training
( ) EMA participation in part 139 exercises
( ) Table top exercises
( ) Functional exercises
( ) Peer-review of programs by other airport or EMA
( ) Peer-review of plans by other airport or EMA
( ) Peer-review of training by other airport or EMA
( ) Airport observing EMA exercises
( ) EMA observing airport exercises
( ) Airport having designated liaison person to EMA
( ) EMA having designated liaison person to airport
( ) Airport having dedicated EM position(s)
( ) Airport having EM assigned as a major collateral duty to mid-level or senior manager
( ) Airport having EM assigned as a major collateral duty to a lower level manager

( ) Joint participation in outside functional training such as TEEX (Texas A&M Extension Training Service)
( ) Airport and EMA periodically evaluate effectiveness of relationship
( ) Formal accountability system to mayor, board, or other sponsor or owner
( ) Airport participates in regional emergency or disaster coordination effort
( ) Airport knows EMAC procedure and has written procedure for contacting EMAC
( ) Airport knows FEMA regional representative and has written procedure for contacting FEMA
( ) Other(s) (Please specify.)

Consider the airport's activities in the most recent two years:

( ) The airport has dispatched emergency equipment off-airport to support a mutual aid partner or sister department
( ) The airport has dispatched emergency personnel off airport to support a mutual aid partner or sister department

Consider the local or regional EM agency's activities in the most recent two years:

( ) The EMA has dispatched emergency equipment to the airport
( ) The EMA has dispatched emergency personnel to the airport

Please describe briefly one incident, accident, emergency, or disaster in which cooperation and coordination between the airport and your agency could be described as a solution. (open-ended)

The following questions pertain to relationships with on-airport agencies.

With which non-airport, on-airport agencies is your agency involved in emergency planning and/or response at the airport? Please mark all that apply.

( ) Airlines
( ) Customer service providers (wheelchairs, carts, skycaps)
( ) Concessionaires
( ) FBO
( ) Tank farm operators/fueling contractors
( ) Security contractors
( ) Architects and engineers
( ) ARFF that is a tenant rather than an organic part of the airport's organization
( ) LE that is a tenant rather than an organic part of the airport's organization
( ) FAA
( ) TSA
( ) CBP
( ) FBI
( ) CDC
( ) ANG, USAF, or other military joint use on airport
( ) U.S. Marshals
( ) Air Marshals

APPENDIX B

Airports and Emergency Management Agency Respondents

Responding Airports

(Shaded rows indicate airports for which EM agencies responded to the survey.)

Airport Name	Code	NPIAS	Governance	City	State or Province	FAA Reg.
Albuquerque Int'l. Sunport	ABQ	MH	City Department	Albuquerque	NM	SW
Addison	ADS	R	City Department	Addison	TX	SW
Altoona–Blair County	AOO	CS	County Authority	Altoona	PA	EA
Centennial	APA	R	County Department	Englewood	CO	NM
Warrenton–Astoria Regional	AST	CS	Port Authority	Astoria	OR	NM
Hanscom Field	BED	GA	Port Authority	Bedford	MA	NE
Western Nebraska Regional	BFF	CS	County Authority	Scotts Bluff	NE	CE
Raleigh County Memorial	BKW	CS	County Authority	Beckley	WV	EA
Boise	BOI	SH	City Department	Boise	ID	NM
Boston Logan Int'l.	BOS	LH	Port Authority	Boston	MA	NE
Jack Brooks Regional	BPT	NH-P	County Department	Beaumont	TX	SW
Baton Rouge Metropolitan	BTR	SH	City and Parish	Baton Rouge	LA	SW
Akron–Canton	CAK	SH	Regional Authority	North Canton	OH	GL
Cedar City Regional	CDC	CS	City Department	Cedar City	UT	NM
Port Columbus Int'l	CMH	MH	Airport Authority	Columbus	OH	GL
Cotulla–LaSalle County	COT	GA	County Department	Cotulla	TX	SW
Chennault Int'l.	CWF	GA	Industrial Auth.	St. Charles	LA	SW
Denver Int'l.	DEN	LH	City & County Department	Denver	CO	NM
Dallas–Ft Worth Int'l.	DFW	LH	Authority/Corp.	DFW Airport	TX	SW
Duluth Int'l.	DLH	NH-P	Airport Authority	Duluth	MN	GL
Sedalia Regional	DMO	GA	City Department	Sedalia	MO	CE
Detroit Metropolitan Int'l.	DTW	LH	Airport Authority	Detroit	MI	GL
Phoenix Deer Valley	DVT	R	City Department	Phoenix	AZ	WP
El Paso Int'l.	ELP	SH	City Department	El Paso	TX	SW
Hector Int'l.	FAR	SH	Airport Authority	Fargo	ND	GL
Flying Cloud	FCM	R	Airport Authority	Eden Prairie	MN	GL
Flagstaff Pulliam	FLG	NH-P	City Department	Flagstaff	AZ	WP
Page Field	FMY	R	Port Authority	Ft. Myers	FL	SO
Range Regional	HIB	NH-P	Airport Authority	Hibbing	MN	GL
Phoenix–Mesa Gateway	IWA	SH	Airport Authority	Mesa	AZ	WP

