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Tabletop and Full-Scale Emergency Exercises for General Aviation, Non-Hub, and Small Hub Airports

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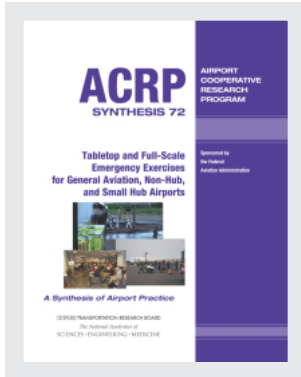
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AIRPORT COOPERATIVE RESEARCH PROGRAM

ACRP SYNTHESIS 72

**Tabletop and Full-Scale
Emergency Exercises
for General Aviation, Non-Hub,
and Small Hub Airports**

A Synthesis of Airport Practice

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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
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Every airport can find benefits from going beyond regulatory minima for training and exercises. This is true of the FAR Part 139 airports as well as for the general aviation airports. The focus of the report is on exercise practices that can be used by small airports; that is, general aviation, reliever, non-hub, and small hub airports. The most direct and useful parts of this report are the sample exercise tools and plans, the checklist of effective practices for tabletop and full-scale emergency exercises, and a road map for developing an effective exercise program. In every instance, this report seeks to enable the reader to be able “grab and go” with many of the ideas and sample exercise materials presented in this effort.

James F. Smith, Smith–Woolwine Associates, Inc; Ricardo E. Garcia; John M. Sawyer, JMS Airfield Safety Consulting LLC; and Kimberly A. Kenville, University of North Dakota, 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.

CONTENTS

xiii	ACRONYMS
1	SUMMARY
3	CHAPTER ONE INTRODUCTION
	Definitions of Types of Exercises, 3
	Exercises That Airports Use, 5
	Study Methodology, 5
	Results, 8
9	CHAPTER TWO RESOURCES AVAILABLE TO AIRPORTS
	Publications, 9
	Courses, 10
	Videos, 12
	Blogs, 13
14	CHAPTER THREE SURVEY RESULTS
	Airport Structure, 14
	National Incident Management System and Incident Command System Implementation, 14
	Airport Staffing, 14
	Types of Exercises Used, 16
	Staff Training for Exercise Development, 16
	Exercise Development, 17
	Exercise Development Tools and Processes Used, 17
	Contact Lists, 18
	When Tabletop Exercises Are Used, 18
	Scenarios, 19
	Design of Exercises, 22
	Participants in Exercises, 23
	Settings and Locations, 25
	Props and Equipment Used in Exercises, 25
	Other Types of Exercises, 25
	Exercise Evaluation, 25
	Defining a Successful Exercise, 27
	Applying the Lessons Learned from Exercises, 27
	Exercise Materials Desired by Airports, 27
29	CHAPTER FOUR CASE EXAMPLES
	Case Example 1: Denver International Airport (DEN) Training Exercise and Design Group, 29
	Case Example 2: Boise International Airport (BOI), 34
	Case Example 3: Rochester International Airport (RST), 35
	Case Example 4: Lakeland Linder Regional Airport (LAL), 40
	Case Example 5: Miami–Opa Locka Executive Airport (OPF), 44
	Case Example 6: Owatonna Degner Regional Airport (OWA), 46
	Common Themes from Case Examples, 49

