Memphis International Airport
2016 Emergency Exercise

After-Action Report
December 14, 2016
EXERCISE OVERVIEW

Exercise Name: Memphis International Airport 2016 Emergency Exercise

Exercise Dates: Annual Plan Review & Tabletop Exercise – August 30, 2016
Full Scale Exercise – September 19, 2016

Scope: The six hour Tabletop Exercise was conducted to review the Airport Emergency Plan with stakeholders and identify needed updates. The 1/2 day full-scale exercise was designed to test the plan and reveal any potential opportunities for improvement.

Mission Area(s): Emergency Response

Core Capabilities: Emergency Notification and Warning
Emergency Response
On-scene Security Protection
Emergency Communications
Command, Control, Coordination
Medical Services
Critical Transportation
Health & Social Services

Objectives: See page 6

Hazard: Alert III – Aircraft Crash / Mass Casualty Incident

Scenario: A scheduled arrival of Exercise Airlines, operated on a Boeing 737 with 150 souls on board, crash lands on Runway 36R at Memphis International Airport.

Exercise Sponsor: Memphis-Shelby County Airport Authority

Participating Organizations: See page 15

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EXECUTIVE SUMMARY

The Federal Aviation Administration (FAA) mandates that all airports certificated to serve scheduled passenger-carrying operations of an air carrier aircraft with nine (9) or more seats, like Memphis International Airport (MEM) must have and maintain an Airport Emergency Plan (AEP) designed to minimize the possibility and extent of personal injury and property damage on the airport in an emergency. Included in the AEP are procedures for prompt response to airport emergencies including aircraft incidents and accidents. The FAA requires that MEM review the AEP annually and test the AEP through a full-scale exercise at least once every three (3) years. The 2016 Emergency Exercise was designed to meet these requirements.

The goals for the 2016 full-scale exercise were as follows:

- Test Annex 1 – Aircraft Incident/Accident of the AEP for accuracy
- Test Annex 13 – Mass Casualty Incident of the AEP for accuracy
- Test Annex 6 – Crowd Control of the AEP for accuracy
- Practice the use of National Incident Management System (NIMS) / Incident Command System (ICS) at MEM
- Test the effectiveness of communications
- Evaluate the new of using Airport Maintenance as mutual aid escorts on the airfield
- Provide an opportunity for the participating airline to test their local station emergency plan
- Test the concept of a Family Reception Center

Memphis International Airport uses plan reviews and exercises as an instrument for implementing continual improvement. Recognizing that there is always room for improvement, MEM approached the 2016 Emergency Exercise as an opportunity to assess current practices and test new innovative procedures for streamlining emergency response efforts.

As a result of this exercise, several existing processes were identified as strengths that should be continued without modification. Additionally, new procedures were tested and deemed worthy of inclusion in the response plan. Opportunities for enhancement in a few areas were also observed. This report will identify each of those areas and any associated recommended improvements.
## ANALYSIS OF CORE CAPABILITIES

<table>
<thead>
<tr>
<th>Task(s)</th>
<th>Core Capability</th>
<th>Performed without Challenge</th>
<th>Performed with Minor Challenges</th>
<th>Performed with Major Challenges</th>
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<tbody>
<tr>
<td>Activation of the Emergency Notification System</td>
<td>Emergency Notification and Warning</td>
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<tr>
<td>Social Media sites are updated with appropriate information regarding the incident</td>
<td>Emergency Response</td>
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<td>Memphis Fire Department responds with appropriate personnel and equipment</td>
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<td>On-scene size up and report are conducted</td>
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<td>Incident Command Post (ICP) established</td>
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<td>Assignments are made in accordance with MEM’s ICS</td>
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<td>Accountability of responders is maintained throughout the exercise</td>
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<td>Staging location identified and Staging Manager designated.</td>
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<td>Base established for responding Mutual Aid</td>
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<tr>
<td>Law Enforcement establishes a scene perimeter</td>
<td>On Scene Security Protection</td>
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<td>Law Enforcement provides additional security as needed at support centers</td>
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<tr>
<td>Implement and utilize the Airport Communication Plan as identified in the AEP</td>
<td>Emergency Communications</td>
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<tr>
<td>Airport Command Center (ACC) is activated and staffed</td>
<td>Command, Control, Coordination</td>
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<td>ACC positions filled by necessary personnel</td>
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<td>ACC briefings performed in a timely manner by appropriate personnel</td>
<td>Command, Control, Coordination</td>
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<td>Forward looking incident planning conducted</td>
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<td>ACC personnel forecast future resource needs</td>
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<td>Determine necessary resources required for casualties</td>
<td>Medical Services</td>
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<td>Request appropriate level and type of resources</td>
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<td>Perform Triage and Treatment</td>
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<td>Response Gate and Ingress/Egress routes established for response agencies</td>
<td>Critical Transportation</td>
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<tr>
<td>Airport Maintenance provides mutual aid escorts</td>
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<td>Transportation methods identified for moving passengers to appropriate centers (Survivor’s Center, Reunification Area, etc.)</td>
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<tr>
<td>Transportation obtained for passengers headed to Survivor’s Center</td>
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<td>Perform Transport via BLS/ALS ambulance(s)</td>
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<td>Execute the transport of multiple walking wounded to the Survivor’s Center</td>
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<td>Support agencies are available to provide crisis counseling</td>
<td>Health and Social Services</td>
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<td>American Red Cross, Airport Staff work in conjunction with airline to staff Family Reception Center</td>
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<td>Airline enacts procedures for family support</td>
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<tr>
<td>Survivor’s Center is activated</td>
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<tr>
<td>Family and Friends are provided support and resources</td>
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The following sections provide an overview of the performance related to each exercise objective and associated core capability, highlighting strengths and areas for improvement where appropriate.
EXERCISE OBJECTIVES

Emergency Notification and Warning

Objective:

Memphis International Airport test selected core elements of Functional Annexes, Section 2 - Communications and Section 4 – Emergency Public Information, of the AEP.

Tasks:
- Activation of the Emergency Notification System
- Social Media sites are updated with appropriate information regarding the incident

Discussion/Observation:

This exercise was the first wide scale use of the Airport’s Emergency Notification System (ENS) Everbridge since making the transition from the old platform to the latest release of the software. The older version of the system relied on the MEM Communication Center Operator to carefully craft the message and determine the appropriate message recipients. Conversely, the latest version of the system in use at MEM is based on a matrix with pre-established message formats and distribution lists. The Airport Communications Center (Comm Center) personnel reported that the new process worked extremely well. Notifications for the exercise were easier and faster to activate than ever before. This task was deemed a success. Thus, rollout of the system and expanded use thereof will continue for day-to-day incidents.

Use of social media for this exercise was intentionally limited to public notice of the exercise and a confluence of emergency response equipment. The exercise designers did not wish to issue public messaging / false news that could be mistaken for real notices. The use of social media during the exercise for its intended purposes was deemed successful.

Emergency Response

Objective:

Mobilize first responders from both on and off-airport in support of Functional Annex, Section 7 – Firefighting and Rescue/Search and Rescue, of the AEP.

Tasks:
- Memphis Fire Department responds with appropriate personnel and equipment
After Action Report (AAR)

- On-scene size up and report are conducted
- Incident Command Post (ICP) established
- Assignments are made in accordance with MEM’s Incident Command System (ICS)
- Base established for responding mutual aid
- Staging location identified and Staging Manager designated
- Accountability of responders is maintained throughout the exercise

Discussion/Observation:

The Aircraft Rescue Firefighting (ARFF) response by Memphis Fire Department (MFD) from MEM ARFF Station 9 to the simulated aircraft crash on Runway 36R was executed flawlessly. The regular training MFD receives in accordance with 14 CFR 139.319 is apparent during events like this exercise. The MEM Standard Emergency Response Pattern (SERP) was deployed and first responders effectively began firefighting (simulated) and rescue operations.

Part of the exercise simulated a response of off-airport mutual aid resources as would likely be used in a real event. As such, a Response Gate was identified and a Base established for the responding mutual aid to arrive at. One post exercise comment stated that some responders were bypassing the Base Manager and proceeding straight to the Response Gate. It is believed that situation was a function of the exercise environment that would likely not exist during real world conditions.

Exercise debriefings determined that the Staging Area element of the SERP was located closer than desired to the Incident Command Post. Ideally, the location of the Staging Area would be close enough to the ICP for immediate response of personnel as directed by the Incident Commander, yet far enough away to prevent confusion at the scene and eliminate the temptation for responders to self-assign.

Additional exercise observations identified that several responders to the ICP parked their vehicles, yet left the strobe lights on with the vehicle locked. MEM protocol prescribes for responders to extinguish their overhead lights once on scene to limit visual pollution thereby making it easier to locate the flashing green light of the Incident Command Post.

The benefits of an ideal Staging Area location as well as vehicle parking procedures at the ICP will continue to be practiced during SERP drills that MEM performs routinely. Additionally, Base operations will be discussed with prospective Base Managers and mutual aid responders during annual plan reviews.
**On-Scene Security Protection**

**Objective:**

Airport Law Enforcement activates Functional Annex, Section 6 – Law Enforcement and Security/Crowd Control of the AEP, establish a security perimeter around the accident scene, and control points at the various emergency locations and support centers.

**Tasks:**
- Law Enforcement establishes a scene perimeter
- Law Enforcement provides additional security as needed at support centers

**Discussion/Observation:**

The MSCAA Airport Police Department responded to the Response Gate, the accident scene and Incident Command Post, the Airport Command Center (ACC), and other emergency areas per the AEP and as directed. There were no reported issues setting up the security perimeter around the scene by APD or managing crowd control near the Incident Command Post. Though the use of Airport Maintenance as emergency escorts (described later in this report under Critical Transportation) has relieved Airport Police of that duty thereby freeing up the resources for other assignments, those assets still remain available should the need arise.

During the post exercise debrief, a thorough discussion arose regarding the requirement for Airport Operations to inspect the Airport after an accident in accordance with 14 CFR 139.327(a)(3) – Self Inspection and how to balance that with the additional requirements under FAA Advisory Circular 150/5200-12 – First Responders’ Responsibility for Protecting Evidence at the Scene of an Aircraft Accident/Incident. The discussion proved to be a good review for all concerned of the Airport’s post-accident regulatory requirements and how best to achieve them.

**Emergency Communications**

**Objective:**

The Comm Center and other emergency responders activate the Functional Annex of the AEP, Section 2 – Communications. Responders test the Communications Plan and use alternate emergency channels during their response efforts as warranted.
Tasks:

- Implement and utilize the Airport Communications Plan as identified in the Airport Emergency Plan (AEP)

Discussion/Observation:

There were no reported issues during the exercise with implementing the Airport Communications Plan. Most communications-related issues experienced during the exercise were ancillary in nature and/or were due to extenuating circumstances that may not exist during actual emergency conditions. Once such issue was a report by the responding Operations Duty Manager (ODM) that he found it challenging to issue associated Notices to Airmen (NOTAMs) remotely from the field on his electronic communications device (ECD). During a scenario like the one simulated in the 2016 Emergency Exercise, the ODM would be required to inspect the Airport after the accident and issue NOTAM’s notifying air carriers of the condition/status of the airport in accordance with 14 CFR 139.339 – Airport Condition Reporting like, for example, if the airport was closed. In a real world situation though, there would be multiple redundancies available for either issuing a NOTAM or in conveying airport status to the users.

Another issue related to communications that was reported after the exercise was that at times it was difficult to hear radio transmissions at the scene. The observation was due in part to the emergency generator for the emergency response trailer being placed closer to the Incident Command Post than normally desired. As previously stated in this report, MSCAA will reaffirm the ideal SERP layout during routine SERP drills and at future tabletop and functional exercises. Additionally, the ambient noise issue made it difficult to hear some radio transmissions was exacerbated the fact that many MSCAA personnel carry handheld portable radios without the benefit of microphone booms. The MSCAA already has plans to correct this deficiency as part of the impending 800 MHz radio replacement project currently contemplated for FY18.

Command, Control, Coordination

Objective:

Airport staff will activate Functional Annex of the AEP, Section 1 – Command and Control. Key emergency positions will be staffed and ICS principles followed.

Tasks:

- Airport Command Center (ACC) is activated and staffed
- ACC positions filled by necessary personnel
- ACC briefings performed in a timely manner by appropriate personnel
- Forward looking incident planning conducted
Central to any emergency response is effective command and control to ensure that the appropriate type and amount of resources are being used in the safest, most effective manner. Memphis International Airport meets this obligation by adopting National Incident Management System (NIMS) principles in the development and implementation of its Incident Command System (ICS). As such, during periods of emergency response to complex and/or protracted incidents like the scenario contemplated in the 2016 Emergency Exercise, Airport personnel staff various ICS positions at the ICP, the ACC, and other emergency locations as needed. Observations indicate that MEM ICS guidelines were generally followed during the exercise. There were no exceptions of note or areas for improvement identified during the exercise in this area.

One observation that was discussed during the exercise debrief by the participating Operations Duty Manager was that as an emergency incident such as the contemplated scenario progresses from the response to recovery phases, careful coordination between Operations, ARFF, Air Traffic, Airport Police, and the other stakeholders will be necessary before reopening the airport as a whole or portions thereof to aircraft operations. This is a known condition that would require proper coordination and planning between the ICP and ACC.

**Medical Services**

**Objective:**

Airport emergency responders and mutual aid support will activate Functional Annex Section 8 of the AEP – Health and Medical/Mass Care, in order to assess methods of mobilizing and managing health and medical services in response to a mass casualty incident (MCI) on airport property.

**Tasks:**

- Determine necessary resources required for casualties
- Request appropriate level and type of resources
- Perform Triage and Treatment

**Discussion/Observation:**

The 2016 Emergency Exercise was designed to test the ability of the Airport team to triage, treat, and transport victims off the airport grounds as quickly and safely as possible. Volunteers acting as passengers of the simulated ill-fated flight were used to represent a mix of various
Injury levels or casualties in accordance with FAA Advisory Circular 150/5200-31 – Airport Emergency Plan. These mock casualties were triaged, treated, and transported off airport by the participating emergency responders. Observations indicated that there were no exceptions of note identified during the exercise in this area. However, one comment that was received suggested that a good process for transporting passengers on medical litters/rescue basket out of the accident scene to the triage area could be further improved upon. In particular, a tow trailer has been developed for loading and transporting multiple litters. Emergency responders commented that although the trailer was effective and very much appreciated, the load deck was a little high for the firefighters, thereby requiring extra strain and effort to load the litters. If a trailer of similar capabilities could be fashioned that had a lower, more ergonomic load deck it would be appreciated by the litter bearers. Additionally, the trailer should be modified to prevent a passenger with long hair or dangling clothes from getting accidentally caught in the tires. Airport staff took note of the observation and are evaluating opportunities to improve on the design of the trailer.

Critical Transportation

Objective:

Activation of Functional Annex, Section 9 of the AEP – Resource Management in order to test the dispatch of personnel, equipment, and resources. Additionally, this exercise was used as an opportunity to evaluate a new process for escorting mutual aid onto the airfield.

Tasks:
- Response Gate and Ingress/Egress routes established
- Airport Maintenance provides mutual aid escorts
- Transportation methods identified for moving passengers to appropriate centers (Survivor’s Center, Reunification Area, etc.)
- Transportation obtained for passengers headed to Survivor’s Center

Discussion/Observation:

The core elements of the Functional Annex of managing resources were successfully demonstrated in the exercise. Mutual aid resources were escorted from the Base location, through the Emergency Response Gate along the Emergency Response Route to the scene. From there, the resources were used for transporting seriously injured passengers off the airfield for a simulated dispatch to area hospitals while other resources were ordered, employed, and tracked for moving less critically injured passengers to a Survivor’s Center.

Airport staff used this exercise as an opportunity to test a newly developed procedure for escorting mutual aid resources onto the airfield, a task previously assigned to Airport Police.
The new procedure that was tested called for using Airport Maintenance personnel for emergency escorts from the Response Gate to/from the Scene and to/from associated passenger care centers. The intent of the new procedure is to release Airport Police from the escorting duty in order to make those valuable, yet limited resources available for the many law enforcement specific tasks. Prior to the full-scale exercise, Airport staff had reviewed, trained, and tested the new procedure. Implementation of the new emergency escorting procedure was reported to have gone very well for bringing resources onto the airfield. However, escorting resources back off of the airfield did not go quite as smoothly. This observation was attributed to a lack of clear direction at the Staging Area for departing vehicles. Airport staff are planning recurring drills to refine the emergency escorting process in order to mitigate similar issues in the future.

An additional comment was received from the participating Operations Duty Manager regarding the escorting process. In particular the ODM, who was charged with establishing and marking the response route from Emergency Response Gate to Staging and the Incident Command Post, reported that this task was challenging to accomplish in addition to his other required inspection and response duties. This report was discussed at length during the formal exercise debrief. The discussion identified that the workload challenge for the ODM may only exist on a case-by-case basis depending on incident timing, incident location, ODM staffing levels, escort capabilities, and other variables. It was decided that additional drills would provide the opportunity to further practice this task to determine if there is indeed an opportunity for improvement.

**Health & Social Services**

**Objective:**

Airport staff and mutual aid support will activate Functional Annex Section 8 of the AEP – Health and Medical/Mass Care, by establishing various passenger and family care centers in response to the exercise scenario.

**Tasks:**

- Support agencies are available to provide crisis counseling
- American Red Cross, Airport Staff work in conjunction with the airline to staff Family Reception Center
- Airline enacts procedures for family support
- Survivor’s Center is activated
- Family and Friends are provided support and resources

**Discussion/Observation:**
Memphis International Airport is largely an origin & destination (O&D) airport now where 99% of all passengers are either traveling to or from the Memphis area. Conversely, when MEM was still a hub more than two-thirds of all passengers through the airport were connecting from their origin through the airport on to their destination. Given the current high concentration of passengers with ties to the Memphis area, it is highly likely that a significant aircraft accident at the airport would cause numerous people to drive to the airport to inquire about their family or friends onboard the incident aircraft. As such, Airport staff should expect to work with the affected airline to activate a family reception center where assistance and services can be provided while the emergency response efforts progress.

The 2016 Emergency Exercise was designed to provide an opportunity for Airport staff to work with the participating airline and the American Red Cross to activate a limited Family Reception Center in order to practice the general concepts associated with this element of the emergency plan. Additionally, a simulated reunification would take place between a passenger that arrived in the Survivor’s Center and a waiting family member in the Family Reception Center. For this piece of the exercise, the concourse level of the southwest leg of Concourse B was used for the Family Reception Center.

In general, the Family Reception Center and Reunification efforts during the exercise were deemed successful. The post exercise debrief generated some thorough discussion amongst the stakeholders about what to prepare for during actual conditions. In particular, the American Red Cross reminded participants of the importance of frequent briefings for waiting family and friends as well as the need for lots of security. Additionally, it was decided that a Family Reception Center will require a larger, better equipped space than the southwest leg of Concourse B as was tested in the exercise. Airport staff determined that it would be beneficial to develop a future exercise that would focus entirely on Family Assistance matters.

