CHAPTER 3

Airport Operations

Safety

In the survey conducted for this guide, the majority of airport managers cited wildlife as their most significant safety threat, followed closely by theft, accidental aircraft incursions by the public, and vandalism. Airport security is a priority for 70% of the survey respondents. The survey showed that most airports have signage, fencing, and security plans and that many airport managers would like closed circuit television screens and card reader security gates. Figure 3 shows what practices survey respondents are employing to increase airport safety.

Other safety preferred practices noted by survey respondents include

- Full-perimeter security fencing, with daily perimeter inspections;
- Controlled access (allowing only airport and FAA employees on the airfield);
- Random patrol by local police for additional security; and
- Coded electronic gates for vehicle access.

Safety is clearly an issue for airport managers across the United States.

Public Protection

Awareness

It is the airport owner's responsibility to undertake every effort to protect the public from hazards that may exist in the airport environment. The general public visiting the airport should be clearly reminded of these hazards and generally not given access to the airfield unless under supervision. Safeguards to prevent inadvertent entry to the airfield and protection from aircraft blast can be provided through fencing, signage, public announcements, and proactive maintenance. Emphasis should be placed in areas of common use such as parking lots, sidewalks, terminals, and FBO facilities. Routine maintenance tasks, construction, and weather are common factors that may lead to additional hazards.

Airfield Signs, Fencing, and Lighting

Aircraft movement areas—including, but not limited to, runways, taxiways, ramps, and hangar access routes—present an obvious and important hazard to the general public unfamiliar with the operating procedures in these areas. Unauthorized vehicles, pedestrians, bicyclists, and pets are concerns that need to be addressed. A common method to prevent inadvertent access is to erect fencing and gates to define the area. In addition, airport property "no trespassing" signs provide awareness of the airport environment and security procedures that may be in place. Such signs should be placed every 200 feet, at each access point, and on each fence corner. Well-lighted parking lots, sidewalks, and additional pedestrian areas will help improve visibility hazards and provide a certain level of deterrence for unwanted activities. The FAA regulations for airport markings,

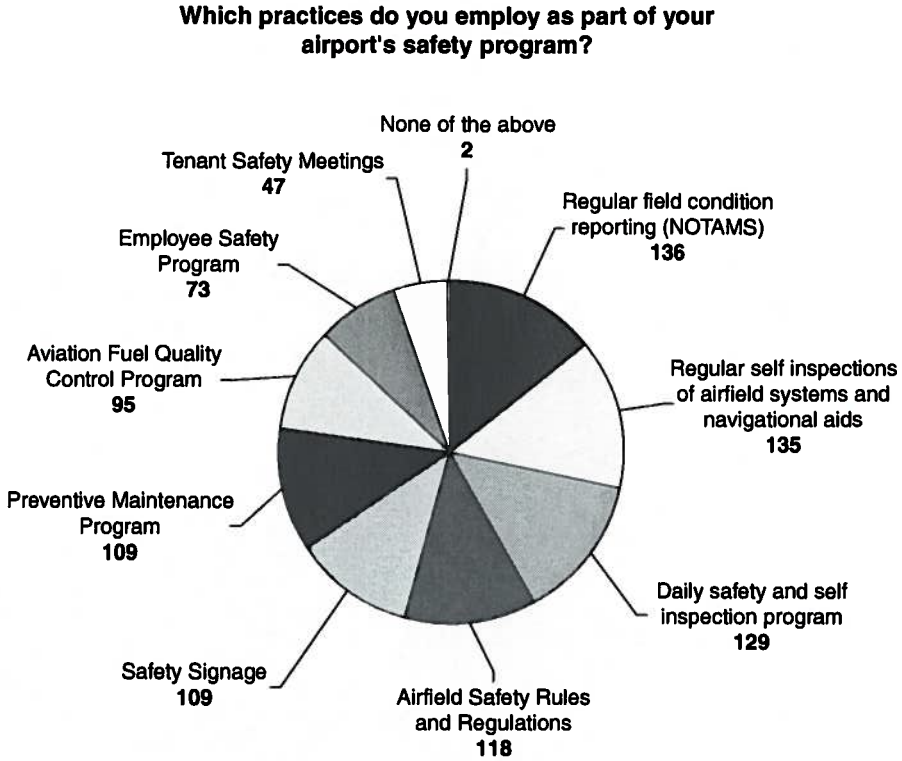

Figure 3. Airport safety practices employed by survey respondents.

signs, and lighting are contained in 14 CFR Part 139. In addition, the FAA provides guidance for appropriate airport signage in AC 150/5340-18, *Standards for Airport Sign Systems.*

Terminal Areas and Buildings

Because the public uses the airport's building facilities, consideration should be given to safe access and utilization. Well-lighted areas, clean and dry floors, and well-maintained facilities will limit exposure to hazards. Areas off-limits to the public, such as aircraft ramp areas, utility rooms, and basements, should be secured to prevent inadvertent entry.

Accommodating Individuals with Disabilities

An airport owner also has the responsibility under the Americans with Disabilities Act to safely accommodate individuals accessing public facilities. Local building codes should provide guidance in this area. The "Checklist for Existing Facilities: The Americans with Disabilities Act Checklist for Readily Achievable Barrier Removal" provides a means for assessment. This checklist may be obtained at the Accessing Safety website: www.accessingsafety.org. The FAA also provides guidance to airport managers on this subject in AC 150/5360-14, *Access to Airports by Individuals with Disabilities.* This AC is available online through the FAA website: www.faa.gov/regulations_policies.

Tenant and Contractor Protection

The airport owner's responsibility to protect airport patrons does not stop with the visiting general public. Airport tenants, contractors, and frequent users of the airport's facilities also require safety awareness and protection. Ideally, safety is addressed when initially establishing a contract or lease with the individuals or companies. The contract or lease should specifically state each party's responsibilities concerning a safe operation, including airport familiarization,

specific airfield access points, and authorized operation areas. Any airfield hazards or unique situations requiring awareness should be addressed during the term of the contract or lease. Finally, the airport must ensure an appropriate level of training is provided to all individuals involved in the contracted operation. Ensuring this may include the airport owner providing the training to ensure the manager, supervisors, and subordinates are properly trained and understand their responsibilities.