Airport Name	Code	NPIAS	Governance	City	State or Province	FAA Reg.
Jackson–Evers Int'l	JAN	SH	Airport Authority	Jackson	MS	SO
Concord Regional	JQF	GA	City Department	Concord	NC	GA
Los Angeles Int'l.	LAX	LH	City Department	Los Angeles	CA	WP
Rickenbacker Int'l.	LCK	GA	Airport Authority	Columbus	OH	GL
Long Beach	LGB	SH	City Department	Long Beach	CA	WP
Laredo Int'l.	LRD	NH-P	City Department	Laredo	TX	SW
Livermore Municipal	LVK	R	City Department	Livermore	CA	WP
Lynchburg Regional	LYH	NH-P	City Department	Lynchburg	VA	EA
Kansas City Int'l.	MCI	MH	City Department	Kansas City	MO	CE
Orlando Int'l.	MCO	LH	Airport Authority	Orlando	FL	SO
Memphis Int'l.	MEM	MH	Airport Authority	Memphis	TN	SO
McKellar–Sipes Regional	MKL	CS	City & County Department	Jackson	TN	SO
Morristown Municipal	MMU	R	City-owned, operated by private corporation	Morristown	NJ	EA
Northwest Alabama Regional	MSL	CS	County Department	Muscle Shoals	AL	SO
Minneapolis–St. Paul Int'l.	MSP	LH	Airport Authority	Minneapolis	MN	GL
Martha's Vineyard	MVY	NH-P	County Department	Vineyard Haven	MA	NE
Oakland Int'l.	OAK	MH	Port Authority	Oakland	CA	WP
Oxnard	OXR	CS	County Department	Oxnard	CA	WP
Palm Beach Int'l.	PBI	MH	County Department	West Palm Beach	FL	SO
Portland Int'l.	PDX	MH	Port Authority	Portland	OR	NM
Phoenix Sky Harbor Int'l.	PHX	LH	City Department	Phoenix	AZ	WP
New River Valley	PSK	GA	Airport Authority	Dublin	VA	EA
Portsmouth Int'l. at Pease	PSM	GA	Devel Authority	Portsmouth	NH	NE
Rapid City Regional	RAP	NH-P	City Department	Rapid City	SD	GL
Rawlins Municipal	RWL	CS	Airport Authority	Rawlins	WY	NM
San Diego Int'l.	SAN	LH	County Department	San Diego	CA	WP
San Antonio Int'l.	SAT	MH	City Department	San Antonio	TX	SW
Savannah–Hilton Head Int'l.	SAV	SH	Airport Authority	Savannah	GA	SO
Seattle–Tacoma Int'l.	SEA	LH	Port Authority	Seatac	WA	NM
Sulphur Springs Municipal	SLR	GA	City Department	Sulphur Springs	TX	SW
John Wayne	SNA	MH	County Department	Costa Mesa	CA	WP
Friedman Memorial	SUN	NH-P	City & County Department	Hadley	ID	NM
Thief River Falls Int'l.	TVF	CS	Airport Authority	Thief River Falls	MN	GL
Van Nuys	VNY	R	City Department	Los Angeles	CA	WP

Airport Name	Code	NPIAS	Governance	City	State or Province	FAA Reg.
Willow Run	YIP	R	Airport Authority	Ypisilanti	MI	GL
Calgary Int'l.	YYC	LH	Airport Authority	Calgary	AB	Can
Toronto Pearson Int'l.	YYZ	LH	Airport Authority	Toronto	ON	Can

