

The background of the slide features the official seal of the Federal Aviation Administration (FAA). The seal is circular and rendered in a lighter blue color against the dark blue background. It contains the text "FEDERAL AVIATION ADMINISTRATION" around the perimeter and a central emblem depicting an eagle with its wings spread, perched atop a globe. Two stars are positioned on the left and right sides of the seal.

# **Airport Safety Technology Research & Development**

Presented by:

**Jim Patterson**

**Airport Safety Specialist**

**FAA's Airport Safety Technology R&D Sub Team  
William J Hughes Technical Center, Atlantic City, NJ**

**November 7, 2008**

# Airport Safety R&D



The background of the slide is a large, semi-transparent blue seal of the Federal Aviation Administration. The seal features a central eagle with its wings spread, perched atop a globe. The globe is marked with latitude and longitude lines. The eagle's tail feathers are prominent. The words "FEDERAL AVIATION" are arched across the top, and "ADMINISTRATION" is arched across the bottom. Two five-pointed stars are positioned on the left and right sides of the seal.

**Operation of New Large  
Aircraft Research**

# AIRBUS A-380



COPYRIGHT T.LAURENT

AIRLINERS.NET

CN #14

# Operation of NLA

## Current NLA Status:

- Singapore Airlines completed 1,000<sup>th</sup> flight on August 5, 2008. Now operating 5 in their fleet.
- Emirates accepted delivery of their first A380, started Dubai – JFK flights on August 1<sup>st</sup>. First scheduled flight to USA! (Three times weekly.)
- SFO and LAX up next for Emirates!
- A380 orders up from 173, to 189, and now 192. (6 in operation/delivered).
- Singapore added flights to Beijing for Olympics!

# Operation of NLA

## Current NLA Status:

- Boeing still planning B747-8 (B747-8i and B747-8F)
- Orders at 78 (Freighters)
- Freighter released in late 2009 (Cargolux), and Intercontinental (Lufthansa) in 2010.
- 10 different customers, including Cargolux, Nippon Cargo, Atlas, Emirates, Lufthansa.