Employee Protection

Every efficient and safe operation involves adequate employee training and safety programs. Each airport operator should establish initial and recurrent training for every employee that, at a minimum, includes airfield operations, maintenance operations, administrative procedures, emergency and security procedures, and safety. The programs need not be complex and can evolve as the airport grows. Each program should be written and made available to all employees. Initial and recurrent training records should be documented and retained for each employee for liability purposes. An employee safety program should define personal protective equipment and require its use. Such items as hearing protection; hand, foot, eye and head protection; visibility vests; and proper clothing may be crucial in protecting individuals in the airport environment. The Occupational Safety and Health Administration website (www.osha.gov) provides additional resources for establishing employee and overall public safety guidelines and procedures.

Aircraft Fueling

Aircraft fueling at smaller airports may be provided by the airport owner or an airport operator such as an FBO. Regardless of who owns and operates the fueling operation, it is the ultimate responsibility of the airport owner to ensure the fueling systems are well maintained and the services are provided safely. Aircraft fueling presents two major concerns: storage and handling of hazardous materials and fire safety. When establishing proper airport fueling operation procedures, the airport manager should include at a minimum the following two sources: the latest edition of the National Fire Protection Association (NFPA) 407, *Standard for Aircraft Fuel Servicing,* available at the NFPA website (www.nfpa.org/catalog) and the latest edition of FAA AC 150/5230-4, *Aircraft Fuel Storage, Handling and Dispensing on Airports,* available at the FAA website (www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars).

It is imperative that the fueling operator establish and provide initial and recurrent employee training. Although only FAR Part 139–certificated airports are required to use them, the FAA maintains a list of approved agencies that provide fuel safety training programs. These agencies may provide the resources needed to establish a professional training program. Such programs should include at a minimum aircraft familiarization, aircraft towing, product (fuel) recognition, bonding, testing, inspections, and fire safety training.

To ensure safe and efficient fueling operations, a routine equipment inspection program should be established, combined with timely maintenance. Fueling systems generally include fuel farms (storage tanks) and fueling trucks. An increasing trend at smaller airports is the installation and operation of self-serve fuel systems. These systems provide efficiency and great customer service. However, the airport owner's liability may increase if the system is not properly and routinely inspected. Providing clear user instructions and ensuring the system is well maintained and safe will reduce the airport's liability. An inspection checklist can be developed and include routine (daily), monthly, quarterly, and annual inspections and maintenance tasks. The checklist should be documented and kept on file for a minimum of one year.

Providing fire safety training is a large component of fueling operations. Initial and recurrent training should cover awareness, static control, extinguishing agents, and emergency procedures.

Because local fire codes may vary, fire safety training and inspections should involve the local fire jurisdiction's personnel.

Notice to Airmen

The Notice to Airmen (NOTAM) system was established to provide timely information to aircraft operators to describe conditions on or around the airport that may affect aircraft operations. Typically, a NOTAM is issued and canceled by the airport owner or operator. (The FAA may also issue and cancel NOTAMs regarding certain circumstances, such as FAA-owned navigation aids and temporary flight restrictions.) The NOTAM is issued by calling the local flight service station (FSS) and identifying the airport affected, person issuing the NOTAM, and information establishing the NOTAM. The NOTAM is then disseminated by the FSS until canceled by the person or agency originating the NOTAM. Because the intent is to disseminate critical information, procedures must be in place to notify local tenants and coordinate any updates as conditions change. The NOTAM issuance procedure has been enhanced recently in many states because of a newer program supported by Lockheed Martin. The airport manager should contact state aeronautics offices or local FSS offices to verify the procedures for issuing a NOTAM.

A NOTAM log should be used to record the issuing date and time, NOTAM information, initials of the person issuing the NOTAM, and initials of the FSS individual receiving the information. The log should also include the cancellation date and time and initials of the individual canceling the NOTAM. The NOTAM log should be retained for event documentation and liability purposes. Further guidance on using the NOTAM system may be obtained from FAA AC 150/5200-28 (www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars).

Airfield Data and Communications

Most small airports do not have an air traffic control tower and are therefore considered uncontrolled airports. Aircraft communications and airfield advisories are generated through a common traffic advisory frequency or UNICOM frequency by a local radio operator at the airport. Weather information is typically provided though an automated system on the airfield, such as an automated weather observation system or automated surface observation system. Such systems provide information on wind direction and intensity, visibility, barometric pressure, and precipitation. Because these systems are so important, the airport owner or operator ensures their correct operation by monitoring and reporting deficiencies to the proper maintenance personnel. In addition, a small airport may utilize a ground communications outlet or remote communications outlet. These communications facilities are unstaffed and enable a pilot to contact air traffic control or the FSS to obtain flight clearances, close flight plans, and obtain the weather.

Specific information about each airport is found in the FAA Airport Master Record—Form 5010-1 and the *U.S. Airport Facility Directory.* Each one contains airport owner contact information, runway data, communication frequencies, and remarks on potential airfield hazards. The FAA Airport Master Record also provides the number of based aircraft and annual aircraft operations. It is the responsibility of the airport owner to ensure the information contained in these records is current. An airport's current Form 5010, and information on how to update Form 5010, are accessible through the FAA website (www.faa.gov).

Airfield Driving Programs

The airport owner is responsible for ensuring that access to the aircraft movement areas is limited to what is necessary for airport operations. The airport owner may achieve this through fencing and access barriers and, in addition, through airport rules and regulations defining who has access and to what extent.

An airfield driving program should be established at each airport to ensure access control procedures and safe operations. The airfield driving program should be tailored to the individual groups using the airfield. Tenants and contractors will be limited to those areas necessary to perform their driving operations. Typically, these areas are only ramps, hangar access areas, and areas closed to normal aircraft operations. Airport employee and FAA personnel driving programs will normally include those previously mentioned areas as well as the aircraft movement areas. These programs will be more complex, involving runway markings and signs, airfield lighting, aircraft communications, and specific vehicle requirements. The driving program should include a training session followed by a written test (documentation retained for individuals' files) and a behind-the-wheel road test to ensure proficiency. FAA AC 150/5210-20, *Ground Vehicle Operations on Airports,* provides guidance for developing ground vehicle operation training programs.

Airfield familiarization is the most important component of the airfield driving program. Anyone allowed access to aircraft movement areas needs to be assured of their surroundings and current conditions. The airport environment will look different at night and during low-visibility conditions. In addition, it is essential that the driving program includes vehicle/aircraft radio communication procedures.

An airfield driving program should also address the vehicles allowed on the airport, and more important, the aircraft movement areas. Vehicles should be well maintained; should be marked, painted, or lighted for high visibility; and should include working radios with the proper frequencies for communication. Additional information can be found in ACs on the FAA website (www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars).

Wildlife Hazard Mitigation

As a good steward, the airport owner balances the issues of wildlife protection and public protection/wildlife hazard mitigation. Airport owners and operators throughout the nation cite wildlife hazards as the most prevalent and realistic concern for the flying public's safety.

Regardless of an airport's location, wildlife is a concern. Whether it is migratory waterfowl, deer, coyotes, or reptiles enjoying the warmth of the runway pavement, wildlife inadvertently poses a threat to public safety. It is important to assess an airport's wildlife hazard situation to determine the hazard level. During airfield inspections, any visible wildlife, as well as the time, location, and methods used to remove any wildlife hazard presence, should be noted. This documentation is valuable for assessing the threat, assisting with the development of a hazard mitigation program, and recording proactive mitigation. Demonstrating proactive mitigation will help the airport owner's defense in the event of an aircraft accident involving wildlife at the airport.

Several effective methods have been developed over the years to successfully mitigate wildlife hazards at airports. Unfortunately, every airport environment and wildlife situation is unique. An airport manager should establish a strong relationship with a local wildlife professional. These individuals are well educated with particular species, habitats, and annual rituals and can help develop a successful program to protect the wildlife and the public. Additional wildlife mitigation is provided on the FAA website (http://wildlife-mitigation.tc.faa.gov/public_html/index.html).

Preferred practices obtained from the survey conducted when developing this guidebook include vegetation control, fencing, proactive hazing, and installation of a lightweight string between the airport's access area and a nearby water source to deter walking geese from entering.

Methods for Reducing Wildlife Hazards

Methods for reducing wildlife hazards on an airfield fall into two major categories: legal/liability and operational. Wildlife logs, strike reporting, wildlife hazard assessment, wildlife

hazard management plans, and wildlife hazard working groups are methods that consider legal/liability issues. Exclusion, repellents, hazing, harassment, shooting, and trapping are methods that consider operational issues.

Techniques for Legal/Liability Issues. Recent court cases dealing with wildlife control have established that liability is born by the airport operator. These court cases have also made clear the need to

- Document *all* wildlife control efforts,
- Obtain opinions from wildlife biologists, and
- Establish requirements for issuing NOTAMs for existing hazards.

Documenting all wildlife control activities protects both the airport manager and the airport. Airport managers should conduct an inspection of the airfield every day and document any wildlife seen (or not seen). These wildlife logs also provide a historical record of wildlife activity at the airport. If Canada geese tend to be seen only in September, the airport can prepare before the Canada geese arrive. A log also identifies wildlife population reductions or increases and makes employees aware of wildlife hazards.

A wildlife hazard assessment and wildlife hazard management plan are generally recommended for Part 139 airports rather than general aviation airports. Part 139 airports are required by the FAA to conduct a wildlife hazard assessment when either a significant wildlife strike has occurred or a wildlife species or numbers capable of causing such a strike are on an airport. The assessment documents wildlife species, numbers, seasonal use patterns, behavior, and attractive habitat features at the airport and provides recommendations to mitigate these hazards. A wildlife hazard management plan, which is created if required after an assessment, outlines a wildlife hazard management program specific to the airport.

A first step in reducing wildlife hazards is to identify attractive habitats on the airfield. These could consist of open water, ponding areas, or nesting and perching sites or food sources such as landfills, waste transfer stations, or agriculture. Removing these habitat areas is an effective way to avoid attracting wildlife to the airport.

Tools and Techniques for Operational Issues. Variety is the key to any wildlife control program. Using more than one technique has proven to be more effective than using the same method every day to control wildlife.

Maintenance activities include

- Removing trash and litter,
- Covering garbage cans and dumpsters,
- Removing dead animals from the field, and
- Prohibiting wildlife feeding.

Exclusion—such as fencing, putting grids along culverts, placing pin wire on top of lights or signs, or using duct tape to cover holes used for nesting—can help eliminate wildlife on an airport. Covering retention ponds and installing bird netting along hangars and buildings are other exclusion methods.

Using chemical repellents is another way to help control wildlife at an airport. These repellants may be cost-prohibitive for large areas, however, because they must be reapplied after rain or mowing.

Active wildlife hazard management techniques include hazing or harassment, removal, trap and relocation (which is usually not recommended and is against state statute for most species),

and egg or nest destruction. Other alternatives include the use of remote control planes, dogs, falcons, or effigy.

Pyrotechnics are a common way to scare birds from the airport. Twelve-gauge cracker shot, 15 mm launchers, and screamers and bangers are useful pyrotechnics. Scare devices, which are also used to haze and harass wildlife, include propane cannons, distress-cry generators, horns and sirens, Mylar tape, and scare-eye balloons.

Shooting with a rifle or a shotgun is an effective way to reinforce hazing and harassing techniques and to remove hazardous wildlife. Trapping wildlife may also be effective for certain species.

Federal and State Involvement

Several federal and state agencies can help when working with wildlife control at an airport. They include the FAA, U.S. Department of Agriculture (USDA) Wildlife Services, U.S. Fish and Wildlife Services (USFWS), Environmental Protection Agency (EPA), Department of Defense, the U.S. Army Corps of Engineers (ACE), and the state agency responsible for managing wildlife resources.