Responding Emergency Management Agencies

EM Agency	City	State	Code	NPIAS	FAA Reg
City of Albuquerque Office of EM	Albuquerque	NM	ABQ	MH	SW
Blair County 911 Center	Altoona	PA	AOO	CS	EA
South Metro Fire Rescue	Englewood	CO	APA	R	NM
Clatsop County Emergency Services Division	Astoria	OR	AST	CS	NM
Massport	Boston	MA	BED	GA	NE
Nebraska Region 22 EM	Scotts Bluff	NE	BFF	CS	CE
Boise Fire Department	Boise	ID	BOI	SH	NM
Massachusetts EM Agency	Boston	MA	BOS	LH	NE
Jack Brooks Regional Fire Department	Beaumont	TX	BPT	NH-P	SW
Summit County EM Agency	Akron	OH	CAK	SH	GL
Franklin County EM Agency	Columbus	OH	CMH	MH	GL
Calcasieu Parish EM Agency	Lake Charles	LA	CWF	GA	SW
City & County of Denver Office of EM and Homeland Security	Denver	CO	DEN	LH	NM
City of Grapevine Fire Department	Grapevine	TX	DFW	LH	SW
Sedalia–Pettis County EMA	Sedalia	MO	DMO	GA	CE
Cass Fargo EM	Fargo	ND	FAR	SH	GL
City of Eden Prairie Fire Department	Eden Prairie	MN	FCM	R	GL
Flagstaff Fire Department	Flagstaff	AZ	FLG	NH-P	WP
Hibbing Fire Department	Hibbing	MN	HIB	NH-P	GL
City of Mesa—Emergency Operations	Mesa	AZ	IWA	SH	WP
City of Los Angeles EM Department	Los Angeles	CA	LAX	LH	WP
Franklin County EM Agency	Columbus	OH	LCK	GA	GL
Laredo Fire Department	Laredo	TX	LRD	NH-P	SW
Orange County Office of EM	Orlando	FL	MCO	LH	SO
Jackson–Madison County EM Agency	Jackson	TN	MKL	CS	SO
Morristown Police Department	Morristown	NJ	MMU	R	EA
Ventura County Office of Emergency Services	Ventura	CA	OXR	CS	WP

EM Agency	City	State	Code	NPIAS	FAA Reg
Palm Beach County Fire Rescue	West Palm Beach	FL	PBI	MH	SO
Pulaski County	Pulaski	VA	PSK	GA	EA
Chatham EM Agency	Savannah	GA	SAV	SH	SO
King County EM	Seattle	WA	SEA	LH	NM
Suphur Springs Police Department	Sulphur Springs	TX	SLR	GA	SW
Orange County Sheriff's Department	Santa Ana	CA	SNA	MH	WP
Calgary Police	Calgary	AB	YYC	LH	Can
Teel Regional Police	Brampton	ON	YYZ	LH	Can

APPENDIX C

PHX EP Bulletin

PHX EPBulletin

Emergency Preparedness Bulletin — *Failing To Plan Is Planning To Fail*

TOPIC: Emergency Notification - Letting the Masses Know ASAP

With the 2013 monsoon season almost upon us, timely notification of pending airport weather, and other major aviation events is crucial to airport operations. The City of Phoenix Aviation Department owns and operates an Emergency Notification System (ENS) used to send out routine and emergency messages to individuals and groups involved in activities at the City's three airports of Sky Harbor, Deer Valley and Goodyear. The current system is capable of sending out messages to hundreds of devices and individuals at a time. The system sends messages to voice devices such as telephones; Short Message Service (SMS) devices such as Smart Phones; and wireless devices such as radios and email addresses.

July 2011 Dust Storm at Sky Harbor Airport

The airport ENS can attempt to contact an individual through multiple communication methods until it receives a confirmation from the individual. The system is also capable of receiving responses from communication devices and executing actions based upon those responses. There are currently 100+ various groups, 1058 individuals, and 2616 communication devices set up in the system.

Effective next month, the Aviation Department will begin using an enhanced ENS system called Everbridge. Everbridge is widely used in the airline, airport and transportation industries, and is a recognized leader in incident notification systems. This enhanced ENS merges technology with industry expertise to allow better communications in a crisis. Everbridge is capable of integrating with existing airport technologies, including security systems, sensors, access control, smoke detectors, weather alerting and more. Because Everbridge focuses exclusively on incident notification, they will work closely with Sky Harbor Airport staff to customize and refine our current solutions, and will assist to anticipate evolving future challenges for the City of Phoenix Aviation Department and it's numerous customers, partners and stakeholders.

Upcoming: Drills / Exercises / Training

America's Friendliest Airport is America's Most Prepared Airport!

- PHX Sky Train Tabletop Exercises: On-going
- Mobile Command Vehicle (MCV) Briefings: On-going
- Sky Harbor—Honeywell Joint Exercise: June 26, 2013
- AZ Statewide Exercise (SWE): November 6-7, 2013

For more information on Sky Harbor Emergency Preparedness, contact:

Scott.Maxwell@phoenix.gov; 273-2703
Christopher.Rausch@phoenix.gov; 273-4542
Kimberly.L.Brown@phoenix.gov; 273-3386
Diane.Sanchez@phoenix.gov; 273-4031

*The **E**mergency **P**reparedness Bulletin is a monthly publication used to relay various emergency preparedness related topics to Aviation staff and business partners. The EPBulletin will include drill, exercise and training schedules as well as important updates, to better assist personnel become more effective and efficient responders during a Sky Harbor Airport emergency. For future issue topic recommendations, please email: Christopher.rausch@phoenix.gov.*