50	CHAPTER FIVE	ENHANCING EXERCISES AT GENERAL AVIATION, NON-HUB, AND SMALL HUB AIRPORTS Sample Emergency Exercise Materials, 50 Essential and Desirable Elements to Enhance Emergency Exercises, 51
52	CHAPTER SIX	CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH
54	GLOSSARY	
57	REFERENCES	
59	APPENDIX A	SURVEY QUESTIONS AND RESPONSES
77	APPENDIX B	PARTICIPATING AIRPORTS
81	APPENDIX C	GOALS AND OBJECTIVES: FUNCTIONAL EXERCISE #1– ALERT 3 TIME RESPONSE AND ICP EXERCISE
82	APPENDIX D	GOALS AND OBJECTIVES: TARMAC EVACUATION EXERCISE
83	APPENDIX E	GOALS AND OBJECTIVES: OVERALL OBJECTIVES LAL
85	APPENDIX F	TABLE TOP DRILL SCENARIO: HURRICANE (JAX)
86	APPENDIX G	TABLE TOP DRILL SCENARIO: FAMILY ASSISTANCE (RSW)
87	APPENDIX H	FULL-SCALE SCENARIO: AIRCRAFT EMERGENCY (RNO)
88	APPENDIX I	FULL-SCALE SCENARIO: COMPLEX SCENARIO (RSW)
89	APPENDIX J	FUNCTIONAL DRILL: MONTHLY NO-NOTICE FUNCTIONAL DRILL SCENARIO FROM LAL
90	APPENDIX K	EXERCISE PLANNING CHECKLIST FOR TABLE TOP (RNO)
93	APPENDIX L	EXERCISE PLANNING CHECKLIST AND TIMELINE: FULL-SCALE EXERCISE (PHX)
103	APPENDIX M	FULL-SCALE SCENARIO: DETAILED TIMELINE FOR EXERCISE/MASTER SCENARIO EVENTS LIST (MSEL) (HIB)
107	APPENDIX N	EXERCISE BRIEF: AIRCRAFT EMERGENCY TABLE TOP WITH MUTUAL AID PARTNERS (JNL)

108	APPENDIX O	EXERCISE COMMUNICATION PLAN (JAX)
109	APPENDIX P	EXERCISE SAFETY PLAN: FULL-SCALE EXERCISE SAFETY PLAN (LAL)
111	APPENDIX Q	EVALUATION PLAN AND FORMS: EMERGENCY EXERCISE EVALUATION FORM (EUG 2014)
112	APPENDIX R	EVALUATION FORMS: PARTICIPANT FEEDBACK SUMMARY FORM (RNO 2015)
114	APPENDIX S	EVALUATION CHECKLIST: EVALUATION CHECKLIST FOR TABLE TOP EXERCISE (RNO 2015)
118	APPENDIX T	POST-EVENT DOCUMENTATION/HOT WASH SUMMARY: HOT WASH COMMENTS FROM LAL FULL-SCALE EXERCISE (LAL)
119	APPENDIX U	POST-EVENT DOCUMENTATION/HOT WASH SUMMARY: HOT WASH DEBRIEF FOR TRIENNIAL EXERCISE (EUG 2014)
122	APPENDIX V	POST-EVENT DOCUMENTATION/AFTER ACTION REPORT: AAR FOR TTX (JAX 2013)
126	APPENDIX W	POST-EVENT DOCUMENTATION/AFTER ACTION REVIEW: AAR/EMERGENCY PLAN REVIEW (OPF 2015)
129	APPENDIX X	POST-EVENT DOCUMENTATION/AFTER ACTION REVIEW & IMPROVEMENT PLAN (AAR/IP LAL 2013)
134	APPENDIX Y	COMPLETE FULL-SCALE EXERCISE PLAN (HSEEP-BASED) (EUG 2014)
143	APPENDIX Z	CHECKLIST FOR CREATING AND IMPROVING EMERGENCY EXERCISES AT GA, NON-HUB, AND SMALL HUB AIRPORTS
146	APPENDIX AA	ROAD MAP FOR DEVELOPMENT OF EXERCISE PROGRAM

Note: Photographs, figures, and tables in this report may 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.

ACRONYMS

AC	Advisory Circular (FAA)
AAE	Accredited Airport Executive
AAR	After action review
AAR/IP	After action review/improvement plan
A-CERT	Airport Community Emergency Response Team
ACE	Airport Certified Employee
ACI	Airports Council International
ACM	Airport certification manual
AEP	Airport emergency plan
AirTap	Airport Technical Assistance Program (Minnesota)
AOA	Air operations area
APA	Centennial Airport
API	Airport Performance Indicator
ARFF	Aircraft Rescue and Fire Fighting
ASE	Aspen/Pitken County Airport
ASP	Airport security program
ATC	Air traffic control
ATCT	Air traffic control tower
ATL	Hartsfield–Jackson Atlanta International Airport
AVSEC	Aviation Security
BFF	Western Nebraska Regional Airport
BIS	Bismarck International Airport
BOI	Boise International Airport
BUR	Bob Hope Airport
CBP	U.S. Customs and Border Protection
CDP	Center for Domestic Preparedness in Anniston, AL
CERT	Community Emergency Response Team
CFR	Code of Federal Regulations
CFRPC	Central Florida Regional Planning Commission
CM	Certified Member (AAAAE)
COMM	Communications
COS	Colorado Springs Municipal Airport
CRW	Yeager Airport
CS	Non-primary commercial service airport in Essential Air Service program
CTOS	Center for Rad/Nuclear Training at the Nevada Test Site
DCA	Washington Ronald Reagan National Airport
DEN	Denver International Airport
DFW	Dallas/Fort Worth International Airport
DIA	Denver International Airport (acronym used by airport and city)
DVL	Devils Lake Regional Airport
DVT	Phoenix Deer Valley Airport
EAS	Essential Air Service
EGV	Eagle River Union Airport
EM	Emergency management
EMI	Emergency Management Institute (of FEMA)
EMP	Emergency Management Plan
EOC	Emergency operations center
EPG	Executive Policy Group
EPA	Environmental Protection Agency
EPM	Emergency Procedures Manual
EUG	Eugene Airport
EXPLAN	Exercise plan