The Migratory Bird Treaty Act is a federal law that protects all birds except English sparrows, pigeons, and starlings. The CFR lists all federally protected birds. The CFR also covers the different types of permits needed to remove wildlife. Airports must get a depredation permit to lethally remove wildlife from an airfield.

The USFWS grants federal permits to airports to lethally remove migratory birds. It also provides biological opinions on proposed federal activities that may affect federally listed endangered or threatened species. The USDA Wildlife Services recommends the issuance of a permit for an airport to the USFWS.

Individual state agencies may also issue state permits to take mammals and birds. Both a state and federal permit may be needed in some cases, and both permits must be in sync with one another. For example, if the federal permit allows taking 50 Canada geese, then the state permit should also say that 50 Canada geese can be taken.

The Department of Defense has a wildlife strike reduction organization: the U.S. Air Force's Bird Aircraft Strike Hazard (BASH) team. The BASH team documents and records wildlife strikes on military aircraft in a database similar to the FAA/Wildlife Services database for strikes on civilian aircraft. Because of low-level high-speed flights, the military experiences a large number of bird strikes.

The EPA works with the FAA on wetland projects. The EPA also approves or disapproves landfill sites and pesticides. ACE deals primarily with the federal Clean Water Act. It issues permits required for wetland filling or disturbance.

Permits

Federal permits issued by the USFWS protect migratory birds, and state permits issued by the state's wildlife management agency protect birds and mammals. Any protected bird except the bald eagle can be hazed or harassed without a permit. A state and federal permit is required to remove gulls, waterfowl, wading birds, raptors, and other protected birds. A federal or state permit is not needed for crows, blackbirds, or magpies if they are causing damage or are a hazard. Finally, permits are typically not required to take starlings, English sparrows, and pigeons but airport staff should abide by city ordinances if the airport is within the city limits.

The process for obtaining a migratory bird depredation permit (needed for all federal migratory birds except starlings, pigeons, and English sparrows) from the USFWS is as follows:

- The applicant obtains and completes the one-page application form (airports are exempt from the application fee).
- USDA Wildlife Services recommends a permit for approval to the USFWS, including the species, numbers, and conditions.
- The USFWS approves the recommendation and issues a permit.
- The airport operator fills out an annual report reviewing the number, species, and methods used to take wildlife from the airfield.
- The permit is easily renewed after the annual report is received.

A state's wildlife management agency may issue wildlife removal permits. No permit is required for rabbits, squirrels, raccoons, coyotes, woodchucks, weasels, and striped skunks if they are causing damage. For deer, bears, and moose, a permit is needed from the local area wildlife office. For state-protected birds and routinely controlled mammals, a permit is needed. Airport operators should be aware of local firearm ordinances even with mammals for which no permits are needed.

Wildlife Identification

Identification of birds and mammals affecting an airfield is an important step toward reducing hazards. Field marks—certain characteristics of animals—make identification of the species of wildlife that are on the airport easier. Field marks to look for when identifying wildlife are

- Size (larger or smaller than a robin or crow);
- Color(s);
- Color patterns (tail, wings, eye stripes);
- Bill type (long and skinny or short and stout); and
- Habitat (marsh, water, short grass, forested area).

Peterson Field Guides are a useful reference for identifying wildlife. They can be found in almost any bookstore.

Maintenance

Inspections and Surveillance

A safe and efficiently operated airport employs a successful maintenance program. This success begins with routine airport inspections and surveillance. The importance of routine inspections cannot be overstressed. If the airport is utilized on a daily basis, provisions should be made to inspect it on a daily basis. Such daily inspections are considered routine inspections. Activities such as construction or wildlife migration may require continuous surveillance to prevent hazards to aircraft. Periodic inspections are less frequent and may include specific assessments of pavements and pavement markings and recording on airfield lighting circuit performance. Special inspections include checking the airfield after an unusual condition such as an aircraft accident or meteorological event. A special inspection will ensure the pavements and safety areas are clear and airfield lighting systems are functioning correctly. In the survey conducted when developing this guidebook, one airport manager shared that he would walk the runway (with a Unicom radio) for a thorough inspection and for exercise!

Checklists should be developed and used during the inspections, with any discrepancies and corrective actions noted. The inspection logs should be filed and maintained to provide historical data and helpful evidence in the event airport maintenance is ever challenged in court.

Preventive Maintenance Programs

A proven and effective method to operate an efficient airport and reduce maintenance costs is to establish preventive maintenance programs. The adage "pay me now or pay me later" may definitely be applied to this topic. Spending a certain amount of time and money on airport systems each year will significantly reduce the need to spend larger amounts later and replace systems prematurely.

If an airport receives federal funding, it may be required to develop a pavement preventive maintenance program. Annual monitoring and recording is an important part of the preventive maintenance program. Pavement programs may include crack sealing, surface sealing, and partial- and full-depth repairs. Lighting programs may include replacing fixtures, wiring controls, and repainting fixtures. Measuring lighting circuit voltage and recording the numbers may indicate the loss of electrical current requiring maintenance prior to system failure. Building structures and heating, cooling, and ventilation systems should be monitored and addressed as needed. The airport's vehicles and equipment also should be routinely checked and maintained to ensure safe and efficient operations.

Maintenance Equipment

Each airport should keep an inventory of current equipment and desired future equipment needed to safely and efficiently maintain the airport property. To obtain the equipment in a timely manner, it should be identified during the budgeting and capital improvement project (CIP) process. The high cost of some airport equipment will also require early planning and a financial plan. A revolving equipment schedule—which is an inventory of equipment listed by year and showing its replacement schedule based on age and use—can help in this planning process.

Because many airports are publicly owned and operated, most federal, state, and local regulations require the airport to purchase goods through a public advertising and bidding process. Some state agencies organize this process and receive bids for certain equipment and services. Publicly operated airports may then purchase from the state's established contract. In addition, airports may elect to bid for certain equipment and services themselves. The first step is to research the airport's specific needs and the optional equipment available. Visiting with equipment vendors and following up with references is a key step to this education process. It may be useful to use staff (and neighboring airport's) experience and opinions. Assembling a set of bid documents and precise specifications is extremely important. Airport managers should devote adequate time to carefully review these documents prior to advertising. It is important to ensure the documents are written precisely but do not exclude vendors from the ability to participate. Bids are usually received sealed and opened at a public meeting. The award is generally given to the lowest-priced qualified bidder.

In addition, the survey conducted during the preparation of this guidebook suggested consideration of the following practices to improve equipment management: establish and maintain a preventive equipment maintenance program, hire and maintain experienced personnel, acquire a single piece of equipment for multiple roles, and maintain an inventory of frequently needed parts to prevent long downtime repair periods. Cost-saving practices also mentioned included utilizing used equipment from local governments and participating in the Federal Surplus Property Program. More information about this program is available on the FAA website.

Record Keeping

The value of establishing written forms, logs, or checklists, documenting efforts, and maintaining organized files cannot be stressed enough. Record keeping should involve inspections, training, and maintenance efforts. It should also include special conditions such as significant weather

events and accidents or incidents involving aircraft, vehicles, and people on the airport property. Proper record keeping may be used to prove the airport owner is proactive in management programs and may reduce potential liability if challenged in court. In addition, these records may be useful in determining cost of ownership and pre-existing factors for developing the budget for the next fiscal year. Records should be retained for a minimum of one year.

Airfield (Airside) Maintenance

An airfield inspection program should be established and include aircraft movement surfaces, safety areas, lighting, navigational aids (NAVAIDs), construction, wildlife hazards, and public protection. The inspections should be standard, and more important, performed on a routine basis. Because an airport owner is exposed to liability regarding the safety of the operating environment, it is recommended that an airfield inspection (followed by corrective actions for noted deficiencies) be conducted on a daily basis.

Much is written on the subject of airport pavement maintenance. Because runways are the backbones of airports, much time and money are spent nationally to inspect, repair, and replace airfield pavement. Again, routine inspections and preventive maintenance programs cannot be stressed enough because of the expense of pavement repair.

If there is the slightest chance that an airport will experience snow and ice conditions, a snow and ice control plan should be established. At a minimum, a snow and ice control program should identify equipment, personnel, airfield inspection procedures, snow removal priorities, and a list of key contact personnel involved in coordinating airfield operations. It is recommended that a snow removal committee be established and the snow and ice control plan updated and discussed on an annual basis prior to the snow season. An effective method to disseminate current airfield conditions to the pilots and local tenants should be established as well.

FAA AC 150/5200-30, *Airport Winter Safety and Operations,* is an excellent source when establishing or revising the airport's snow removal plan. This source provides information on runway-friction reporting equipment utilized to measure the runway's breaking conditions for aircraft. In addition, it discusses treatment of pavements with chemical and nonchemical techniques to improve conditions.

Properly maintained airfield lighting is an essential component of successful airfield operations. Lighting should be inspected on a daily basis during a period of low daylight to ensure all units are working properly. Lighting is required to be replaced as soon as a deficiency is noted. NAVAIDs may be maintained by the FAA or state or local agencies but should be monitored by the airport owner or operator to provide timely maintenance reporting. Lighting and NAVAID maintenance logs will assist with preventive programs and replacement determinations.

As part of the daily airfield inspection, special attention should be given to airfield signage and markings. Markings may fade over time because of weather, frequent aircraft landings, and snowplow operations. This fading or erosion may not be noticeable to the daily inspector. A periodic inspection specifically noting airfield markings with a fresh set of eyes will help with this issue. Outlining the critical markings with black paint and glass beads for lighting reflection are also recommended to improve safety. Signage is critical for airfield safety, especially for transient pilots unfamiliar with the airport. Ensuring that airfield signs have reflective panels and working lights and remain clear of obstructions will also improve safety.

Vegetation obstruction and erosion control is also part of the daily inspection. Because these issues change slowly and may not be noticeable to the daily inspector, they should be included in a specific periodic inspection. The airfield should be inspected on an annual basis for trees and other objects that may violate the airport's approach airspace. Once identified, the objects should

be removed and a management plan established for future growth. A plan should be established to control erosion that may affect the aircraft movement areas and security fencing. Vegetation growth may also contribute to wildlife hazards. The survey conducted during the preparation of this guidebook indicated that a large percentage of airports use herbicide to help manage vegetation as a maintenance practice and a wildlife mitigation technique. Most airport managers cite frequent grass mowing as the preferred practice. In addition, airports will allow local individuals to cut the grass as hay, which saves the airport time and money. Contact the local wildlife representative for help in developing an effective plan to manage vegetation and control certain wildlife.

The attacks of September 11, 2001, resulted in more financial aid for airport security. However, the motivation at most small airports for installing fencing is not the threat of terrorist attacks as much as pedestrian and wildlife incursions. Financial assistance for most small airports recognizes the combined value of safety and security. Prior to installing an airport fence, the airport manager should consider local conditions and the object to be deterred. Ground frost may push fence bases upward in northern climates; special bases may be required in sandy or wet locations; and heights exceeding 10 feet may be recommended for keeping out deer.

Landside Maintenance

Airport maintenance includes the landside, or pedestrian side, of the airfield as well. Routine inspections should cover public areas such as buildings, sidewalks, roadways, and parking lots. Special attention should be given to safety-related items, especially during construction and adverse weather conditions. Routine inspections help the general upkeep and save dollars under an efficient preventive maintenance program. Remember, the airport is the "front door" to a community and a good (or bad) first impression is the responsibility of the airport owner and operator.

Security

History and Overview

The FAA established airport and airline security regulations in 1972 to primarily address a series of airline hijackings and other criminal threats. The security regulations were established under FAR Part 107, Airport Security, and FAR Part 108, Airplane Operator Security, to control access to the air operations area and prohibit explosives, incendiary, or deadly/dangerous weapons aboard commercial aircraft. These regulations applied to commercial air carriers and airports certified for air carrier service; there were no mandates for smaller, general aviation airports to establish and maintain an airport security program.