Issue 11- 2 — *It's not a matter of if, it's a matter of when!* — **June 2013**

PHX DVT GYR
City of Phoenix Aviation Department

APPENDIX D

Checklist for Creating and Sustaining Sound Airport–Emergency Agency Relationships

Using the results of the literature review, surveys, and case example interviews, a list of effective practices for creating and sustaining sound airport-emergency agency relationships was developed. This list of 72 elements is presented here as a checklist that can serve as a flight plan for the establishment, maintenance, management, and repair of such relationships. The elements in the checklist are classified as "Essential (E)," "Desirable (D)," or "Context-Sensitive (C)." In general, the context-sensitive elements would apply in special cases where the parties are dealing with a barrier or a broken relationship.

Checklist for Creating and Sustaining Sound Airport–Emergency Agency Relationships		
Element	**Essential (E) Desirable (D) Context-Sensitive (C)**	**Done**
Focus on shared and overlapping missions, especially safety	E	
Strong personal relationships based on respect, trust, and information	E	
Support from airport senior management	E	
Have an airport emergency manager as a full-time position or major collateral duty	E	
Regular meetings, ideally not less frequent than once a month	E	
Focused agenda for meetings	E	
Periodic assessment of the effectiveness of the relationship	E	
Mutual education, for example Airport E0E, Ops E0E, and EM E0E	E	
Clarity regarding roles and responsibilities	E	
Open and honest communication	E	
A focus on finding solutions, not just on identifying problems	E	
A high degree of inclusion	E	
A willingness to learn from each other and from exercises and incidents	E	
Active airport participation in local and regional emergency and disaster organizations or boards	E	
Be proactive	E	
Be willing to invest work to sustain relationships	E	
Consider the effects of a lack of a good relationship	E	
Consistent updating of information regarding roles, responsibilities, resources, capabilities, and constraints	E	
Consistent use of NIMS and ICS	E	
Constant update of information about capabilities and resources	E	
Designate liaison persons in both directions in the relationship	E	
Develop and maintain connectivity	E	
Do not rely totally on formal or structural aspects of relationships	E	
Effective after-exercise and after-action reviews	E	
EM agency participation in triennial exercises	E	
Focus on collaboration and teamwork	E	
Focus on interoperability	E	
Honest and open evaluation of strengths and weaknesses of organizations	E	
ICS training and refresher training	E	
Identify who experts are and establish access to them	E	
Include EM agencies in AEP preparation	E	
Involve full range of stakeholders	E	
Involve senior leadership in exercises	E	
Joint planning	E	
Joint training, drilling, and exercising that are realistic and challenging enough to test procedures and relationship	E	
Maintain copies of each other's plans and procedures	E	
NIMS training and refresher training	E	
Optimize interoperability	E	

Checklist for Creating and Sustaining Sound Airport–Emergency Agency Relationships		
Element	**Essential (E) Desirable (D) Context-Sensitive (C)**	**Done**
Reciprocal visits and tours between airport operational and ARFF personnel	E	
Share information	E	
Use every training, drilling, and exercising opportunity to test and improve the entire team's ability and to reinforce the relationships	E	
Use the power of invitations to keep the airport and the relationship in the forefront of all partners' minds	E	
Airport community and general community awareness of the strong link between EM and business continuity planning	D	
Celebrate variety of experience	D	
Airport observe EM agency exercises	D	
EM agency observe airport exercises	D	
Chart personnel turnover rates in relation to exercise frequencies and results	D	
Formal EM accountability system to mayor, board, or other sponsor or owner	D	
Get everyone on a first name basis	D	
Joint participation in team training at an outside facility run by a state, university, or federal agency	D	
Peer review of exercises	D	
Peer review of plans	D	
Peer review of programs	D	
Physical or virtual presence in each other's EOC	D	
Sensitivity to local culture	D	
Use each other as exercise evaluators	D	
Use of qualitative metrics	D	
Use of quantitative metrics	D	
Use special events to practice cooperation and collaboration and to test plan integration	D	
Airport knows EMAC procedure and has written procedure for contacting EMAC	C	
Airport knows FEMA regional representative and has written procedure for contacting FEMA	C	
Airport personnel volunteer with community EM agency	C	
Educate local EM agencies about airport-to-airport mutual aid including EMAC procedures	C	
Put everything into full regional context, especially the economic context	C	
Willingness to drop old bad habits and move forward	C	
Work out revenue diversion/rates and charges with airlines in advance if you think it might be an issue when something happens	C	

Source: J.F. Smith.

Abbreviations used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation