



**Agenda Item 2: Air navigation regional activities**

**AIRFIELD SAFETY IN THE UNITED STATES**

(Presented by the United States)

**SUMMARY**

ICAO has elevated the reduction of runway incursions and excursions as a high global safety initiative under its Runway Safety Program. This paper discusses how the United States Federal Aviation Administration (FAA) places a high priority on improving airfield safety, and how, in partnership with industry, airport operators, and air traffic controllers, the FAA has enacted many changes to reduce the risk of runway excursions and incursions. One ICAO-endorsed method used for reducing runway excursions is the use of Engineered Materials Arresting System (EMAS) to minimize excursions off the end of a runway.

**ICAO Strategic  
Objective:**

*A - Safety.*

**1. Introduction**

1.1 The FAA regards safety as its first priority. Both runway incursions and runway excursions pose a threat to passengers, crews, and airport workers that can cause significant damage to aircraft and infrastructure.

1.2 An aggressive runway safety program reduced the number of serious category A and B runway incursions in the United States by 50 percent from 24 in 2008 to 12 in 2009. A further 50 percent reduction was obtained in 2010 when serious category A and B incursions were reduced to 6. Further improvements were recorded in 2011. Reduced consequences of runway excursions were achieved by the use of Engineered Materials Arresting System (EMAS) off runway ends. Over the past three years, EMAS installations have captured three (3) aircraft excursions, resulting in zero fatalities and minimal aircraft damage.

**2. Discussion**

2.1 To improve controller situational awareness on the airport movement area at the busiest U.S. airports, the FAA has installed ASDE-X ground surveillance systems at 35 towers. The ASDE-X display also shows the edges of a runway where a plane is landing or departing. If another plane or vehicle crosses those lines or moves toward them at a certain speed, visual and aural alarms go off, and allow the controller to defuse the situation.

2.2 Runway Status Lights are part of a fully automated system that integrates airport lighting equipment with surveillance systems to provide a visual signal to pilots and vehicle operators when it is unsafe to enter or cross a runway (Runway Entrance Lights) or begin takeoff roll on a runway (Takeoff Hold Lights). Airport surveillance sensor inputs are processed through light control logic that command in-pavement lights to illuminate red when there is traffic on or approaching the runway. The developmental systems have proven successful and the FAA is moving ahead with installing FAA operated Runway Status Lights production systems at 23 of the busiest airports. In addition, a new application for Runway Intersection Lights is currently being evaluated at Boston Logan International Airport.

2.3 The FAA is also evaluating the use of low-cost radar surveillance systems that would reduce the risk of runway incursions at certain small and medium-sized airports that are currently not programmed to receive ASDE-X. Four vendors were selected to provide one system for each for evaluation. The Operational Evaluation is under way at Spokane. Installations are in process at San Jose, Manchester, Long Beach, and Reno.

2.4 The FAA requires air traffic control tower facilities to conduct a Runway Safety Action (RSAT) meeting on an annual basis. RSAT participants typically include airport management, air traffic controllers and management, airport tenants, airlines, charter companies, general aviation pilots, fixed base operators, airport certification inspectors, and aviation safety inspectors. As with other aviation organizations, such as International Air Transport Association (IATA), the FAA has developed the Local Runway Safety Action Team Toolkit to provide guidance in the planning and conduct of an RSAT and drafting of the Runway Safety Action Plan. The toolkit is available on the FAA Office of Runway Safety web-site.

2.5 FAA is improving Runway Safety Areas (RSAs) [note: ICAO uses the term Runway End Safety Areas (RESA)] to enhance safety in the event an aircraft undershoots, overruns, or veers off the side of the runway. Since the program was started, 79 percent of the RSA improvements have been completed. Thirty-five airports achieved their improvements by installing EMAS (see Figure 2.5 below), a bed of crushable concrete placed at the end of a runway to absorb the forward momentum of an aircraft. This technology is now in place at 51 runway ends at 35 airports in the United States. There have been seven incidents where the technology has worked to stop overrunning aircraft and prevented injury to passengers and damage to the aircraft. For standards and recommended practices, please see U.S. FAA Advisory Circular 150/5220-22A, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*.

