



## FAA R&D Factsheet

### FAA Tests New EMAS Prototype

The FAA, the Port Authority of New York and New Jersey, and Engineered Systems Company (ESCO) of Ashton, PA, researchers are currently installing a second-generation engineered material arresting system (EMAS) at New York's LaGuardia airport that will increase airport runway safety, protecting people, and aircraft during overrun accidents.

For those approximately 350 airports locations in the United States that do not have the space for a full runway safety area, EMAS, made of water, foam, and cement, may provide an engineered solution to create a margin of safety. EMAS deforms readily and reliably under the weight of an aircraft tire. As the tires crush the material, the drag forces decelerate the aircraft, bringing it to a safe stop.

Although the prototype has proven to be a critical safety enhancement for airports that do not have space for a full 1,000-foot safety area at the end of the runway, researchers discovered that over time the arrestor material deteriorated when exposed to jet blast. To solve this problem, the FAA worked with industry to redesign the system, making it more resistant to jet blast, wind, noise, acoustics, and temperature.

This second generation prototype recently underwent extensive jet blast testing at the FAA's William J. Hughes Technical Center in Atlantic City, NJ. Researchers mapped the various components of jet blast forces on the runway 22 overrun safety area at New York's LaGuardia airport, where conditions are perhaps the most severe imaginable. They then set up the test at the FAA wind tunnel facility, where they ran a series of tests equivalent to a full year of jet blast from runway 4 departures at LaGuardia. The cellular cement blocks and new topcoat survived this exposure with absolutely no damage. As a result of the wind tunnel tests, a demonstration bed was installed 75 feet from the departure end of runway 4 at LGA. After 16 months of jet blast exposure the demo bed is in excellent condition.

"EMAS is proven technology that has saved lives," said Charlie Keegan, FAA's Associate Administrator for Research and Acquisition. "On May 8, 1999, this key product of the FAA R&D program paid a huge safety dividend."

On that day, an American Eagle flight ran out of runway while trying to land at John F. Kennedy International Airport (JFK). The Saab 340 commuter aircraft overshot the runway, stopping 248 feet into the 400-foot long arrestor bed, only 200 feet from the waters of Thurston Bay. All 30 onboard walked off the aircraft. Damage to the aircraft was minimal; damage to the bed was restricted to a 30-foot wide and 250-foot long section.

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To provide further assurance of durability, this Fall the Port Authority plans to install a second demonstration bed on the LaGuardia runway 22 overrun safety area. This installation will use a 35foot setback, rather than the typical 100 feet or more. Over the next year, the bed will be extended gradually to full length, 275 feet, and will convert to a fully functional bed next summer. This will culminate a two-year R&D effort to solve both the jet blast and weatherability issues that created problems for the first generation beds.

EMAS is now being installed at airports around the country, significantly enhancing the safety of the flying public. EMAS is currently at airports in Minneapolis/St. Paul, MN, Little Rock, AR, Rochester, NY, and Burbank, CA. In 2002 EMAS will be installed at Baton Rouge, LA, New York (JFK), NY, and Binghamton, NY (2 beds). In 2003, EMAS is planned for New York's LaGuardia (1 rebuild and one new), and Little Rock, AK (a second bed). Six additional EMAS are currently under design and FAA review. International interest is also increasing.

Generally, the cost to install an EMAS ranges between \$2 million and \$4 million, plus site preparation, for U.S. installations. Airports can apply to the FAA for Airport Improvement Program (AIP) grants to help defray the cost of the system.

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