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NORTH AMERICAN, CENTRAL AMERICAN AND CARIBBEAN OFFICE
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Agenda Item 3: **Air Navigation Matters**
3.6 Other Air Navigation issues

STATUS OF ENGINEERED MATERIALS ARRESTING SYSTEM INSTALLATIONS IN THE UNITED STATES

(Presented by the United States of America)

SUMMARY

The United States Federal Aviation Administration (FAA) places a high priority on improving runway safety areas (RSA) at commercial service airports to meet current standards. Since many airports are constrained and construction of a full RSA is not possible, FAA, in partnership with industry representatives developed an Engineering Materials Arresting System (EMAS) in the 1990's. EMAS consists of a lightweight concrete material that crushes under the weight of an aircraft's landing gear when it leaves the runway surface. In many situations, EMAS installations meet RSA standards even when standard RSA dimensions are not attainable. Through FAA's leadership, EMAS continues to be deployed at airports throughout the US and it has proven to successfully stop aircraft overruns on several occasions.

1. Introduction

1.1 The Federal Aviation Administration (FAA) requires that commercial airports, regulated under Part 139 safety rules, have a standard Runway Safety Area (RSA) where possible. At most commercial airports the standard RSA is 500 feet wide and extends 1000 feet beyond each end of the runway. The FAA has this requirement in the event that an aircraft overruns, undershoots, or veers off the side of the runway. The most dangerous of these incidents are overruns, but since many airports were built before the 1000-foot extension was adopted some 20 years ago, the area beyond the end of the runway is where many airports cannot achieve the full standard RSA. This is due to obstacles such as bodies of water, highways, railroads and populated areas or severe drop-off of terrain.

1.2 The FAA has a high-priority program to enhance safety by upgrading the RSAs at commercial airports and provide federal funding to support those upgrades. However, it still may not be practical for some airports to achieve the standard RSA.

1.3 The FAA, knowing that it would be difficult to achieve a standard RSA at every airport, began conducting research in the 1990s to determine how to ensure maximum safety at airports where the full RSA cannot be obtained. Working in concert with the University of Dayton, the Port Authority of New York and New Jersey, and the Engineered Arresting Systems Corporation (ESCO) of Ashton, PA, a new technology emerged to provide an added measure of safety. This technology, EMAS, uses a lightweight, crushable concrete material with closely controlled strength and density placed at the end of a runway to stop or greatly slow an aircraft that overruns the runway. When an aircraft rolls into an EMAS arrestor bed, the tires of the aircraft sink into the light concrete and the aircraft is decelerated by having to roll through the material.

2. Discussion

2.1 The EMAS technology provides safety benefits in cases where land is not available or where it would be very expensive for the airport sponsor to buy the land off the end of the runway.

2.2 The EMAS technology also provides an added measure of safety at airports where it is not possible to have the standard 1,000-foot overrun. This technology is now in place at 16 airports with installation under contract at four additional airports.

2.3 An EMAS that meets all FAA requirements for a standard RSA only needs to extend 600 feet from the end of the runway. However, an EMAS arrestor bed can still be installed to help slow or stop an aircraft that overruns the runway, even if less than 600 feet of land is available

2.4 Presently, the EMAS system using crushable concrete is the only system that meets the FAA standard.

2.5 To date, there have been three incidents where the technology has worked successfully to keep aircraft from overrunning the runway and in several cases has prevented injury to passengers and damage to the aircraft.

- May 1999: A Saab 340 commuter aircraft overran the runway at JFK
- May 2003: Gemini Cargo MD-11 was safely decelerated at JFK
- January 2005: A Boeing 747 overran the runway at JFK
- July 2006: Mystere Falcon 900 airplane ran off the runway at the Greenville Downtown Airport, South Carolina

2.6 Currently, EMAS is installed at 21 runway ends at 16 airports in the United State.

Airport	**Location**	**# of Systems**	**Installation Date**
JFK International	Jamaica, NY	1	1996
Minneapolis St. Paul	Minneapolis, MN	1	1999
Little Rock	Little Rock, AR	2	2000/2003
Rochester International	Rochester, NY	1	2001
Burbank	Burbank, CA	1	2002
Baton Rouge Metropolitan	Baton Rouge, LA	1	2002
Greater Binghamton	Binghamton, NY	2	2002
Greenville Downtown	Greenville, SC	1	2003
Barnstable Municipal	Hyannis, MA	1	2003
Roanoke Regional	Roanoke, VA	1	2004
Fort Lauderdale International	Fort Lauderdale, FL	2	2004
Dutchess County	Poughkeepsie, NY	1	2004
LaGuardia	Flushing, NY	2	2005
Boston Logan	Boston, MA	2	2005/2006
Laredo International	Laredo, TX	1	2006
San Diego	San Diego, CA	1	2006

2.7 Seven additional EMAS systems are currently under contract at four additional airports.

Location	**Number of Systems**	**Expected Installation Date**
San Diego, CA	1	Fall 2006
Charleston, WV	1	Fall 2006
Laredo, TX	1	May/June 2006
Cordova, AK	1	Summer April 2007
Teterboro, NJ	1	Oct. 2006
Chicago Midway	1	Oct. 2006
Chicago Midway	3	2007

2.8 EMAS has also been installed internationally in Jiuzhai-Huanglong (JZH), Sichuan Province, PRC and is planned for Madrid-Barajas International Airport, Spain

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