**Exercise Design**

**Objective:**

Though the intent for conducting the Memphis International Airport 2016 Emergency Exercise with its corresponding Annual Plan Review & Tabletop Exercise and the subsequent Full-Scale Emergency Exercise was to meet the requirements of 14 CFR 139.325 (g)(4) & (h), the goal of these exercises was to test the Airport Emergency Plan and reveal any potential opportunities for improvement.

**Tasks:**

- Review the plan with stakeholders to ensure that all parties know their responsibilities and that all of the information in the plan is current.
- Hold a full-scale airport emergency plan exercise
Discussion/Observation:

Conducting a full-scale emergency exercise at an airport the size of Memphis International Airport is a significant undertaking that takes a lot of time and resources to accomplish. Nearly as much planning and coordination is needed to hold an exercise as is required to actually respond to one. This may be a reason airports are only required to undertake such an event every three years. Considering the scope and scale of a full scale exercise such as MEM’s 2016 Emergency Exercise, there are always observations and recommendations for improving the experience.

One such recommendation was to consider a different time of year to hold the exercise for the sake of improving the odds of recruiting volunteers to participate as passengers, family members, etc. Simulating an aircraft accident with 150 passengers with another 20+ family members requires a lot of volunteers. Thus, choosing a time of year that improves the availability of volunteers could make holding the event easier.

Another suggestion for planning the exercise was to use National Incident Management System (NIMS) forms in the planning process just as they would be used during an actual event. Airport staff agree. Thus, this recommendation will be adopted for all future large scale exercises.

CONCLUSIONS

The 2016 Emergency Exercise achieved its intended goals. The Airport was able to review and test the Airport Emergency Plan with stakeholders. Regulatory compliance was maintained. Opportunities for improvement were identified. New procedures were tested and established ones were affirmed. Emergency responders and airport stakeholders worked together toward common goals for the benefit of the community and traveling public. For these reasons, the exercise was a success.

Thus, Airport Staff closed the books on the 2016 Emergency Exercise with several key takeaways for use in future emergency planning and response efforts. Some of which include continuing with the practice of holding regular SERP drills and establishing recurrent practice drills for the newly developed emergency escorting procedure. Another important point was the desire of stakeholders to hold a separate functional drill on Family Assistance.

Lastly, despite the regulatory requirement to only test the Airport Emergency Plan through a full-scale exercise on an every-three-year or triennial basis, the MSCAA has established a goal of testing its AEP on a more frequent biennial basis for the sake of continual improvement.
PARTICIPATING AGENCIES

The Memphis-Shelby County Airport Authority would like to thank following agencies who participated in the Annual Plan Review & Tabletop Exercise on August 30, 2016 and/or the Full-Scale Exercise on September 19, 2016. The level of review and testing of the Memphis International Airport Emergency Plan that was achieved simply could not have been accomplished without the considerable help and support of these organizations.

AB Jets
American Airlines
American Red Cross
Baptist Hospitals
Collierville Fire Department
Delta Airlines
DHL
FAA-Air Traffic Control
FBI
FedEx Express
Flight Support Solutions
IDS
Memphis Fire Department
Memphis Office of Emergency Management
Memphis Police Department
Memphis-Shelby County Airport Authority
Mid-South Agency of Continuity Professionals
Millington Airport Authority
National Transportation Safety Board
National Weather Service
Rural Metro Fire Department
The Salvation Army
Seaport
Shelby County Office of Preparedness
Shelby County Medical Examiner
Signature Flight Support
Southwest Airlines
Starr Aviation
St. Jude Children’s Research Hospital/ALSAC
Tennessee Air National Guard
Tennessee Emergency Management Agency (TEMA)
Trego-Dugan
Transportation Security Administration
United Parcel Service
USDA-APHIS
West TN Regional Forensic Center
West Memphis Fire Department
EXERCISE PHOTOS