FAR	Federal Aviation Regulation
FAR	Hector International Airport
FBO	Fixed base operator
FEMA	Federal Emergency Management Agency
FLL	Fort Lauderdale–Hollywood International Airport
FOD	Fort Dodge Regional Airport
FOUO	For official use only
FSD	Federal Security Director
GA	General aviation airport
GA	General aviation
GMJ	Grove Regional Airport
GYR	Phoenix Goodyear Airport
HAZMAT	Hazardous materials
HIB	Range Regional Airport
HSEEP	Homeland Security Exercise and Evaluation Program
IAEM	International Association of Emergency Managers
IAP	Incident action plan
IC	Incident commander
ICP	Incident command post
ICS	Incident Command System
IMT	Incident Management Team
IP	Improvement Plan
IT	Information technology
IWA	Phoenix–Mesa Gateway Airport
JAX	Jacksonville International Airport
JIC	Joint information center
JIO	Joint information officer
JLN	Joplin Regional Airport
LAL	Lakeland Linder Regional Airport
LAWA	Los Angeles World Airports
LAX	Los Angeles International Airport
LEO	Law enforcement officer, law enforcement organization
LEX	Blue Grass Airport
LH	Large hub airport
LPD	Lakeland (FL) Police Department
LVK	Livermore Municipal Airport
MAC	Metropolitan Airports Commission
MACC	Multi-agency coordination center
MCO	Orlando International Airport
MDAD	Miami–Dade Aviation Department
MDFR	Miami–Dade Fire Rescue
MDPD	Miami–Dade Police Department
MEM	Memphis International Airport
MH	Medium hub airport
MIA	Miami International Airport
MMU	Morristown Municipal Airport
MSEL	Master Scenario Events List
MSP	Minneapolis–St. Paul International Airport
MTV	Blue Ridge Airport
MVY	Martha’s Vineyard Airport
MWAA	Metropolitan Washington Airports Authority
NAS	National Airspace System
Navaid	Navigation aid
NH	Non-hub primary airport
NIMS	National Incident Management System
NOTAM	Notice to Airmen
NPIAS	National Plan of Integrated Airport Systems

NTSB	National Transportation Safety Board
NYL	Yuma International Airport
O&M	Operations and maintenance
OPF	Miami–Opa Locka Executive Airport
ORK	North Little Rock Municipal Airport
OWA	Owatonna Degner Regional Airport
PA	Public address
PHX	Phoenix Sky Harbor International Airport
PIO	Public information officer
PR	Public relations
PSK	New River Valley International Airport
RDU	Raleigh–Durham International Airport
RL	Reliever airport
RNO	Reno–Tahoe International Airport
RSW	Southwest Florida International Airport
SAV	Savannah/Hilton Head International Airport
SEA	Seattle–Tacoma International Airport
SFO	San Francisco International Airport
SH	Small hub airport
SLC	Salt Lake City International Airport
SME	Subject matter expert
SOP	Standard operating procedure
SSI	Sensitive Security Information
STL	Lambert–St. Louis International Airport
SXQ	Soldotna Airport
TMB	Miami Executive Airport
TNT	Dade–Collier Training and Transition Airport
TTX	Tabletop exercise
UC	Unified command
UZA	Rock Hill–York County Airport
VQQ	Cecil Airport
WVI	Watsonville Municipal Airport
X51	Miami Homestead General Aviation Airport
YIP	Willow Run Airport