The attacks carried out on September 11, 2001, changed the way the United States views aviation security. President George W. Bush signed into law the Aviation and Transportation Security Act on November 19, 2001. This law created the Transportation Security Administration (TSA) within the Department of Transportation (transferred to the Department of Homeland Security in November 2002). The TSA became the federal agency responsible for security in all modes of transportation. The TSA assumed the federal regulations overseeing aviation security. The FAA's security regulations, FAR Part 107 and Part 108, were revised and renumbered Transportation Security Regulation (TSR) Part 1542, Airport Security, and TSR Part 1544, Aircraft Operator Security: Air Carriers and Commercial Operators.

Although the general consensus does not consider smaller airports and aircraft a threat, general aviation has also been considered under the efforts of reducing potential terrorist activities. The TSA in April 2003 requested the Aviation Security Advisory Committee develop a working group made up of general aviation industry organizations, general aviation airport managers, and repre-

sentatives of various state government aviation agencies to develop guidelines for security enhancements at general aviation airports. This resulted in a publication titled *Security Guidelines for General Aviation Airports*, which will be discussed briefly later in this section.

The public's common notion of airport security tends to revolve around screening commercial airline passengers and preventing terrorist activity. Because historically these issues have not played a significant security role at smaller airports, the focus of small airport security programs has been on protecting the public and preventing inadvertent entry of individuals and wildlife into the airport operations area. Airports surveyed for this guidebook were asked their perception of the most realistic security threat(s) to their airport. The results are ranked as follows:

1. Wildlife,
2. Vandalism,
3. Theft,
4. Accidental airfield incursions by the public,
5. Terrorism, and
6. Unreasonable response time from local authorities.

The top four threats cited are common concerns for almost every airport in the nation and should be addressed in an airport security program. However, each individual airport is unique and a specific site assessment is required to determine the threats and respond adequately to the level of those particular threats.

Of the airports that responded to the security portion of the survey, more than 75% had airfield fencing, gates, and signage for airport security. At least 60% of the respondents want to improve their airport security by obtaining and installing access control systems and closed circuit television systems. Several respondents commented that a low funding priority and the lack of proper funding for security improvements is the airport's biggest security challenge.

Federal Regulations

The TSA has issued security rules and regulations under 49 CFR Chapter XII, Parts 1500 through 1699. These rules and regulations generally apply to certain airports serving commercial air carrier operations. A summary of the potentially applicable security requirements related to airport operations follows:

- **Part 1520—Protection of Sensitive Security Information.** Restricts the availability of security information to those with a "need to know" only. The airport security program defines those who have access to the sensitive security information.
- **Part 1540—Civil Aviation Security.** Contains rules that cover all segments of civil aviation security. It includes "individual accountability" and rules that apply to passengers, aviation employees, and other individuals and persons related to civil aviation security including airport operators, aircraft operators, and foreign air carriers.
- **Part 1542—Airport Security.** Requires airport operators to adopt and carry out a security program approved by the TSA. It describes requirements for security programs, including establishment of secured areas, air operations areas, security identification display areas, and access control systems. This part also lists requirements for fingerprint-based criminal history record checks of specified individuals.
- **Part 1544—Aircraft Operator Security: Air Carriers and Commercial Operators.** Applies to certain aircraft operators that hold operating certificates for scheduled passenger operations, public charter passenger operations, private charter passenger operations, and other aircraft operators. This part requires such operators to adopt and carry out a security program approved by the TSA. It lists requirements for screening of passengers and property.

- **Part 1548—Indirect Air Carrier.** Applies to indirect air carriers, such as freight forwarders. It requires such carriers to adopt and carry out a security program and describes requirements for preventing the carriage of unauthorized explosives or incendiaries aboard passenger aircraft.
- **Twelve-Five Rule.** Requires certain aircraft operators using aircraft with a maximum certificated takeoff weight (MTOW) of 12,500 pounds or more to establish and maintain a security program.
- **Private Charter Rule.** Similar to the Twelve-Five Rule but adds additional requirements for aircraft operators using aircraft with a MTOW greater than 45,500 kilograms (100,309.2 pounds) or with a seating configuration of 61 or more.

Safety and Security Guidelines for General Aviation Airports

Although the TSA regulates airport owners and operators serving air carrier operations, a set of guidelines has been established and recommended for the remaining airports to implement. The document, titled *Security Guidelines for General Aviation Airports,* is an excellent resource when developing or revising an airport security program. The guidelines can be found on the TSA website (www.tsa.gov/what_we_do/tsnm/general_aviation/airport_security_guidelines.shtm).

The document recognizes that every airport is unique and a specific assessment is needed to determine the vulnerability of each facility. Within the document is an Airport Characteristic Measurement Tool to help determine which security enhancements are appropriate based on location, number of based aircraft, runway size, and operations specific to a facility. The document also covers various security enhancement recommendations that include physical aspects as well as personnel training, surveillance, and reporting procedures. An airport manager should also establish a relationship with the local TSA representative for his or her geographic area. Although the TSA may not have jurisdiction over the airport, the TSA representative can be a valuable source of information on airport security issues.

The TSA, in coordination with the Aircraft Owners and Pilots Association (AOPA), has implemented a general aviation hotline [866-GA-SECURE (1-866-427-3287)] for reporting any suspicious activity on or around the airport. The hotline was developed to complement the AOPA's Airport Watch Program, which can be viewed in detail on the AOPA website (www.aopa.org/airportwatch/). In addition, *ACRP Synthesis 3: General Aviation Safety and Security Practices,* identifies current practices in safety management and security, including FBO practices, and presents low-cost and easily implemented practices and ideas that may be transferable to many airports.

Incorporation of State and Local Regulations

Incorporating state and local regulations into the airport security program is important to maintain consistency of enforcement procedures with the applicable agencies. Also, some states may have laws that refer to airport security. Regulations obviously vary for each airport in this regard, so it is important to establish a point of contact for each agency and compare the airport security program with state and local regulations. In some cases, local ordinances specific to the airport's operations may need to be established and adopted by the local governing body to enforce airport security procedures.