# AIRBUS A-380



COPYRIGHT TOM ALFANO-NYC AVIATION

AIRLINERS.NET

CN# 011 – The 1<sup>st</sup> Scheduled Flight Arriving at JFK on Aug 1

# AIRBUS A-380



COPYRIGHT KONSTANTIN VON WEDELSTAEDT

AIRLINERS.NET

CN #11 JFK to Dubai

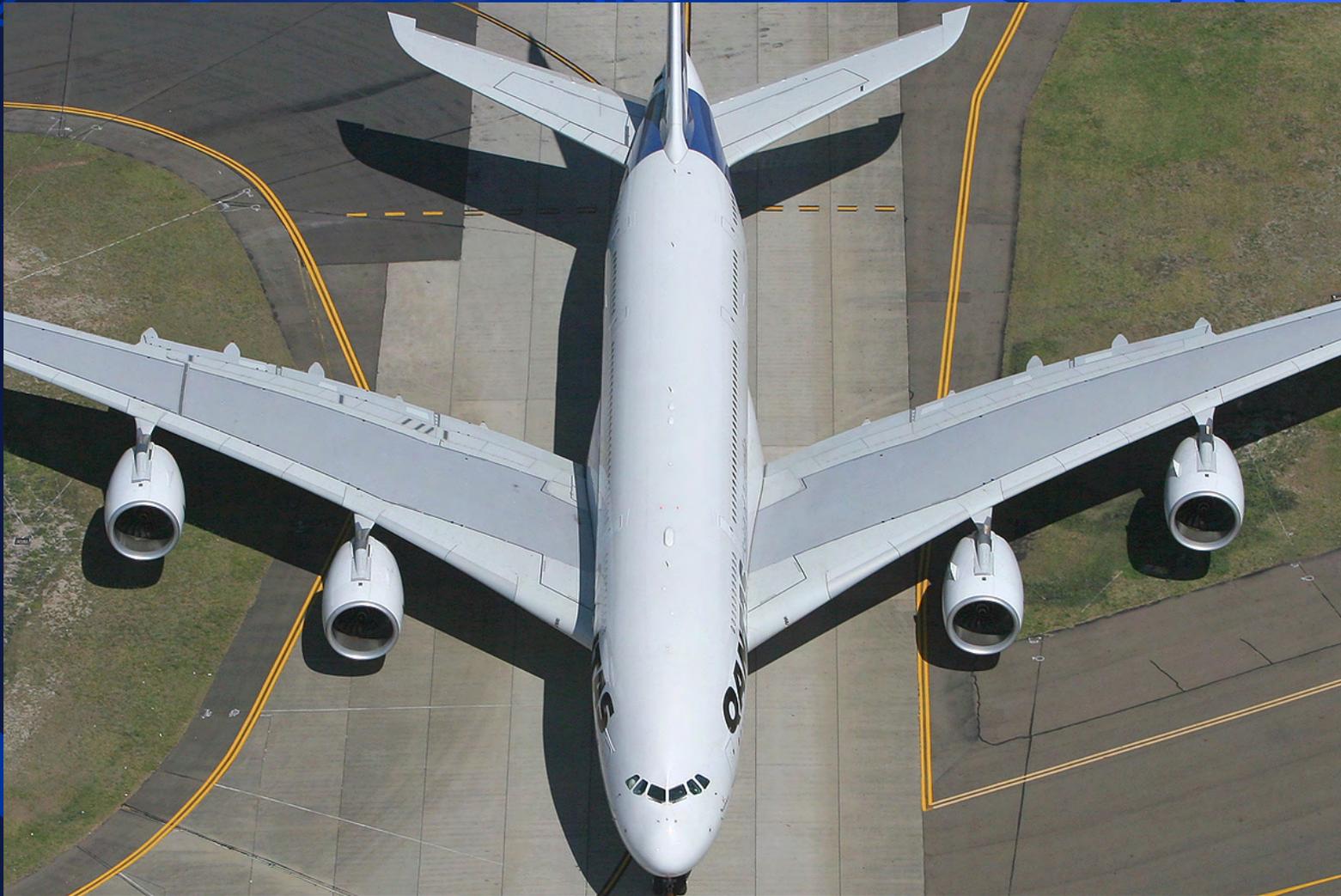
# Boeing 747-8i



# Boeing 747-8



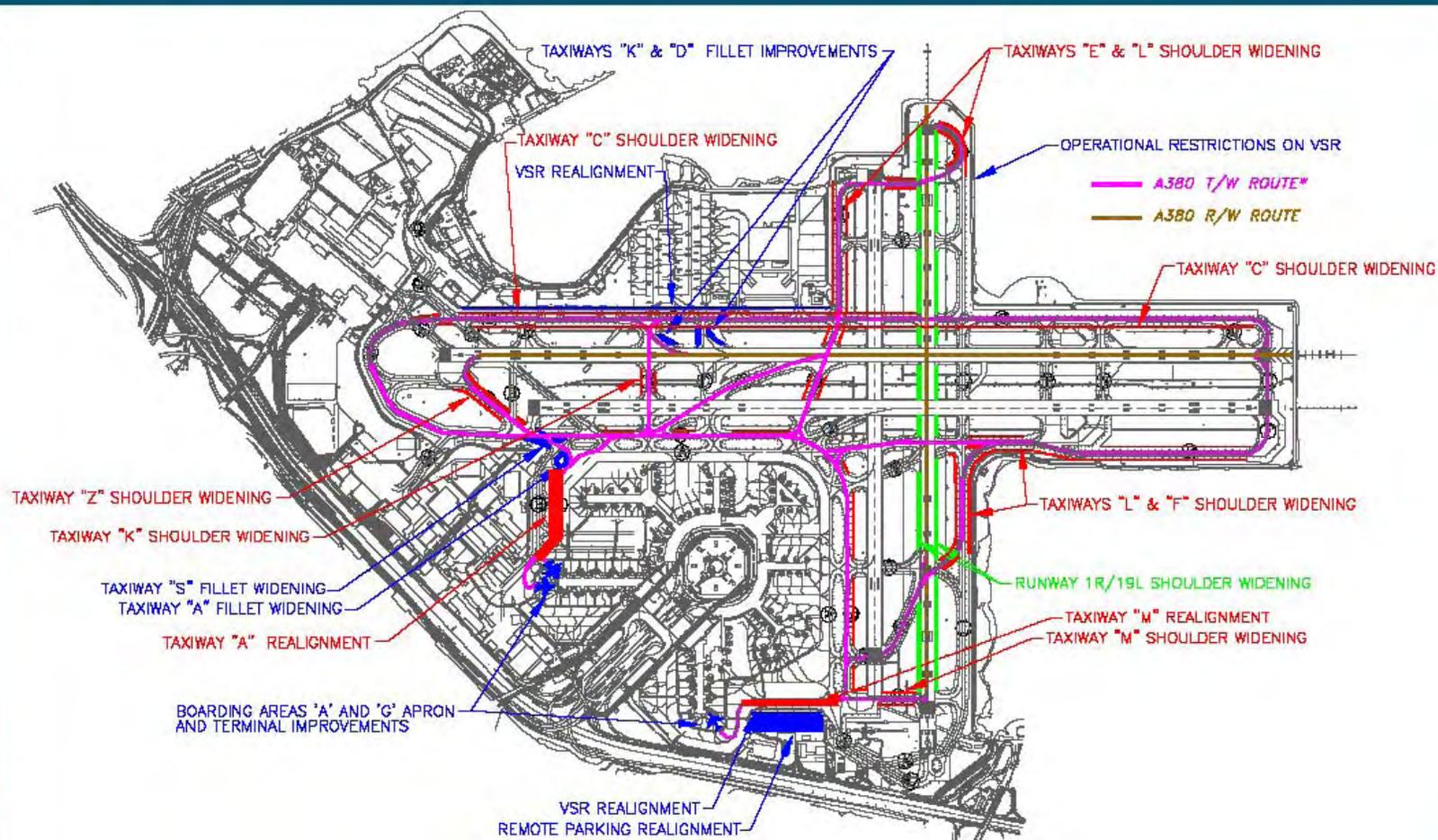
# AIRBUS A-380



COPYRIGHT GABRIEL SAVIT

AIRLINERS.NET

# Projects Related to the A380



\* SPACING OF CENTERLINE LIGHTING ON ALL STRAIGHT SECTIONS OF THE A380 TAXIWAY ROUTES SHALL BE REDUCED FROM 100' TO 50'

# AIRBUS A-380



CN# 009 – Visit to Bradley, CT

# AIRBUS A-380

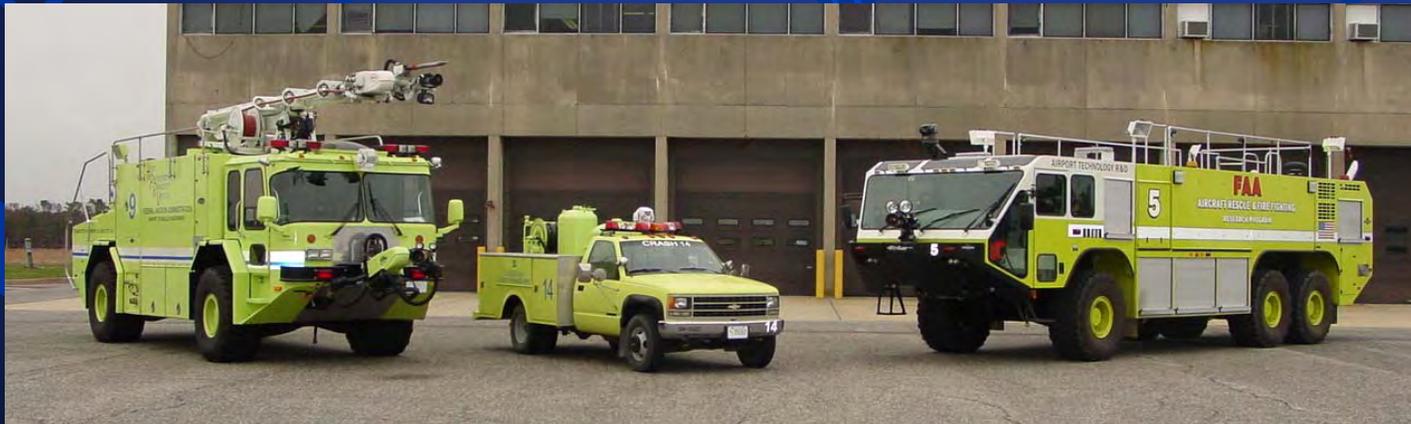


CN# 009 – Visit to Bradley, CT

# Operation of NLA

## Potential NLA Problems for ARFF:

- Accessibility to upper level
- Proximity of vehicles to fuselage
- Increased amount of water and agent
- Search and Rescue requirements
- Requirements for supplemental tools/equip
- Structural Composite Components