TABLETOP AND FULL-SCALE EMERGENCY EXERCISES FOR GENERAL AVIATION, NON-HUB, AND SMALL HUB AIRPORTS

SUMMARY The focus of the report is on exercise practices that can be used by small airports; that is, general aviation, reliever, non-hub, and small hub airports. The most immediately useful parts of this report are the sample exercise tools and plans, the checklist of effective practices for tabletop and full-scale emergency exercises, and a road map for developing an effective exercise program. The purpose is to enable the reader to “grab and go” from the ideas and sample exercise materials, derived from a survey of 58 U.S. airports regarding specific exercise plans and procedures; and from six detailed case examples. The checklist is designed to assist airport managers, emergency managers, and planners in the development, implementation, and evaluation of effective exercise programs. The sample materials are introduced in chapter five and provided in Appendices C through Y. The checklist appears as Appendix Z to this report. Appendix AA is a road map for the development of an exercise program at an airport of any type or size.

Every airport in the study, general aviation as well as FAA Part 139, found benefits from going beyond regulatory minima for training and exercises. Many reported that the exercise guidance in the DHS Exercise and Evaluation Program (HSEEP, Figure 1) provides the most effective model for exercises, but most of those airports noted that extensive effort is required to prepare staff to use HSEEP and to adapt the HSEEP materials to fit the airport environment. Most often, airports said that they have received valuable assistance from local government agency partners in developing exercises, particularly exercises using HSEEP templates and forms. Exercises and their outcomes are meaningless unless the lessons learned are applied through a formal process.

Analysis of the data led to 13 conclusions, detailed in chapter six, “Conclusions and Suggestions for Further Research”:

1. Small airports can and do have effective exercise programs.
2. Many airports in the study believe that an effective exercise program not only improves safety but also enhances customer service.
3. Even airports that are not required to have exercises by FAR Part 139 may choose to carry out tabletop and/or full-scale exercises.
4. Many larger airports have usable, scalable exercise tools that they are willing to share with smaller airports, which will save time and assist them in conducting effective exercises.
5. Small airports with limited resources may have difficulty adapting HSEEP-based exercise materials to the airport environment, but requesting training from emergency management agencies that are already familiar with HSEEP procedures and/or resources can be helpful.
6. Airports can benefit from using a building-block approach; that is, beginning with discussion-based exercises that lead to tabletop exercises and then to full-scale exercise.
7. It is helpful if an airport’s target capabilities determine the exercise, not the other way around. It is important that airports of all sizes consider various scenarios based on likelihood, severity, and impact of possible events.
8. Stakeholder involvement can minimize cost and maximize exercise effectiveness.
9. Airports that use exercise control teams structured on Incident Command System principles and use an explicit exercise safety plan are typically more satisfied.
10. It is productive to incorporate communications procedures and plans into tabletop and full-scale exercises.



FIGURE 1 Elements of HSEEP (DHS 2013).

11. It is typical for exercise plans to include formal evaluation procedures.
12. Airports that have a formal process for incorporating lessons learned from exercises into emergency plan and procedures appear to feel more secure about their preparedness and resiliency.
13. No evaluation criteria for emergency exercise effectiveness were reported.

Chapter one describes the types of exercises that airports currently use and the study methodology. Chapter two summarizes the results of a literature review concerning resources available to airports concerning emergency exercise planning and application, and criteria for follow-up interviews. Chapter three summarizes the information gleaned through the survey. Chapter four describes the six case examples, while chapter five outlines sample exercise materials reproduced in Appendices C through Y. Chapter six presents conclusions drawn from the synthesis and suggestions for further research.

CHAPTER ONE

INTRODUCTION

The objective of this study was to compile existing resources, experiences, and effective practices from U.S. airports that conduct tabletop and full-scale emergency exercises in order to make them more accessible and efficient by general aviation (GA), including reliever, non-hub, and small hub airports that may lack the resources (staff or financial) to develop a large-scale exercise or comprehensive exercise program on their own. This project provides airports, tenants, and other various internal and external stakeholders the airport emergency planning information required by the FAA.

Federal Aviation Regulations (FAR) Part 139 requires an airport serving certain air carrier operations to have emergency preparedness training on a regular basis as a part of the airport's emergency plan (AEP). Airport emergency planning and training usually deals with the response to an accident or incidents on the airport or nearby. Typical training exercises that most airports utilize and are required by FAR Part 139 are tabletop exercises (TTX) and full-scale emergency exercises. The materials presented in this study are equally useful for general aviation and reliever airports that are not subject to FAR Part 139 requirements but wish to enhance their preparedness through an effective exercise program.

Exercises required by the TSA as part of Parts 1540, 1542, and 1544 (Aviation Security/AVSEC) lie outside the scope of this study; however, several of the questions in the survey for this study addressed the extent to which TSA and other security partners are involved in airports' emergency exercise planning, execution, and evaluation. State aviation security exercise requirements also lie outside the scope of this study, but will be noted in passing when a respondent mentioned them.

This chapter describes these exercises, the methodology of this synthesis, and identifies how case example airports were chosen to illustrate some creative and effective practices in the industry.

DEFINITIONS OF TYPES OF EXERCISES

The DHS Homeland Security Exercise and Evaluation Program (HSEEP) defines seven types of exercises and divides the exercises into two classes: Discussion-Based Exercises and Operations-Based Exercises (DHS 2013, pp. 2.4–2.6). The DHS describes them as follows:

Discussion-Based Exercises

Discussion-based exercises include seminars, workshops, TTXs, and games. These types of exercises can be used to familiarize players with, or develop new, plans, policies, agreements, and procedures. Discussion-based exercises often focus on strategic, policy-related issues. Facilitators and/or presenters usually lead the discussion, keeping participants on track towards meeting exercise objectives.

Seminars

Seminars generally orient participants to, or provide an overview of, authorities, strategies, plans, policies, procedures, protocols, resources, concepts, and ideas. As a discussion-based exercise, seminars can be valuable for entities that are developing or making major changes to existing plans or procedures. Seminars can be similarly helpful when attempting to assess or gain awareness of the capabilities of interagency or inter-jurisdictional operations.

Workshops

Although similar to seminars, workshops differ in two important aspects: Participant interaction is increased, and the focus is placed on achieving or building a product. Effective workshops entail the broadest attendance by relevant stakeholders.

Products produced from a workshop can include new standard operating procedures (SOPs), emergency operations plans, continuity of operations plans, or mutual aid agreements. To be effective, workshops should have clearly defined objectives, products, or goals, and should focus on a specific issue.

Table Top Exercises (TTX)

A TTX is intended to generate discussion of various issues regarding a hypothetical, simulated emergency. Table top exercises can be used to enhance general awareness, validate plans and procedures, rehearse concepts, and/or assess the types of systems needed to guide the prevention of, protection from, mitigation of, response to, and recovery from a defined incident. Generally, table top exercises are aimed at facilitating conceptual understanding, identifying strengths and areas for improvement, and/or achieving changes in perceptions.

During a TTX, players are encouraged to discuss issues in depth, collaboratively examining areas of concern and solving problems. The effectiveness of a TTX is derived from the energetic involvement of participants and their assessment of recommended revisions to current policies, procedures, and plans.

Table top exercises can range from basic to complex. In a basic TTX (such as a Facilitated Discussion), the scenario is presented and remains constant—it describes an emergency and brings discussion participants up to the simulated present time. Players apply their knowledge and skills to a list of problems presented by the facilitator, problems are discussed as a group, and resolution is reached and documented for later analysis.

In a more advanced TTX, play advances as players receive pre-scripted messages that alter the original scenario. A facilitator usually introduces problems one at a time in the form of a written message, simulated telephone call, videotape, or other means. Players discuss the issues raised by each problem, referencing established authorities, plans, and procedures for guidance. Player decisions are incorporated as the scenario continues to unfold.

During a TTX, all participants should be encouraged to contribute to the discussion and be reminded that they are making decisions in a no-fault environment. Effective TTX facilitation is critical to keeping participants focused on exercise objectives and associated capability targets.

Games

A game is a simulation of operations that often involves two or more teams, usually in a competitive environment, using rules, data, and procedures designed to depict an actual or hypothetical situation. Games explore the consequences of player decisions and actions. They are useful tools for validating plans and procedures or evaluating resource requirements.

During game play, decision-making may be either slow and deliberate or rapid and more stressful, depending on the exercise design and objectives. The open, decision-based format of a game can incorporate “what if” questions that expand exercise benefits. Depending on the game’s design, the consequences of player actions can be either pre-scripted or decided dynamically. Identifying critical decision-making points is a major factor in the success of evaluating a game.

