U.S. Department
of Transportation
Federal Aviation Administration

Office of Airport Safety
and Standards

800 Independence Ave., SW.
Washington, DC 20591

JAN 20 2006

Mr. Robert Trimborn
Airport Manager, Santa Monica Airport
Office of the Airport Manager
3223 Donald Douglas Loop South
Santa Monica, CA 90405

Dear Mr. Trimborn:

We have considered the proposal and supporting information in your letter of September 8, 2004. As noted in our earlier letters, we are very interested in safety enhancements to the runway environment at Santa Monica Municipal Airport (SMO). At the same time, we recognize the importance of SMO to aviation in the Southern California region, and we are interested in preserving the utility of this airport and its availability to all classes of operator that can safely use the airport.

The reconfiguration of the runway proposed in your letter would provide a 300-foot runway safety area at each end of the runway through a combination of displaced thresholds and declared distances. On takeoff, the full runway length would be available for calculating takeoff distance and takeoff run available (TORA), but the declared distance for accelerate-stop distance available (ASDA) would be 4,687 feet, a reduction of 300 feet from current conditions.

For landing aircraft, the combination of a 300-foot displaced threshold would reduce pavement available by 300 feet. The declared landing distance available (LDA) would be 4387 feet, or 600 feet less than at present. The displaced threshold has no benefit for overruns, but serves as protection for aircraft that land short of the runway pavement. Statistically, undershoot incidents at airports are significantly less common than overruns. A review of National Transportation Safety Board accident records indicates that SMO follows the standard pattern. One short landing accident has occurred at SMO since 1982, a nonfatal accident in 1992.

The existing runway safety area at SMO presently extends only a short distance beyond each end of the runway. While the approved airport layout plan lists the airport reference code as B-II, the design aircraft, based on the current usage of the airport, is D-II. To meet the FAA standard for a runway serving that aircraft, the RSA would have to extend 1000 feet beyond each end of the runway. It is clear from the outset that a standard RSA for D-II aircraft is not possible without major construction off the ends of the runways, involving substantial grading, relocation of public roads, and the taking of residential property. To meet that standard without affecting areas off the ends of the runway would be impractical, as it would require shortening the runway to the point of virtually eliminating its utility.

When it is not possible to provide a standard RSA, it makes sense to design a nonstandard RSA in a manner that will provide the highest net safety enhancement that is consistent with the basic functionality of the runway. As mentioned above, undershoots are experienced much less frequently than overruns. Also, airport operations data for SMO indicate that 95% to 98% of operations are on runway 21. It is clear that the highest safety benefit would be achieved from a measure that addresses overruns on runway 21, which could result either from landings or from rejected takeoffs on that runway. It is also generally beneficial to preserve as much actual pavement as possible for operations on runway 3-21, both to preserve access to the airport and to provide the maximum pavement for braking aircraft.

The proposal in your letter meets these objectives for takeoffs, albeit with some effect on access to the airport resulting from the reduced ASDA of 4,687 feet. For landings, however, your proposal would reduce actual pavement available by 300 feet, to provide an approach-end RSA for undershoot protection. The safety benefit of the proposed changes, aside from the undershoot protection, would result from prohibiting some aircraft from taking off at a certain weight, or at all, in order to eliminate marginal operations which appear to require almost all usable pavement. For all other landing operations at SMO, however, the benefit of the proposal is limited to undershoot protection, and that benefit would be offset by a loss of 300 feet of runway length. We are concerned that a reduction in runway length of 300 feet or more would have an adverse effect on safety in any incident where there is the potential for an overrun, regardless of the design group of the aircraft. Given the special circumstances that exist at SMO, we believe a reduction in available pavement for landings to obtain undershoot protection would not result in a net enhancement to safety.

We suggest two alternatives for enhancing safety for aircraft overruns at SMO.

Engineered material arresting system (EMAS) and declared distance of 4,687 feet. We understand that there is not sufficient land at the ends of the runway for a standard EMAS installation, which would take approximately 600 feet including both the setback from the runway and the EMAS bed itself. You have rejected EMAS on this basis in your prior letters. However, FAA standards provide for a non-standard EMAS installation where a certain minimum benefit can be achieved. That benefit is considered the ability to stop the design aircraft leaving the runway end at a speed not less than 40 knots.