Development of an Airport Security Program

When initially developing an airport security program, establishment of a committee representing airport management, airport tenants, and local law enforcement is recommended. Individuals with knowledge of the airport's operations, tenant operations, and local law enforcement procedures contribute to the success of such a program. These individuals serve a key role when com-

pleting the vulnerability assessment to identify which security enhancements will be required. In addition, their participation may contribute to the acceptance and implementation of the program in a timely manner.

The TSA's *Security Guidelines for General Aviation Airports* lists the essential components for developing a security program. These components include personnel, airport facilities, surveillance, security procedures, communications, and specialty operations. The circumstances of each airport will determine which security enhancements will be included in the program and how they will be implemented and enforced.

Once developed, the written airport security program should be shared with others on a need-to-know basis only. The TSA considers the plan to be sensitive security information, and the airport owner aids security by safeguarding such site-specific information.

Local Training and Airport Familiarization

An airport security plan is only as effective as it is current and rehearsed. Airports regulated under TSR Part 1542 are required to provide a review of the plan every 12 months, including every agency with a responsibility in the airport security program. Today, most response agencies have annual training requirements and it makes good sense to include the airport in those, thereby combining efforts to save time and costs. This also provides a great opportunity for multiple agencies to practice coordination and learn of each other's resources and capabilities. The ability to disseminate information about illegal and suspicious activities is imperative. Exercising contingency plans and maintaining current contact information and procedures ensures efficient response in times of need.

Local law enforcement agencies should understand their responsibilities in the airport security program. They need to be as familiar with the airport's operating procedures and the airport property as they are with local procedures for their city streets and facilities. Commonly, local agencies do not spend the time to familiarize themselves with the airport's surroundings and airfield access procedures. Fences, locked gates, locked doors, and security regulations may pose obstacles for responding agencies unfamiliar with the airport. Airport operators must also consider informing agencies of airport issues such as construction, procedural changes, and seasonal operations that could affect their response.

In addition, security training should be provided to tenants, contractors, and anyone else who has authorized access. This should include airport familiarization, security procedures, and reporting procedures. Special consideration should be given to responsibility for individual awareness. A comment provided during the security portion of the survey raises an excellent issue—complacency. The comment stated, "Another problem that people like myself who manage a small county airport face is the fact that we have always lived in a safe and secure environment and this causes us to doubt what we may actually be seeing and just write it off when the situation requires urgent action." The survey also indicated a strong need to include provisions in the security program to deter theft and vandalism.

Security Technology

Security technology utilized to enhance airport security comprises various components. Items such as access control and closed circuit television (CCTV) systems are becoming more popular and financially reasonable compared to past years.

Access systems for doors and gates leading to secured areas range from the simple—lock and keys, remote-controlled gates, and proximity cards—to the complex—computer-based access

control systems and biometric systems. Obviously, the more complex the systems, the higher the cost will be for installation and operation. To determine which system is appropriate for a particular facility, such factors as physical requirements, costs, reliability, and data recording will need to be considered. An important factor to remember when choosing an access system is its ability to remain uncompromised. The airport owner should keep an inventory of access media and have the ability to negate access if required.

Surveillance methods such as CCTV systems are becoming more and more popular due to their lower costs, provision of security coverage with fewer personnel, and the ability to record events to document activities. Certain systems also have the ability to monitor and record off-site via the Internet. Various systems are available at local electronic retail outlets or national vendors.

Intrusion detection systems are another method for monitoring individual facilities or the property's perimeter. The systems are typically monitored by an off-site contracting company. If an intrusion or other event such as a power outage or fire is detected, the company will contact the airport manager or local police or fire department. Again, the costs will be directly proportional to the complexity of the systems installed.

Airport security requires a team concept. Awareness, education, surveillance, and vigilance must be shared by all airport users.

Emergency Preparedness

Airport Emergency Plan

Small airports not certified under FAR Part 139 are not required to develop and maintain an airport emergency plan (AEP). The majority of airport operators, however, have undertaken this task because of its importance and the airport operator's recognition of responsibility to public safety. Airport operators face challenges in emergency events due to the airport's distance from the responding agencies, few resources, and inadequate funding. These challenges emphasize the airport owner's need to establish a basic AEP to minimize the possibility and extent of personal injury and property damage in the event of an emergency.

The primary purpose of an AEP is to establish delegation of duties, assign agency responsibilities, provide coordination of response efforts, and provide an orderly transition between normal and emergency operations. The development of an AEP will also provide an inventory of available resources and those that will be needed in an emergency event. A good starting point in the AEP development process should be a review of FAA AC 150/5200-31B, *Airport Emergency Plan* (2008).

Operational Planning Procedures

Each airport operator should establish operational planning procedures for the airport. The first hour of response is critical for life-saving efforts, considering an airport's lack of resources and a possible lengthy response time from other professional emergency responders. During this period, on-duty staff should be given an organized checklist that provides guidance and coordination. Such a checklist should include a prioritized list of names and phone numbers of the agencies to contact. It should also provide procedures to follow as the emergency response progresses. Finally, it should cover procedures to ensure airport operations are restored properly and safely before returning the facilities to public use. Checklists are best kept concise and in easy reach of potential users.

Emergency Training and Airport Familiarization

An AEP is only as effective as it is current and rehearsed. FAR Part 139.325 requires a review of the plan every 12 months and a live exercise every 36 months that includes every agency with a responsibility in the AEP. Today, most response agencies have annual requirements to perform training, and it makes good sense to include the airport and combine efforts to save time and costs. Combining training also provides a great opportunity for multiple agencies to practice coordination and learn of each other's resources and capabilities. Communication is the most significant problem encountered during emergency events. Providing a practice drill provides an excellent opportunity to research this challenge and improve shortfalls.