# Operation of NLA



# NLA Access



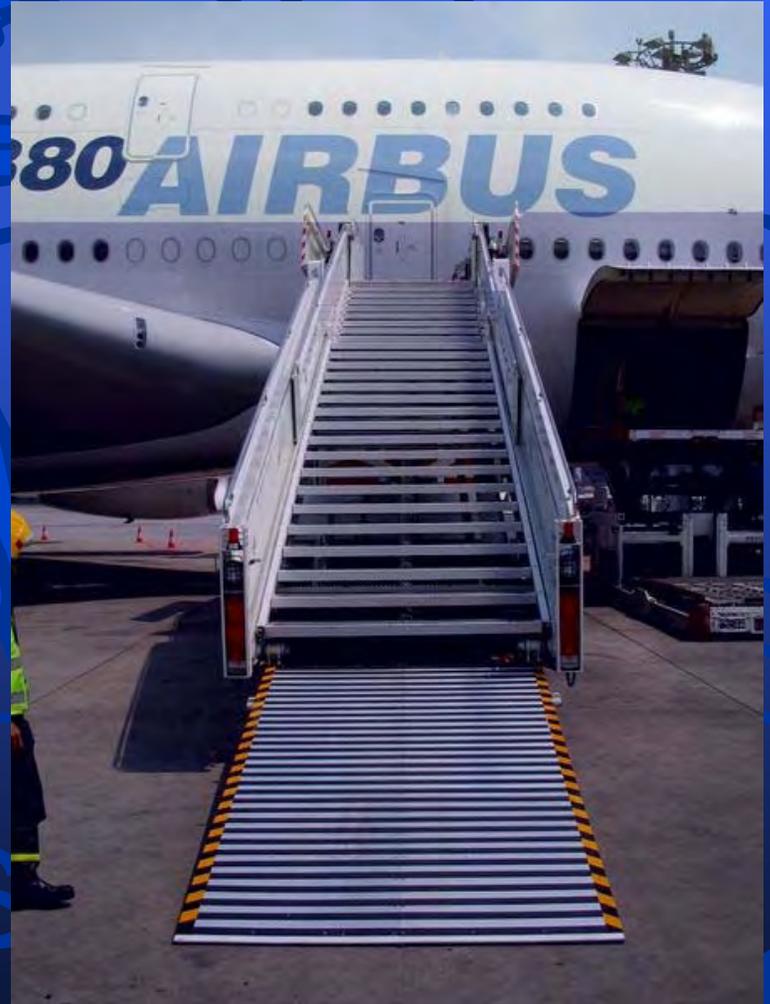
# NLA Access



# NLA Access



# NLA Access





# Operation of NLA

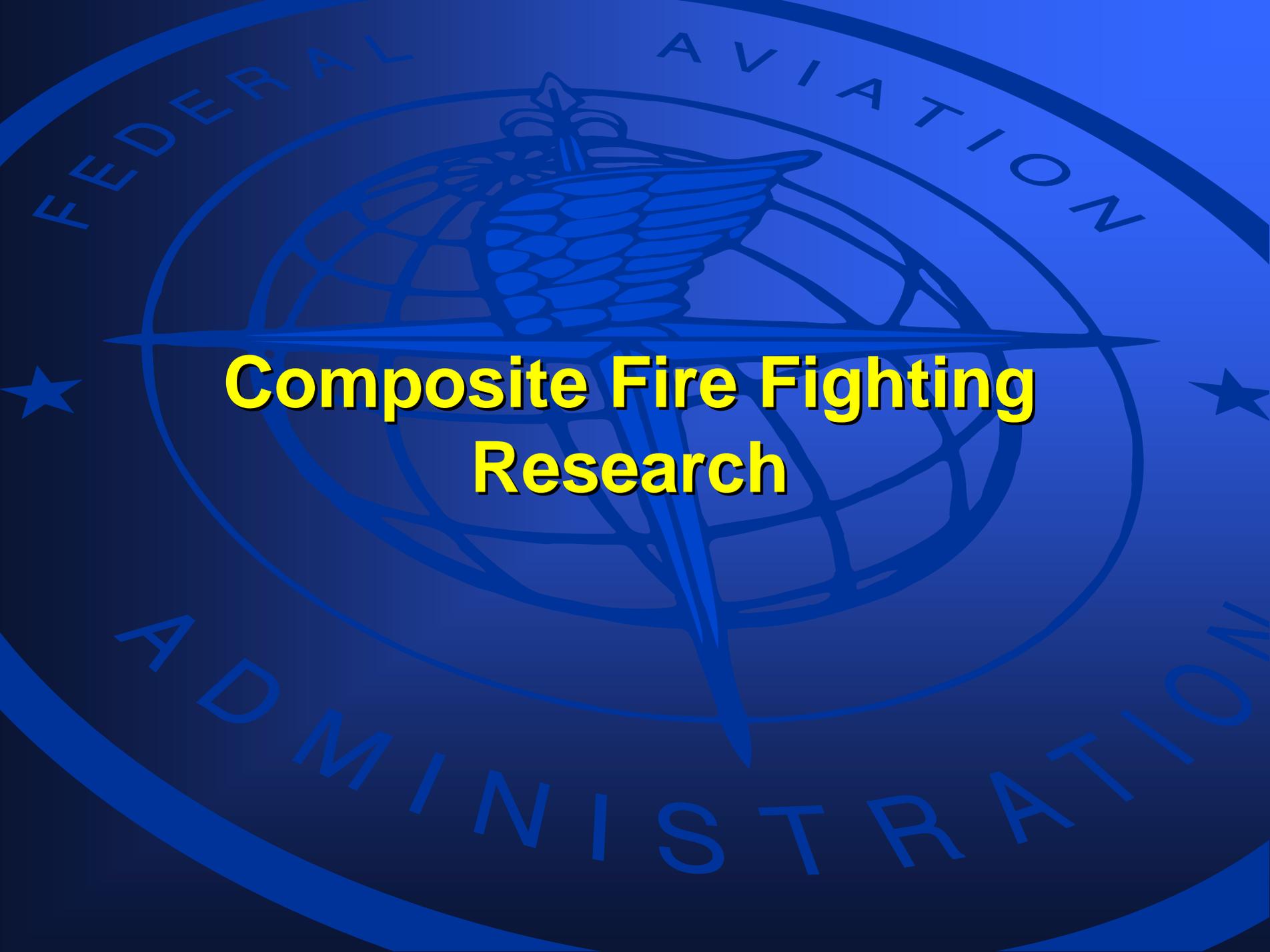


# Operation of NLA



# Operation of NLA



The background of the image is a large, semi-transparent blue seal of the Federal Aviation Administration. The seal features a central globe with a stylized eagle with its wings spread, perched atop a vertical staff. The words "FEDERAL AVIATION" are arched across the top, and "ADMINISTRATION" is arched across the bottom. Two five-pointed stars are positioned on the left and right sides of the globe.