Figure 2.5



EMAS Boston Logan Intl Airport - RUNWAY END 04L

2.6 In an effort to improve runway safety overall, ICAO intends to elevate Runway End Safety Area recommended practices to standards. On February 25, 2011, the ICAO Secretary for the Aerodrome Design Working Group under the Aerodrome Panel announced that ICAO had decided to elevate RESA Recommended Practices to Standards. The ICAO Secretary also acknowledged a 10-year transition period for States to implement the new standard. (Reference: Annex 14, Volume I Paragraph 3.5 Runway End Safety Areas.)

2.7 All U.S.-certificated airports completed installation of the enhanced taxiway centerline surface markings and Surface Painted Runway Holding Position Signs on schedule by December 2010. These two surface markings are low cost methods to improve pilot situational awareness when approaching a runway hold line. ICAO has adopted Enhanced Taxiway Centerline Surface Markings and Surface Painted Runway Holding Position Signs as a Recommended Practices (Reference: Annex 14, Volume I).



2.8 The FAA is working to reduce the risks that Foreign Object Debris (FOD) poses on airports. In September 2009, the FAA published performance standards for continuous FOD detection equipment in Advisory Circular (AC) 150/5220-24, *Airport FOD Detection Equipment*.

2.9 The FAA has developed standards for end-around taxiways, which can keep aircraft from having to cross runways being used for takeoffs and landings at the busiest airports. An end-around taxiway at Atlanta has been operational since April 2007, and another that opened at Dallas-Fort Worth in December 2008 will eliminate more than 1,500 runway crossings each day. The FAA also encourages operators to build perimeter roads around the airfield so that vehicles do not have to be driven across taxiways and runways.

2.10 The FAA formed a joint FAA/Industry Runway Safety Council in October 2008 to explore the root causes of runway incursions. The Council is comprised of representatives from various parts of the aviation industry. The Council's Root Cause Analysis Team investigates serious runway incursions and conducts an analysis. To date, the RCAT has investigated eight (8) incursions and forwarded 21 recommendations to the Council.

2.11 For almost 50 years, the FAA's wildlife hazard management program has focused on mitigating wildlife hazards on or near airports through various methods including habitat modification, harassment technology, research, and partnerships with academia, military, government, and the aviation industry.

2.12 Wildlife strikes are increasing. This is a result of increases in bird populations along with increases in the number of aircraft operations. The FAA believes that airport operators must be proactive and understand if they have a wildlife issue at their airport. The assessment will identify the number and species of wildlife on or near the airport. It will also identify the wildlife attractants on or near the airport. If the wildlife hazard assessment indicates that the airport has a wildlife hazard issue, then the airport must do a wildlife hazard management plan.

2.13 The FAA is also evaluating the capability of avian (bird) radars. The FAA tested a number of commercially available bird radars and developed a performance specification that airports can use to competitively purchase bird radar systems.

2.14 The FAA will continue to evaluate commercially available avian radars and emerging sensor technologies such as electronic scanning radars. A new research effort will examine the feasibility and practicality of having pilots and air traffic controllers use aviation radar data to further reduce the likelihood of collisions between birds and aircraft.

2.15 For the last 15 years, the FAA and the United States Department of Agriculture's Wildlife Services have conducted a research program to make airports safer by reducing the risks of aircraft-wildlife collisions. The FAA has published the results of our wildlife research in a comprehensive Wildlife Hazard Management Manual. The manual has been translated into French and Spanish and provides practical methods that airport operators can use to mitigate wildlife hazards at their airport. It is available at no cost on the FAA web site.

### **3. Action by the Meeting**

3.1 The Meeting is invited to:

- a) note the contents of this paper, and
- b) consider implementing some or all of the technologies and processes above to reduce the risk of runway excursions and incursions on their airfields and wildlife incidents.