Responding agencies should be as familiar with the plan and the airport as they are with local procedures for their city streets and facilities. Commonly, local agencies do not spend the necessary time to familiarize themselves with the airport's surroundings and airfield access procedures. Fences, locked gates, locked doors, and security regulations may pose obstacles for responding agencies unfamiliar with the airport. Airport operators must also consider informing agencies of airport facility changes that could affect their response such as construction, procedural changes, and seasonal operations.

Aircraft Accidents and Incidents

Statistics show the greatest potential for aircraft accidents occurs during the landing or departure operation of the flight. A high percentage of all aircraft accidents occur on or near the airport property, but accidents may occur at any time or any place. Such unpredictable occurrences are another reason to closely coordinate efforts with agencies that have jurisdictional responsibilities for the surrounding community.

The response to each aircraft accident or incident will be different because of variables such as location, aircraft type, number of people involved, type and amount of fuel or cargo on board, and weather. However, the basic response should include the same considerations. Safety for the lives of the victims and the responders is paramount throughout the response and recovery efforts. Professional responders are equipped with the resources and training to provide an efficient and safe response. The airport operator and first responders should keep the area clear of all people until it is safe to enter. Once a safe perimeter is established and rescue efforts have been completed, the aircraft and perimeter need to be protected from disturbance until necessary investigations are completed. (Investigations may be performed by the NTSB, FAA, FBI, TSA, and other state and local agencies.) It is the responsibility of the aircraft owner or operator to remove the aircraft when released by the investigating agencies. The airport owner, however, will need to oversee the coordination of such events and be prepared to possibly help with local resources.

Media Relations

Involving the media in the AEP and training events provides a great public relations opportunity to demonstrate the hard work and preparedness the airport and responding agencies develop during the AEP process. More important, involving the media in the AEP informs them how, when, and where to respond during an emergency. The airport operator should establish an area for media briefings and be prepared to provide timely and informative briefings during an event. This step makes for good public relations and demonstrates professionalism by the airport and responders. Inviting the media to the AEP reviews and live exercises also educates them about the dangers of emergency response and stresses safety procedures. Once the scene is secured, the airport operator can coordinate times and methods to film and cover events in a safe manner.

Prior to interacting with the media during an emergency, the airport manager should spend a few moments preparing a brief and factual statement, select an appropriate site without a view of death or destruction, and arrange to have the media members' identification verified to prevent unauthorized entry to press briefings. During interaction with the media, the airport manager should project a positive image for the airport and responding agencies by remaining calm and serious and avoiding emotional statements, control the briefing by providing brief facts only, and refrain from accepting responsibility for the accident. Chapter 5, Public Relations, contains additional information about media relations.

Preferred Practices and Recommendations

The following preferred practices and recommendations were provided by airport owners and operators during the development of this guidebook:

- Host a base of the local ambulance authority to provide a quicker response time to the airport and throughout the city.
- Get involved with the local emergency management association.
- Ensure mutual aid agreements are in place and the airport is included in the local emergency agency's response plans, too.
- Maintain a certain amount of control during the emergency to include limiting unnecessary radio chatter.
- Include provisions in the airport emergency plan for fuel spills and natural disasters.
- Ensure responding agencies are familiar with utility shut-off sources.
- Conduct annual fire inspections of airport facilities to include aircraft hangars.
- When calling 9-1-1 with a cell phone, always tell the dispatcher specifically where the emergency is located. (In one instance, the dispatcher sent the agencies to the neighboring airport by mistake!)
- Establish a chain of command prior to an event, improve communication procedures, and train, train, train!

Additional Resources

Wildlife Mitigation

Cleary, E., and R. Dolbeer. *Wildlife Hazard Management at Airports: A Manual for Airport Personnel,* 2nd ed., FAA, July 2005.

FAA Airport Wildlife Hazard Mitigation homepage: http://wildlife-mitigation.tc.faa.gov/public_html/index.html.

FAA CertAlerts: www.faa.gov/airports_airtraffic/airports/airport_safety/certalerts:

- FAA CertAlert 04-16 Deer Hazard to Aircraft and Deer Fencing
- FAA CertAlert 03-03, Guidelines for Submitting Bird Strike Feather Remains for Identification
- FAA CertAlert 02-09, Alternative Deer Fencing
- FAA CertAlert 01-01, Deer Aircraft Hazard

Hazardous Wildlife Attractants on or near Airports, FAA AC 150/5200-33, available online from FAA Regulatory and Guidance Library: www.airweb.faa.gov/.

International Civil Aviation Organization Safety Management website: www.icao.int/anb/safetymanagement.

Peterson, R., and V. Peterson, *Peterson Field Guide to the Birds of Eastern and Central North America,* 5th ed. Houghton Mifflin, 2002.

Protocols for submitting bird samples for identification, available from FAA Airport Wildlife Hazard Mitigation: http://wildlife.pr.erau.edu/BirdIdentification.htm.

Safety guidelines for picking up bird remains (in light of recent bird flu developments), available from FAA Airport Wildlife Hazard Mitigation: http://wildlife.pr.erau.edu/safety/Safety_Precautions_for_Handling_Birdstrike_Remains.doc.

Three videos on wildlife control, produced by and available from Transport Canada Aerodrome and Air Navigation office and website:
Transport Canada, Aerodrome and Air Navigation
330 Sparks Street
Place de Ville, Tower C
Ottawa, Ontario, Canada K1A 0N8
Phone: 613-990-0515
www.tc.gc.ca/civilaviation/AerodromeAirNav/Standards/WildlifeControl/Awareness.htm

Security

Aircraft Owners and Pilots Association Airport Watch Program: www.aopa.org/airportwatch.

Quilty, S. M. *Module 15: Airport Security and Response to Emergencies.* American Association of Airport Executives, Alexandria, Va.

Security Guidelines for General Aviation Airports. Transportation Security Administration, Washington, D.C., May 2004.

TSR Parts 1520, 1540, 1542, 1544, and 1548.

Williams, C. *ACRP Synthesis of Airport Practice 3: General Aviation Safety and Security Practices.* Transportation Research Board of the National Academies, Washington, D.C., 2007.