We took a preliminary look at the possibility of installing EMAS at the departure end of runway 21 only, since most operations at SMO use that runway. Our correspondence with the Engineered Arresting Systems Company indicates that the installation of an EMAS no more than 165 feet in length at the end of runway 21 could provide protection for operations at SMO where an airplane exits that runway at 40 knots or less (preliminary report attached). EMAS installations are custom-designed for the size aircraft that use a particular airport. As a result, the overrun protection provided by this EMAS installation would extend to a substantial portion of the aircraft fleet using SMO, including all of the largest aircraft types using the airport. This 40-knot stopping performance meets our criterion for practicability of installation of EMAS. The option of installing a 165-foot EMAS would require grading and possibly use of a small length of existing runway, but on a first look it appears feasible from an engineering standpoint.

Declared distances for ASDA and LDA of 4,687 feet. Without EMAS, a smaller safety enhancement could be obtained by the use of declared distances alone without a displaced threshold or other physical change to the runway. This option would have less adverse effect on airport access than the city's proposal, because it would retain all existing pavement for use in both takeoff and landing, and would affect fewer operations.

In each of these alternatives—the city's and the two alternatives we propose in this letter—operators that use SMO would be affected to some degree. For that reason we intend to discuss these alternatives informally with users to get better information on how they would be affected. Also, we note that any FAA decision required for a change to the runway environment at SMO will require environmental review.

We look forward to your comments on these proposals and to further discussions with you on how best to enhance safety at SMO.

Sincerely,

David L. Bennett
Director of Airport Safety
and Standards

Enclosure

ZODIAC

ESCO
EMAS

PRELIMINARY PERFORMANCE & COST ESTIMATES

FOR

Santa Monica Airport

January 18, 2006

Preliminary Performance & Costing Estimates:

Airport: **Santa Monica**

Location: **Santa Monica, CA**

Runway: **3-21**

Runway Dimensions: **4,987 ft long x 150 ft wide**

Elevation: **175 ft above sea level**

RSA slope(s): **Assume zero slope**

Option#1

Request:	**Size EMAS for maximum available RSA length of 600 feet**
Cost Estimate (Per System)	***$3.7 Million for EMAS materials & installation (excluding any site preparation costs)** Please note site preparation consists of runway shoulder type paving of sufficient strength to support an occasional aircraft passage. The site prep dimensions recommended for this EMAS system would be 600' long x 170' wide. **(*Cost estimate based on FY06 costs)**
Size:	**250' long x 170' wide EMAS arrestor bed (plus 350' long setback/lead-in ramp)** **Suggested total site prep area = 600' long x 200' wide (200' width to allow room for vehicle access)** ***See attached sketch for typical EMAS configuration.**
Performance Estimate:	**Predicted runway exit speeds of 70 knots for G-IV (73,000 lbs), CL-600 (41,000 lbs modeled as CRJ-200), and Lear 35 (17,000 lbs). This covers the range of weights for the fleet mix provided.**
Notes:	(1) EMAS performances shown above were predicted by ESCO's computer simulation, an FAA validated program. (2) Based on design case using poor braking (0.25 braking coefficient) and no reverse thrust.

Option#2

Request:	**Size EMAS for current available RSA length of 165 feet**
Cost Estimate (Per System)	***$1.9 Million for EMAS materials & installation (excluding any site preparation costs)** Please note site preparation consists of runway shoulder type paving of sufficient strength to support an occasional aircraft passage. The site prep dimensions recommended for this EMAS system would be 165' long x 170' wide. **(*Cost estimate based on FY06 costs)**
Size:	**130' long x 170' wide EMAS arrestor bed (plus 35' long setback/lead-in ramp)** **Suggested total site prep area = 165' long x 200' wide (200' width to allow room for vehicle access)** ***See attached sketch for typical EMAS configuration.**
Performance Estimate:	**Predicted runway exit speeds of 40-45 knots for G-IV (73,000 lbs), CL-600 (41,000 lbs modeled as CRJ-200), and Lear 35 (17,000 lbs). This covers the range of weights for the fleet mix provided.**
Notes:	(1) EMAS performances shown above were predicted by ESCO's computer simulation, an FAA validated program. (2) Based on design case using poor braking (0.25 braking coefficient) and no reverse thrust.

Typical EMAS Configuration