**Composite Fire Fighting  
Research**

# Composite Fire Fighting



COPYRIGHT TERENCE LI

AIRLINERS.NET

CN# 010 – The 5<sup>th</sup> Delivery for Singapore

# Composite Fire Fighting



# Composite Fire Fighting



# Composite Fire Fighting



# Composite Fire Fighting



# Aircraft Rescue & Fire Fighting (ARFF)

## Research Program



# FIRE FIGHTING RESEARCH



**Skin-Penetrator**

**Water Spray Pattern**



# FIRE FIGHTING RESEARCH



Photo Copyright © Lee Thomas

AIRLINERS.NET



# FIRE FIGHTING RESEARCH



# FIRE FIGHTING RESEARCH



# FIRE FIGHTING RESEARCH



Teterboro Airport – NJ  
Challenger 600 aircraft

# FIRE FIGHTING RESEARCH

Philadelphia Int'l Airport

DC-8 Cargo



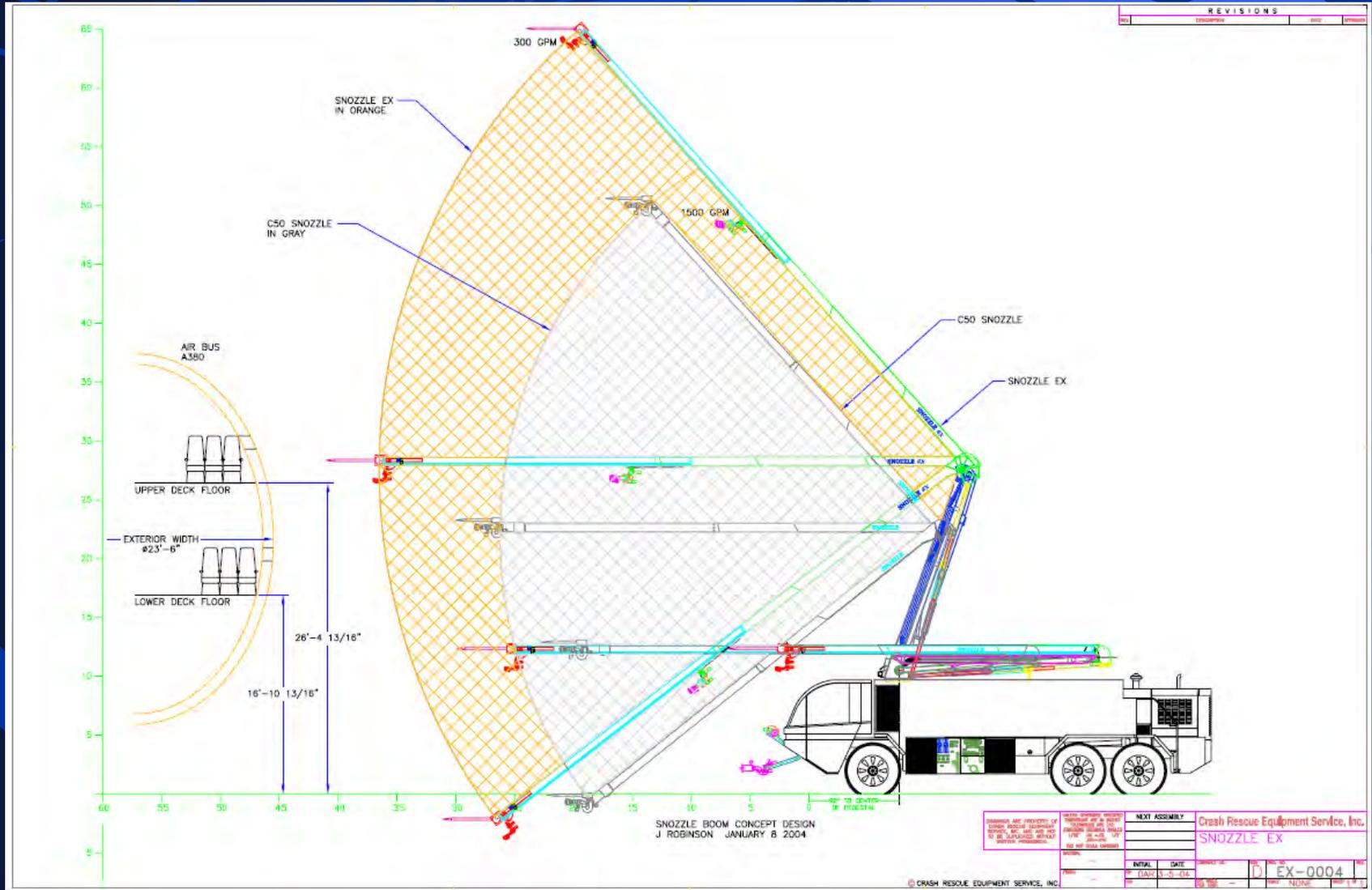
# Need for Next Generation HRET

Rational for longer reach

Physical and topographical obstructions



# Development of Next Gen HRET



# FIRE FIGHTING RESEARCH



# FIRE FIGHTING RESEARCH



# FIRE FIGHTING RESEARCH



# FIRE FIGHTING RESEARCH



# Alternative Fire Fighting Agents



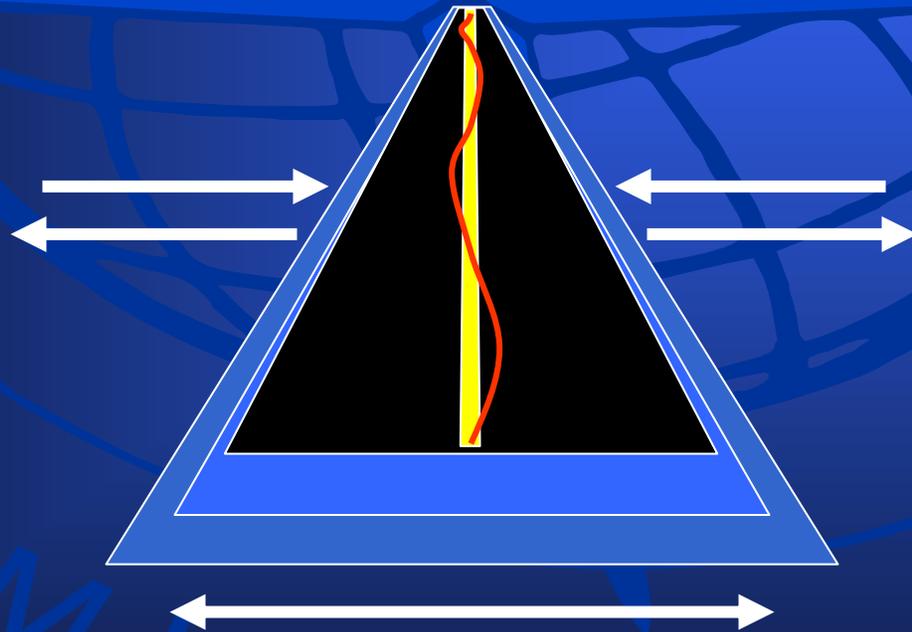


The background of the slide features the official seal of the Federal Aviation Administration (FAA). The seal is circular and rendered in a lighter blue color against a darker blue background. It contains the text "FEDERAL AVIATION ADMINISTRATION" around the perimeter, a central globe with a stylized eagle with wings spread, and two stars on the left and right sides.

**Airport Design Technology  
Research Program**

Airport Design Standards

# Taxiway Centerline Deviation Study



Federal Aviation Administration  
William J. Hughes Technical Center









Margin

The background of the slide features the official seal of the Federal Aviation Administration (FAA). The seal is circular and rendered in a lighter blue color against a darker blue background. It contains the text "FEDERAL AVIATION ADMINISTRATION" around the perimeter, a central globe, and a stylized eagle with wings spread, perched atop a vertical staff. Two five-pointed stars are positioned on the left and right sides of the globe.

# **FOD Detection Research**

# FOD Detection

## FAA Goal

Develop performance standards for FOD Detection Systems.

- *Publish Technical Note documenting research.*
- *Develop FAA Advisory Circular specifically for FOD Detection Systems.*
- *Enable civil airports opportunity to apply for Federal funding to procure systems.*

# FOD Detection

## Available Technologies:

**QinetiQ – Tarsier Radar – Providence, RI (PVD)**

**Millimeter Wave Radar**

**Mounted on Rigid Towers**

**Stratech – iFerret – Chicago O’Hare (ORD)**

**High Resolution Camera**

**Mounted on Rigid Towers**

**X-Sight – FODetect – Boston Logan (BOS)**

**High Resolution Camera and Millimeter Wave Radar**

**Mounted on Airport Lighting Fixtures**

**Trex Enterprises – FOD Finder – Chicago O’Hare (ORD)**

**Millimeter Wave Radar and Infrared Cameras**

**Mounted on roof of Airport Vehicle**

The background of the slide is a large, semi-transparent blue circular logo of the Federal Aviation Administration (FAA). The logo features a central eagle with its wings spread, perched atop a globe. The words "FEDERAL AVIATION" are written in an arc across the top, and "ADMINISTRATION" is written in an arc across the bottom. Two five-pointed stars are positioned on the left and right sides of the globe.

**Solar Powered LED Runway  
Guard Light Research**

# Solar LED Runway Guard Light



# Solar LED Runway Guard Light



# Solar LED Runway Guard Light



The background of the slide is a large, semi-transparent blue seal of the Federal Aviation Administration. The seal features a central eagle with wings spread, perched atop a globe. The words "FEDERAL AVIATION" are arched across the top, and "ADMINISTRATION" is arched across the bottom. Two stars are positioned on the left and right sides of the seal.

**Vertical Flight Research –  
Vertiport Refurbishment**

# Vertical Flight Research



# Vertical Flight Research



The background of the slide is a large, semi-transparent blue seal of the Federal Aviation Administration. The seal features a central globe with a stylized eagle with its wings spread, perched atop a vertical staff. The words "FEDERAL AVIATION" are arched across the top, and "ADMINISTRATION" is arched across the bottom. Two five-pointed stars are positioned on the left and right sides of the globe.

**Bead and Paint Marking  
Research**

# Bead and Paint Marking Research



# Cementitious Paint Material



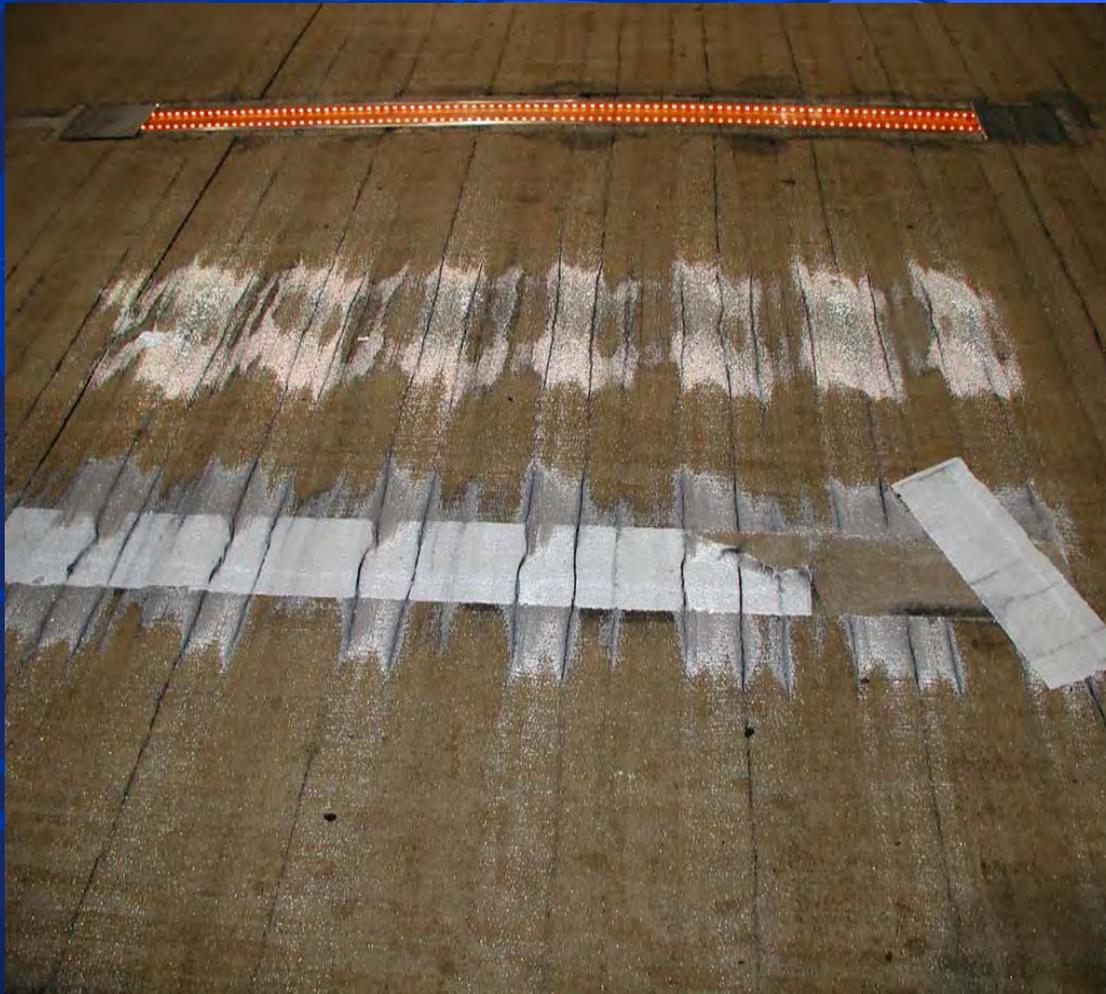
# Adsil at Jacksonville Naval Air Station



# Polyurea Marking Material at Newark



# Polyester Marking Material



# Thermoplastic Marking Material

After 11 months



The background of the slide is a large, semi-transparent blue circular logo of the Federal Aviation Administration (FAA). The logo features a globe with a stylized eagle with spread wings superimposed on it. The words "FEDERAL AVIATION" are written in an arc at the top, and "ADMINISTRATION" is written in an arc at the bottom. Two five-pointed stars are positioned on the left and right sides of the globe.

**Photoluminescent Paint  
Material**

# Photoluminescent Paint

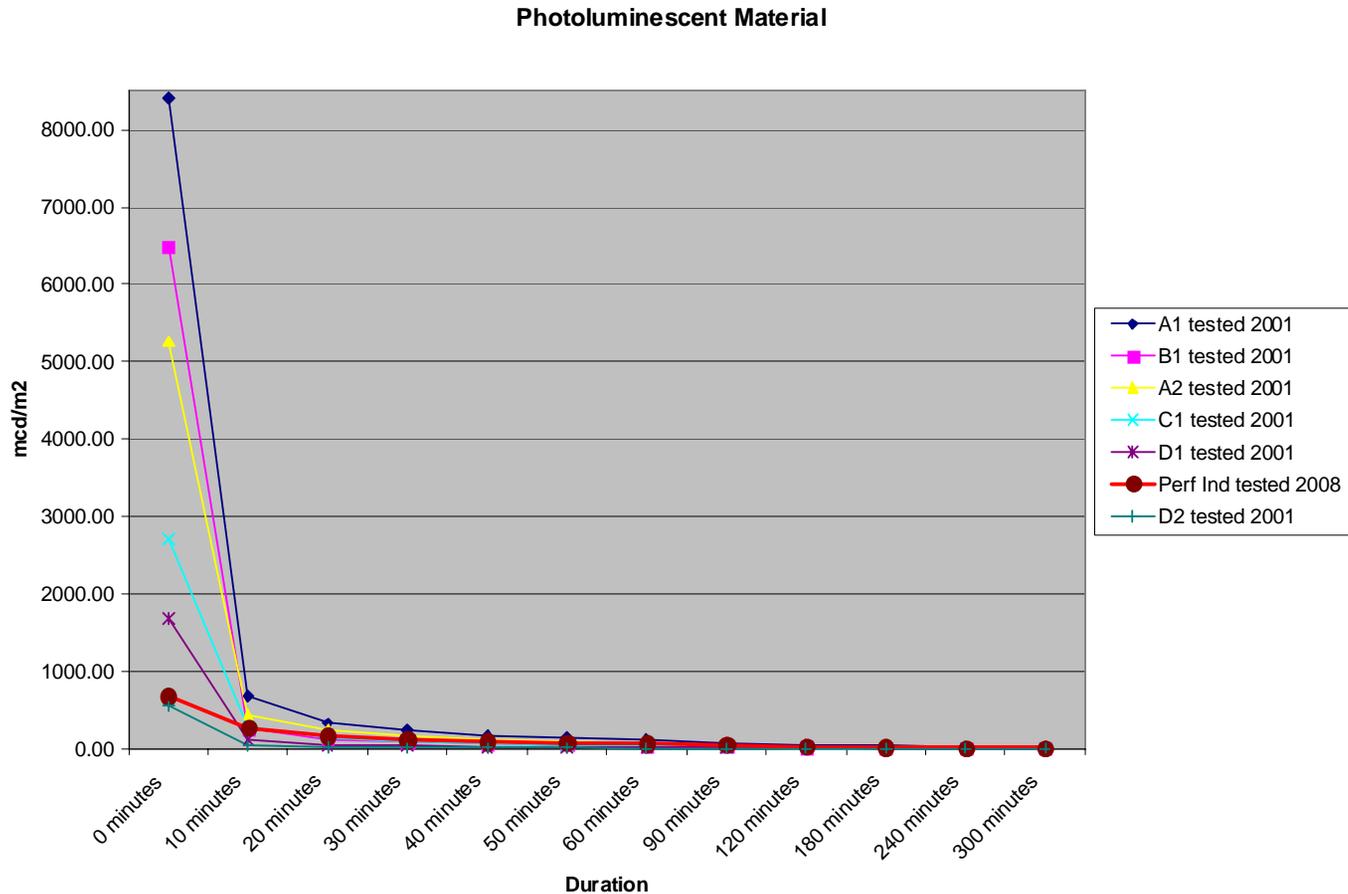


# Photoluminescent Paint

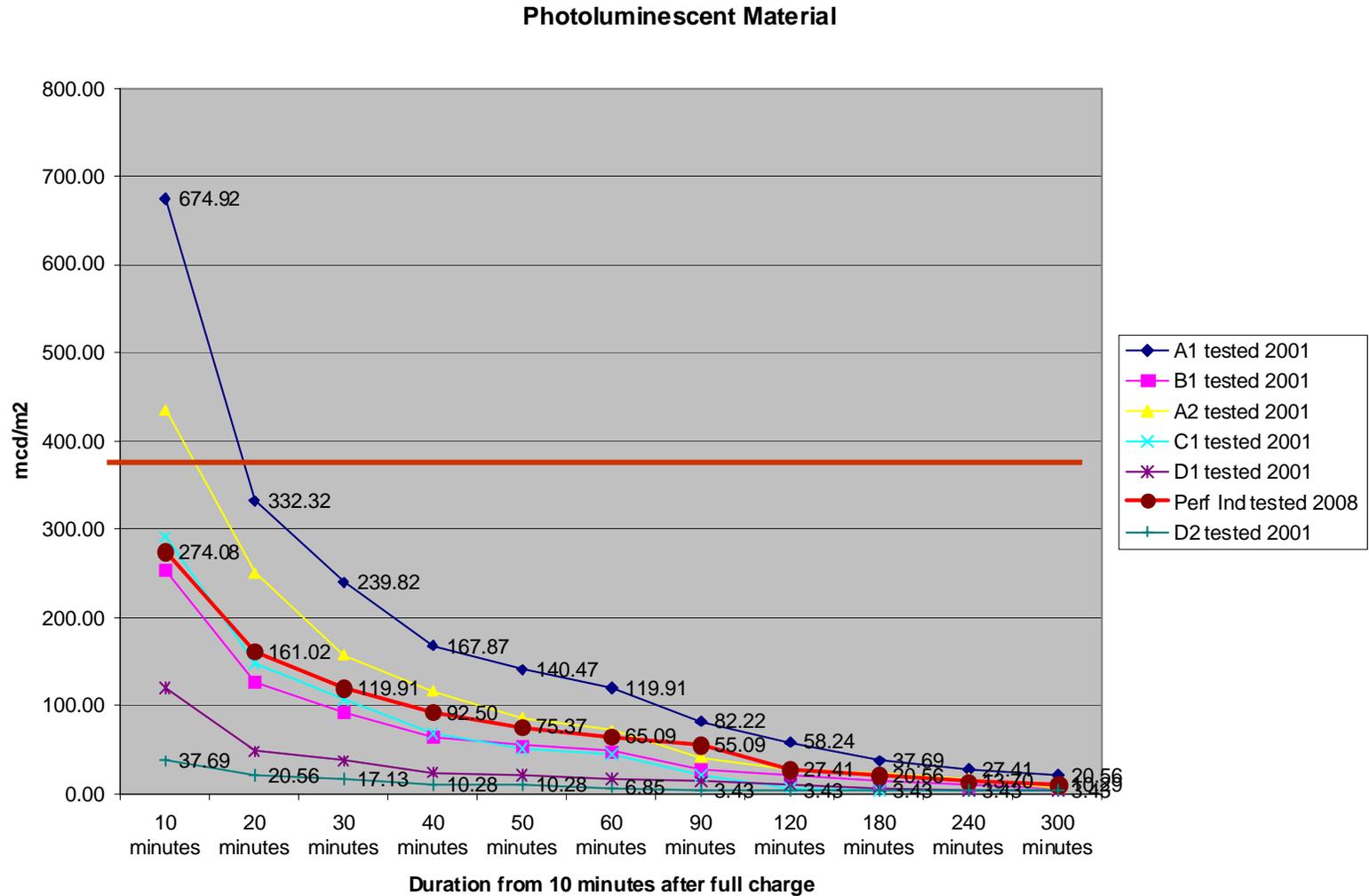


# Photoluminescent Technology for Visible Surface Markings

## Results of Preliminary Study



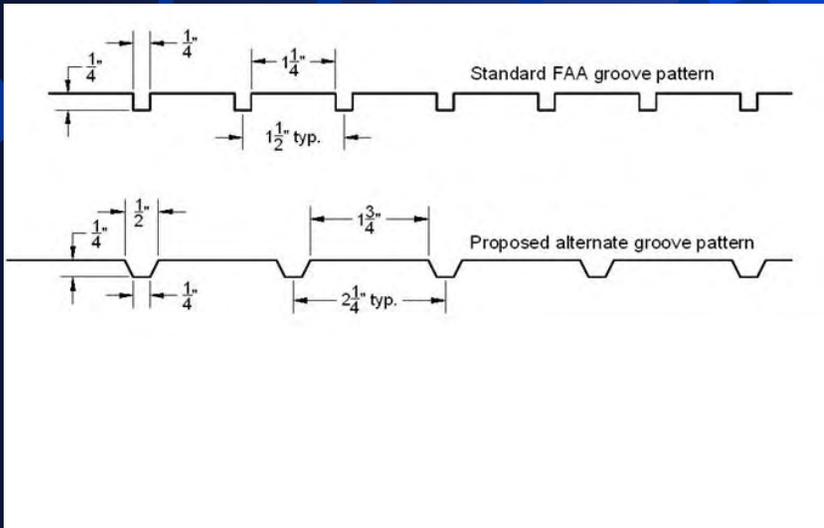
# Photoluminescent Technology for Visible Surface Markings



The background of the slide is the official seal of the Federal Aviation Administration (FAA). The seal is circular and rendered in a dark blue color. It features a central globe with a stylized eagle with its wings spread, perched atop the globe. The words "FEDERAL AVIATION" are written in an arc across the top, and "ADMINISTRATION" is written in an arc across the bottom. Two five-pointed stars are positioned on the left and right sides of the globe.