Operations-Based Exercises

Operations-based exercises include drills, functional exercises (FEs), and full-scale exercises (FSEs). These exercises can be used to validate plans, policies, agreements, and procedures; clarify roles and responsibilities; and identify resource gaps. Operations-based exercises are characterized by actual reaction to an exercise scenario, such as initiating communications or mobilizing personnel and resources.

Drills

A drill is a coordinated, supervised activity usually employed to validate a specific function or capability in a single agency or organization. Drills are commonly used to provide training on new equipment, validate procedures, or practice and maintain current skills. For example, drills may be appropriate for establishing a community-designated disaster receiving center or shelter. Drills can also be used to determine if plans can be executed as designed, to assess whether more training is required, or to reinforce best practices. A drill is useful as a stand-alone tool, but a series of drills can be used to prepare several organizations to collaborate in an FSE.

For every drill, clearly defined plans, procedures, and protocols need to be in place. Personnel need to be familiar with those plans and trained in the processes and procedures to be drilled.

Functional Exercises

FEs are designed to validate and evaluate capabilities, multiple functions and/or sub-functions, or interdependent groups of functions. FEs are typically focused on exercising plans, policies, procedures, and staff members involved in management, direction, command, and control functions. In FEs, events are projected through an exercise scenario with event updates that drive activity typically at the management level. An FE is conducted in a realistic, real-time environment; however, movement of personnel and equipment is usually simulated.

FE controllers typically use a Master Scenario Events List (MSEL) to ensure participant activity remains within predefined boundaries and ensure exercise objectives are accomplished. Simulators in a Simulation Cell (SimCell) can inject scenario elements to simulate real events.

Full-Scale Exercises

FSEs are typically the most complex and resource-intensive type of exercise. They involve multiple agencies, organizations, and jurisdictions and validate many facets of preparedness. FSEs often include many players operating under cooperative systems such as the Incident Command System (ICS) or Unified Command.

In an FSE, events are projected through an exercise scenario with event updates that drive activity at the operational level. FSEs are usually conducted in a real-time, stressful environment that is intended to mirror a real incident. Personnel and resources may be mobilized and deployed to the scene, where actions are performed as if a real incident had occurred. The FSE simulates reality by presenting complex and realistic problems that require critical thinking, rapid problem solving, and effective responses by trained personnel.

The level of support needed to conduct an FSE is greater than that needed for other types of exercises. The exercise site for an FSE is usually large, and site logistics require close monitoring. Safety issues, particularly regarding the use of props and special effects, must be monitored. Throughout the duration of the exercise, many activities occur.

If exercises are labeled “training,” it may make it easier to get involvement and support from local fire, law enforcement, and emergency management agencies (R. Williams, personal communication, Nov. 17, 2015).

EXERCISES THAT AIRPORTS USE

The primary emergency exercise types that airports use are tabletop and full-scale exercises (FSEs). Tabletop exercises are designed to help an organization test airport emergency situations, such as aircraft accidents, personnel emergencies, fires, hazmat incidents, natural disasters, or security threats. Exercises evaluate groups' abilities to prepare, respond, recover, communicate, and work together. Full-scale exercises further test preparedness of all responders and cooperating organizations (mutual aid partners) and individuals in their ability to perform all roles necessary for successful emergency management. Many airports are innovative in their development of exercise scenarios, exercise methods, and exercise evaluation programs.

Airports subject to FAR Part 139, that is, airports served by commercial passenger aircraft over a certain size, are required to perform a full-scale exercise every 3 years and an annual TTX in the other 2 years. This is an absolute requirement for certification. It is one of two reasons that full-scale and tabletop exercises are the predominant types of exercises used by airports. The second reason is that they serve the practical needs of the airports, including non-Part 139 airports.

Airports also use the other five types of exercises, as documented in chapter three.

Irrespective of airport size or capability, there are multiple resources available to leverage the development of realistic tabletop and full-scale exercises.

STUDY METHODOLOGY

Selection of Airports

Sixty-four (64) U.S. airports were invited to participate in the survey, of which 60 responded (two declined). Airports in the sample were selected for convenience or because they were known as having exemplary emergency exercise programs or communications plans. The airports were selected to represent a range of all types and sizes of airports, while providing a wide variety of geographic regions. The lack of randomization and relatively small sample sizes preclude the generalizability of the statistical results beyond descriptive statistics. In addition to the 58 airports that agreed to be surveyed, a representative of one other, Rochester (Minnesota) International Airport (RST), was interviewed after the survey had been completed.