# **Trapezoidal Pavement Grooving**

# Runway Grooving



# Runway Grooving



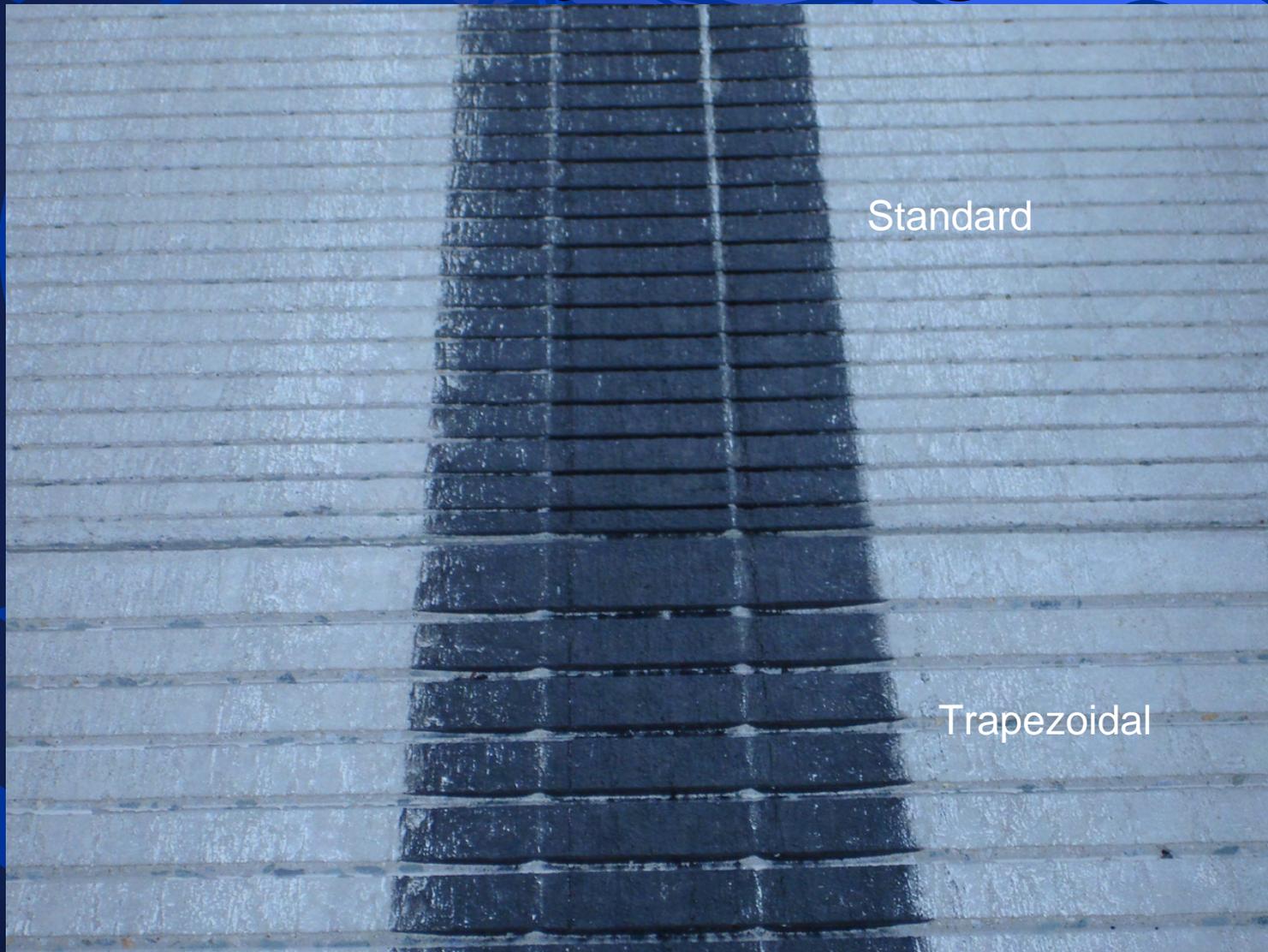
# Runway Grooving



# Runway Grooving



# Runway Grooving



Standard

Trapezoidal

# Runway Grooving



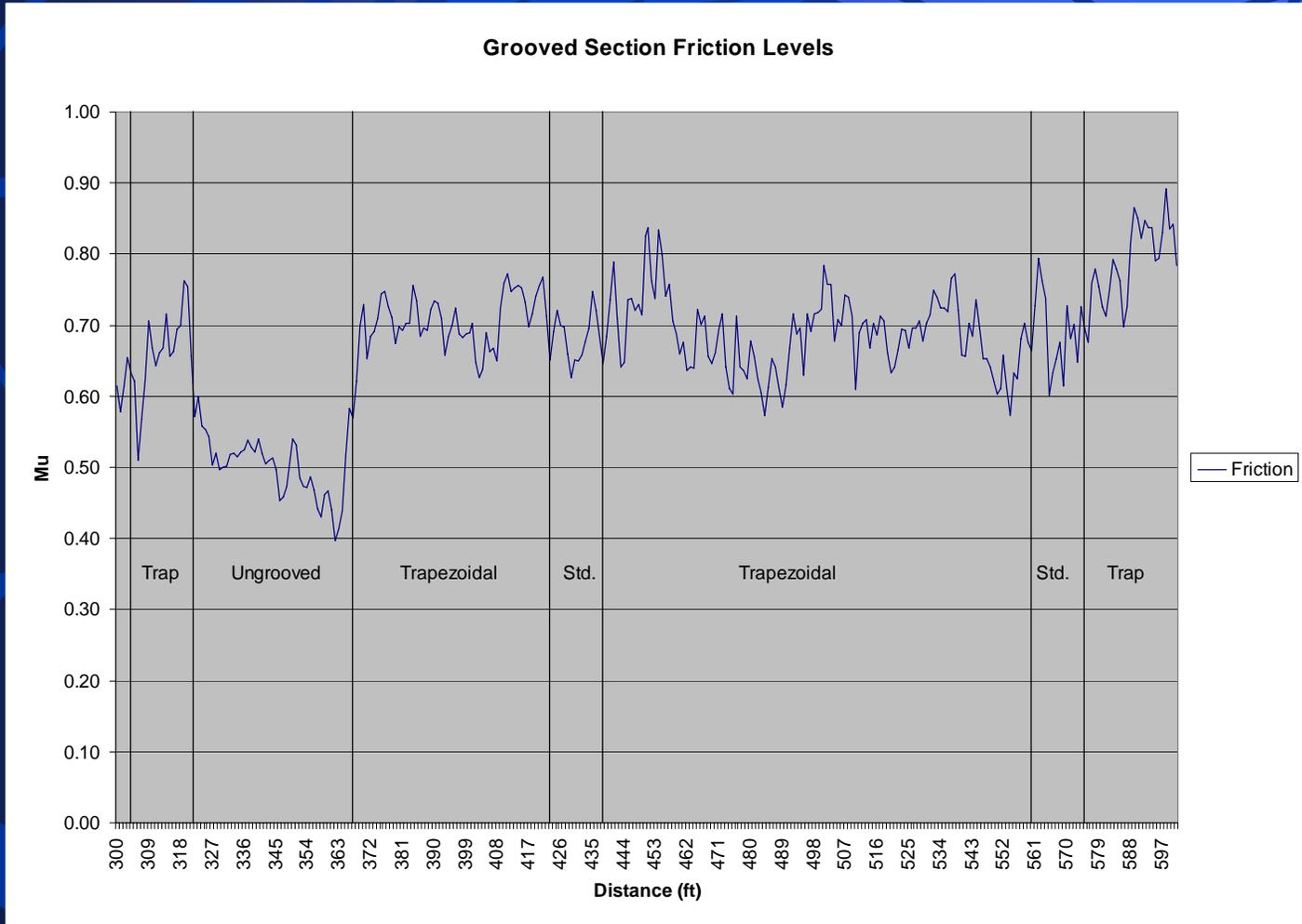
Standard

# Runway Grooving



Trapezoidal

# Runway Grooving



The background of the slide is a large, semi-transparent blue circular logo of the Federal Aviation Administration (FAA). The logo features a central eagle with its wings spread, perched atop a globe. The words "FEDERAL AVIATION" are arched across the top, and "ADMINISTRATION" is arched across the bottom. Two five-pointed stars are positioned on the left and right sides of the globe.

**Engineered Material Arresting  
System (EMAS) Research**

# RUNWAY SAFETY AREA

**Concept:** The Runway Safety Area (RSA) enhances the safety of airplanes which undershoot, overrun, or veer off the runway and is designed to reduce the risk of damage to airplanes. The RSA also provides greater accessibility for firefighting and rescue equipment during such incidents.





**Toronto – Aug. 02, 2005**

Air France A340 carrying 309 pax. overran end of runway during thunderstorm coming to a stop about 600ft from the threshold of RWY 06.



EMAS Bed

**JFK – 1999**

Saab 340 Arrested at the end of Runway 4R after overrun.



**JFK – May 30, 2003**

Cargo MD-11 Arrested at the end of Runway 4R after overrun.



JetPhotos.Net - Image Copyright © Michael F. McLaughlin

**JFK – January 22, 2005**

Cargo B-747 Arrested at the end of Runway 4R after overrunning during Landing in snow storm



**Greenville, South Carolina**

# EMAS Cold Climate Durability Study



Cold Chamber for Lab Freeze-Thaw Cycling of individual EMAS blocks

Conducted at US Army Cold Regions Research and Engineering Lab in NH (CRREL)

Focus is on the durability of late generation EMAS in very cold climates, particularly freeze thaw cycling.

Large scale EMAS test bed 40ft x 80ft installed in huge climate chamber for tests.

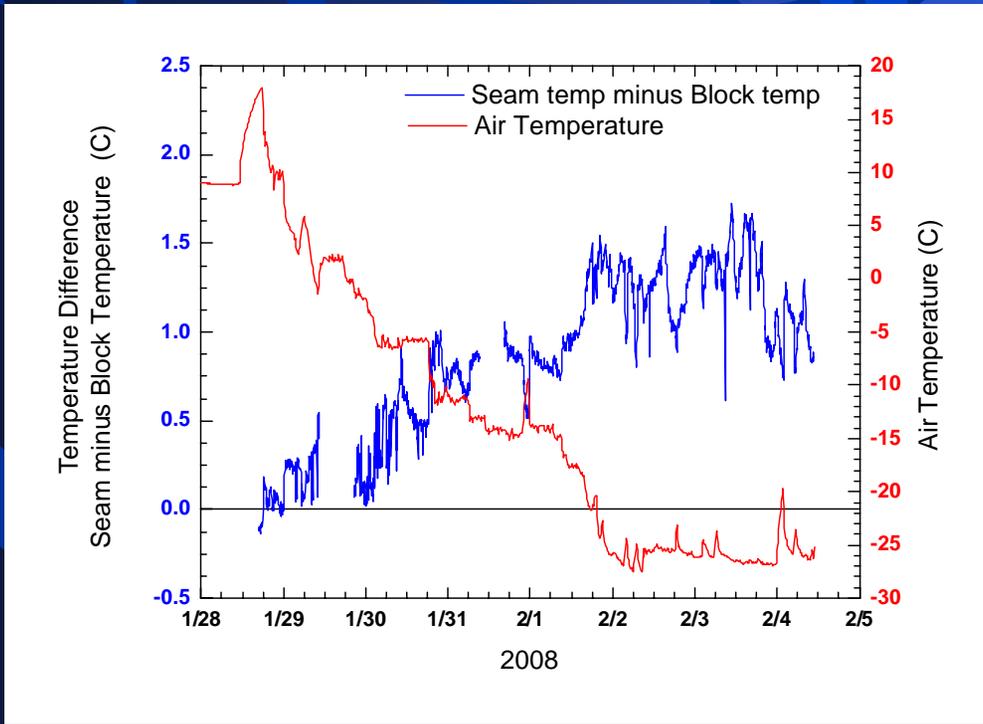
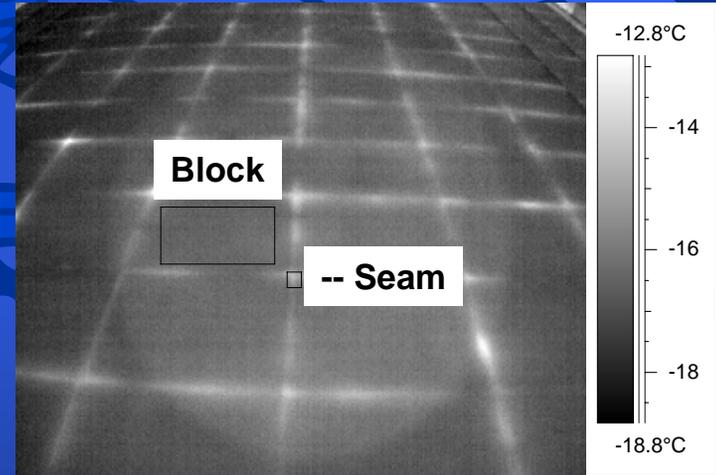


Instrumentation of EMAS blocks to record internal temperatures and relative humidity

# EMAS Durability/Maintenance

- Two year study
- Draft Final Report completed and under review Aug. 2008.
- Results and conclusions forthcoming after review of Final report.
- Additional study into practical field assessment tool is targeted for FY09 to identify a non-destructive tool that airports can use to assess the condition of their in place EMAS beds.
- To date, several tools and method have been evaluated including Ground Penetrating Radar, Infrared Thermal imaging, hand held soil compaction penetrometer (destructive). None of these are ideal or entirely user friendly for airport maintenance personnel.

# Infrared Thermal Images of EMAS



The background of the image is the official seal of the Federal Aviation Administration (FAA). The seal is circular and rendered in a light blue color against a darker blue background. It features a central globe with a grid of latitude and longitude lines. A stylized eagle with its wings spread is superimposed on the globe, with its tail feathers pointing downwards. The words "FEDERAL AVIATION" are written in an arc across the top of the seal, and "ADMINISTRATION" is written in an arc across the bottom. Two five-pointed stars are positioned on the left and right sides of the seal, flanking the globe.

# **Wildlife Mitigation Research**



0261

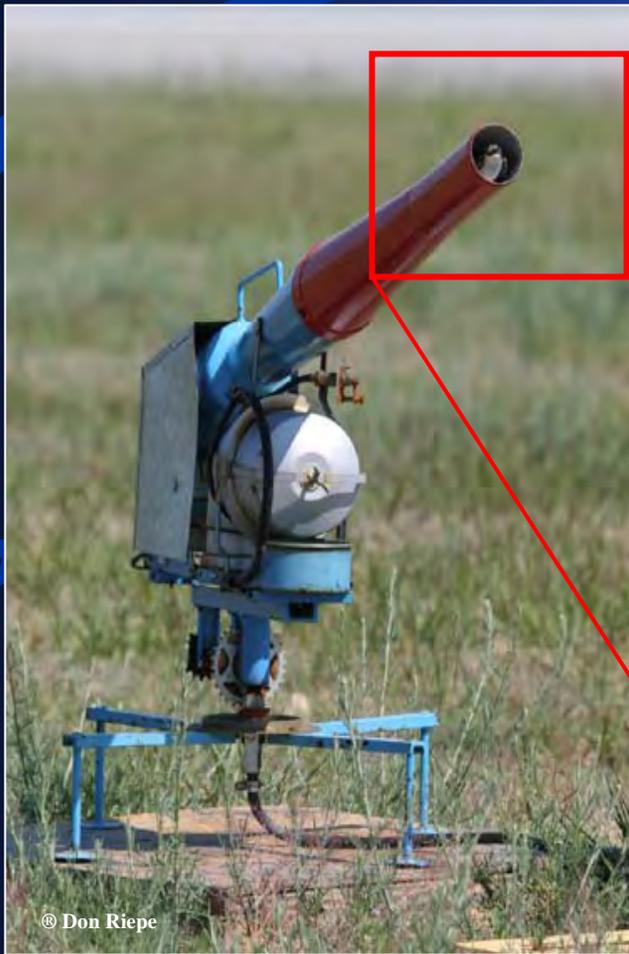
445 AW

2/2/2000 08:28





**Explosive Propane Canon used for deterring birds**



© Don Riepe



© Don Riepe

Swallow sitting in barrel of  
Propane Canon

# Avian Radar



Merlin   
AVIAN RADAR SYSTEMS

**ACCIPITER**   
Radar Technologies Inc.  
— a **Sierra** company —

# Bird Radar – Moving Targets are Tracked



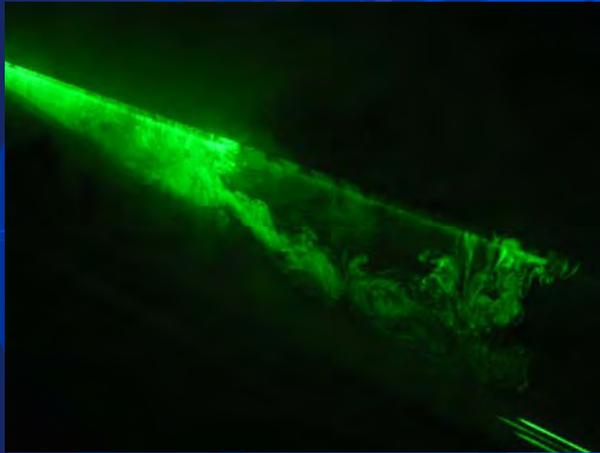
Courtesy of Sicoms Systems

The background of the slide is a large, semi-transparent blue circular logo of the Federal Aviation Administration (FAA). The logo features a central eagle with its wings spread, perched atop a globe. The globe is depicted with a grid of latitude and longitude lines. The eagle's tail feathers are prominent, pointing downwards. The words "FEDERAL AVIATION" are written in a circular path along the top edge of the logo, and "ADMINISTRATION" is written along the bottom edge. Two five-pointed stars are positioned on the left and right sides of the logo, flanking the globe. The entire logo is rendered in a lighter shade of blue against a darker blue background.

**Airport Visual Guidance  
Research**

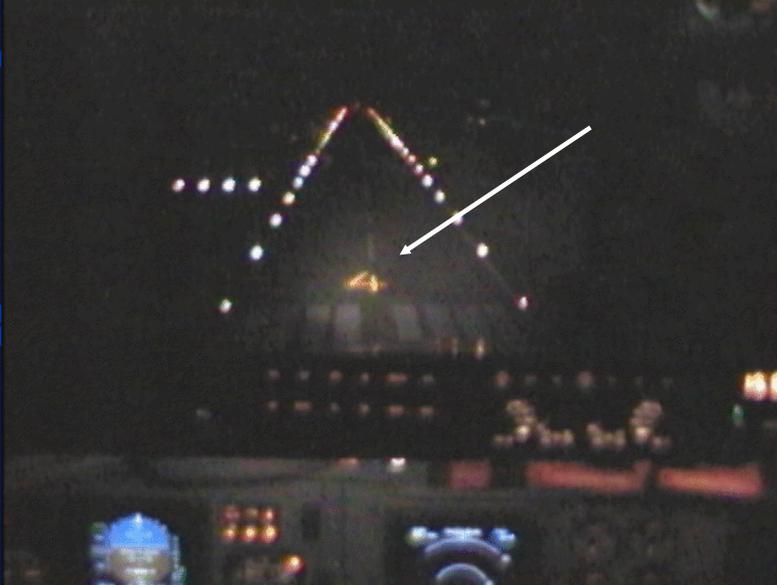
# Lighting/Markings

## Laser Illuminators for Airfield Applications



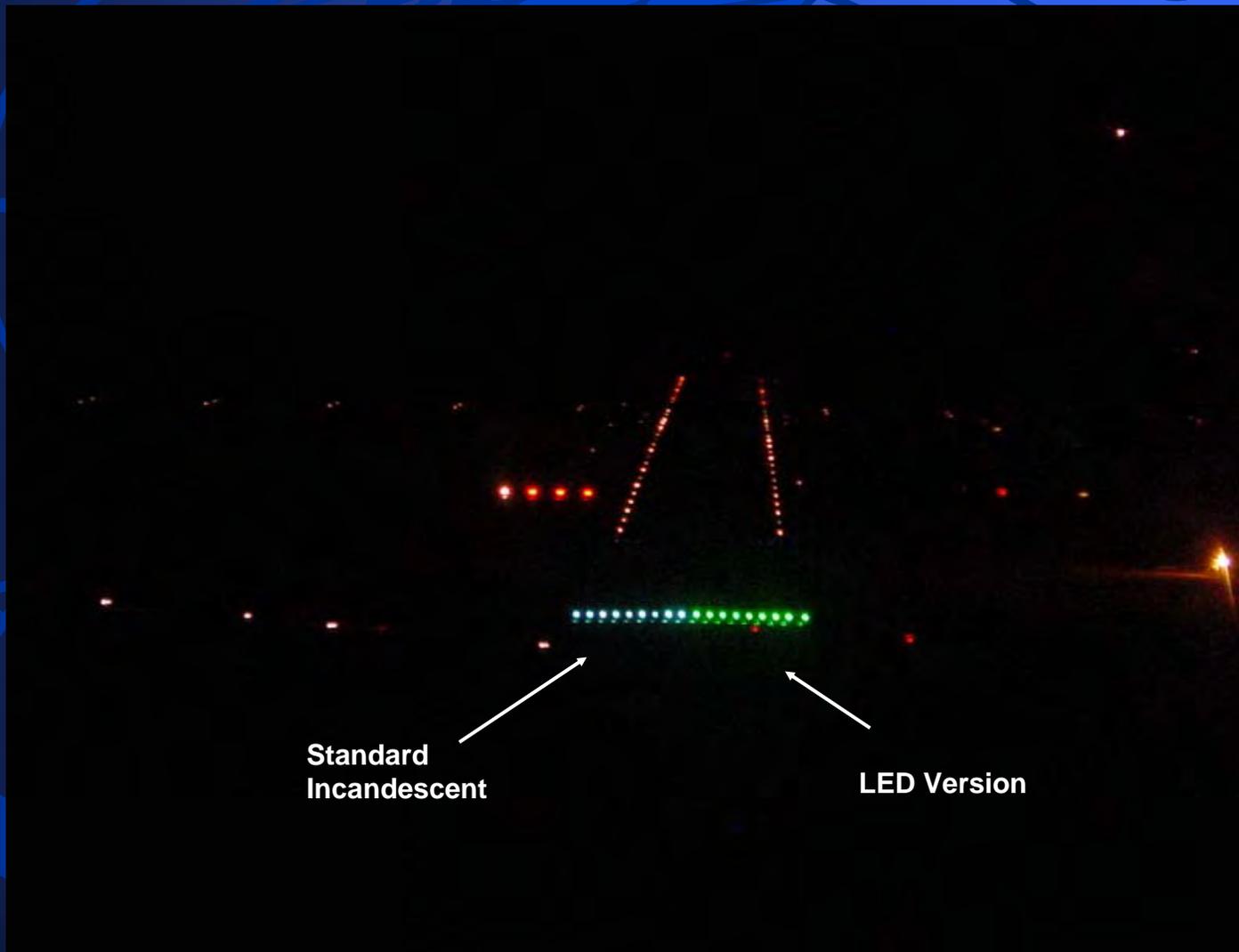
# Lighting

In-Pavement LED Linear Sources



# Lighting

## LED Threshold Lighting



# Lighting

## “Remote Airports”



**Retro-Reflective panels**



The background of the slide features the official seal of the Federal Aviation Administration (FAA). The seal is circular and rendered in a lighter blue color against the dark blue background. It contains the text "FEDERAL AVIATION ADMINISTRATION" around the perimeter and a central emblem of an eagle with wings spread, perched on a globe. Two stars are positioned on the left and right sides of the seal.

## **Questions or Comments?**

**FAA William J Hughes Technical Center  
Airport Safety Technology R&D Sub Team  
AJP-6311AAR-411, Building 296  
Atlantic City International Airport, NJ 08405**

**[Jim.Patterson@faa.gov](mailto:Jim.Patterson@faa.gov) 609-485-4989**

**[www.airporttech.tc.faa.gov](http://www.airporttech.tc.faa.gov)**