Literature Review

Available literature on topics associated with airport emergency exercises 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). Peer-reviewed literature in the field of emergency exercises specifically related to airports is limited, but the literature review sought information on resources in general and particularly focused on exercise design, execution, and evaluation. Special attention was given to previous TRB reports referring to mass transit, highway transportation, and aviation practices that can be applied to exercises at airports.

Survey and Response Data

The online survey is reproduced in Appendix A. It was believed that the topics of airport emergency communications training and broader emergency exercise were closely linked. Using a single survey reduced the number of questionnaires sent to any one airport and allowed the inclusion of more airports in the study. It also allowed the exploration of possible interrelationships between airport emergency communications and emergency response and recovery exercises.

Fifty (50) airports submitted complete responses, four airports responded via an e-mailed memo, four airports submitted partial responses, and two airports declined to participate. With the two declinations included, the overall response rate to the survey was 94%. The 58 airports submitting surveys or responding by memo are listed in Appendix B.

TABLE 1
TYPES AND SIZES OF AIRPORTS RESPONDING TO SURVEY

NPIAS Category	Airports in Study	Airports in U.S.	Percentage in Study
Large Hub Airports	13	30 ¹	43.3
Medium Hub Airports	6	33 ¹	18.2
Small Hub Airports	8	71 ¹	11.3
Non-Hub Primary Airports	7	250 ¹	2.8
Commercial Service Airports (non-primary)	3	117 ¹	2.6
Total of Service Airports	37	501 ¹	7.4
Reliever Airports	11	268 ²	4.1
General Aviation Airports (public use airports only)	10	2,563 ²	0.4

Source: Smith, Kenville, Sawyer, and Garcia data.

¹FAA (2014), CY13 enplanements.

²FAA (2014), National Plan of Integrated Airport Systems.

Appendix B provides each respondent's location, structure, and operational profile. Table 1 shows the distribution among the seven National Plan of Integrated Airport Systems (NPIAS) categories of the 58 airports in the study; it also shows the proportion of all U.S. public-use airports that is represented in the study. The responding airports are widely distributed geographically (Figure 2). Twenty-eight (28) states and all nine FAA regions are represented in the sample.

Case Examples

The following criteria were applied to determine case examples that illustrate tabletop and full-scale exercise policies, procedures, and tools that will be useful for GA, non-hub, and small hub airports:

- The airport's reported use of TTX, FSE, and other exercises;
- The range of exercise types, scenarios, and participants involved;
- Innovative measures used;
- The completeness of the airport's documentation of its exercises and its exercise programs; and
- The airport's willingness to serve as a case example and share its exercise materials and resources.

From the 30 airports that met these criteria, five case examples of actual airport exercise practices were selected and a sixth, Rochester International, was added based on information gathered through an interview for a case study for ACRP S15-04-16, *Emergency Communications Planning for Airports*.

The six case examples are:

- Large hub—Denver International Airport (DEN)
- Small hub—Boise Airport (BOI)
- Non-hub primary—Rochester (MN) International Airport (RST)
- Reliever—Lakeland Linder Regional Airport (LAL)
- Reliever—Miami—Opa Locka Airport (OPF)
- General Aviation—Owatonna Degner Regional Airport (OWA).

Follow-up interviews and document reviews allowed an in-depth examination of how these airports make their exercise programs effective.

Collection of Sample Exercise Materials

Airports that indicated a willingness to share sample emergency exercise materials were asked to provide copies. The materials were analyzed for potential usefulness to GA, non-hub, and small hub airports; a selection is reproduced in Appendix C.

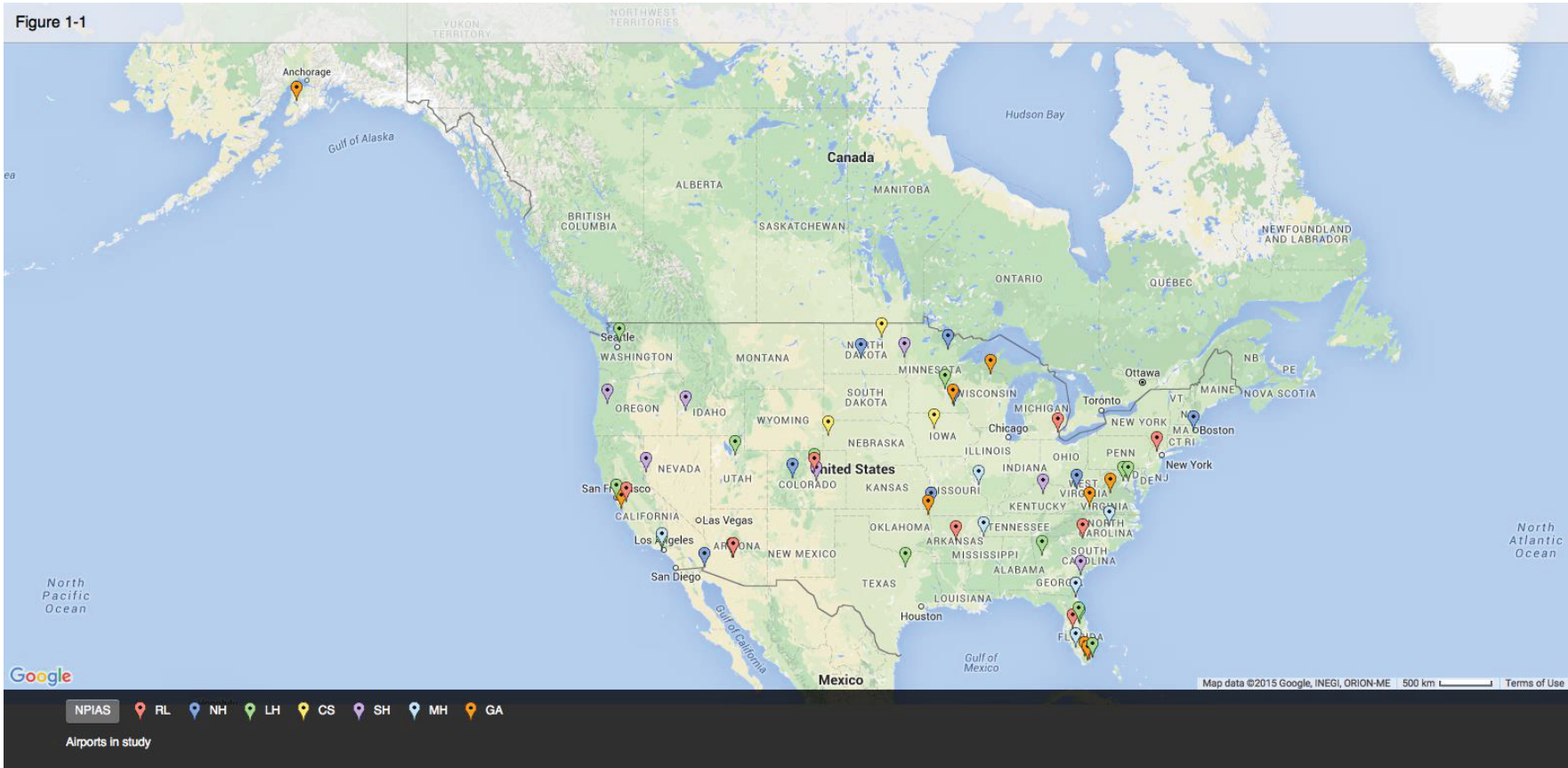


FIGURE 2 Location of airports in the study.

Data Analysis

The survey results, interviews with case example airports, and analysis of reports, plans, and other documents supplied by airports were used to identify effective approaches to exercises, evaluate suitability of methods for smaller airports, identify gaps, and extract lessons learned. These procedures were analyzed for common themes and alternative approaches to a given exercise objective, and the data arranged in spreadsheets that allowed isolation of procedures from any airport pertinent to a case example or to the synthesis of effective practices and major lessons learned. Cross-tabs were used extensively to examine relationships between variables.

RESULTS

Pertinent findings from the interviews, case examples, literature review, and data analysis are presented in five formats: a summary of survey data (chapter three); the case examples (chapter four); sample exercise materials (Appendices A–Y); a checklist for emergency exercises at GA, non-hub and small hub airports (Appendix Z); and a road map for planning emergency exercises at GA, non-hub and small hub airports (Appendix AA).