

Air Show Safety: *an Overview*

Remarks of
John Cudahy, President
International Council of Air Shows
to the
National Transportation Safety Board
January 10, 2012
Washington, DC

Presentation Overview

- ❑ Industry profile
- ❑ Industry relationship with FAA
- ❑ Overview of air show safety program
- ❑ Safety statistics



Industry Profile

- ❑ \$250 million - \$300 million in revenue per year
- ❑ 10-12 million spectators per year
- ❑ 300-325 air shows annually in U.S.
- ❑ 278 aerobatically-certified air show pilots
- ❑ Nearly 10,000 individual performances/year



Air Show Profile

- ❑ Largely volunteer driven**
- ❑ Extremely site dependent**
- ❑ All shapes and sizes**
 - ◆ Military and civilian
 - ◆ At airports and along waterfronts
 - ◆ Large and small
 - ◆ New and well-established
- ❑ As small as 3,000 and as large as 350,000 spectators**
- ❑ Safety is primary concern**

Non-North American Air Shows

- No prohibition on aerobatics directed toward crowd**
- Much smaller separation distances**
- U.K. regulations closest to U.S.**
 - ◆ **Similar philosophy and approach**
 - ◆ **Rigorous pilot evaluation program**

Air Show Performer Profile

- ❑ Principally current or former airline and military pilots
- ❑ Disciplined and highly skilled aviators
- ❑ Largely part-time
- ❑ Varied types of aircraft



International Council of Air Shows

- Non-profit trade association
- Industry focal point for 45 years
- 850+ member organizations
- Established to help promote air show safety
- Administrator of Aerobatic Competency Evaluation (ACE) program for 20 years
- Safety receives major commitment of staff time and association resources



Industry Relationship with FAA

- FAA Order 8900.1, Volume 3, Chapter 6**
 - ◆ 108 pages, 89 of which address air shows
 - ◆ Developed and amended many times with considerable industry input
- Relationship is collaborative, safety-focused**
- FAA is visible, respected, knowledgeable**
- FAA has monitors at nearly every air show**
- ICAS, FAA are partners on ACE program**
- FAA has been helpful in enabling industry Safety Management System (SMS) efforts**

Air Show Safety Program

- ❑ Air show safety program established in 1951 after fatal spectator accident in Colorado**
- ❑ Time tested at nearly 20,000 air shows by 600 million spectators over 60 years**
- ❑ Principal focus is spectator safety**
- ❑ Four principal components**
 - ◆ Separation distances**
 - ◆ Sterile aerobatic box**
 - ◆ No aerobatic energy directed at crowd**
 - ◆ Rigorous industry evaluation programs**
- ❑ Thorough performer briefing is essential**

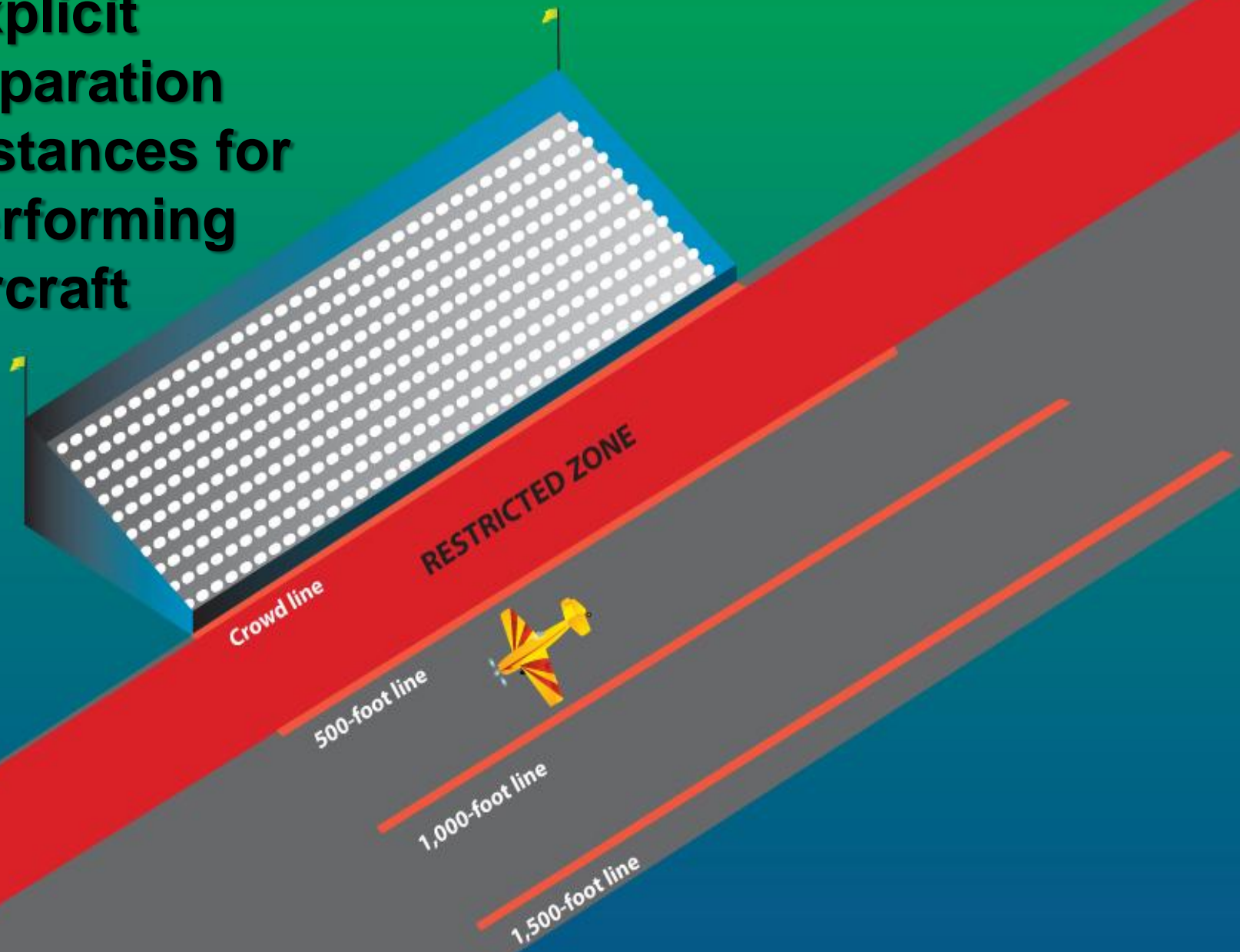
**Air show safety
program based
on four
components**



**Explicit
separation
distances for
performing
aircraft**



Explicit separation distances for performing aircraft



Separation distances from spectator areas

1500 feet- (CAT I)	More than 245 knots(282mph)	Aerobatic Maneuvers
1000 feet- (CAT II)	More than 156 knots but 245 knots or less(181-282 mph) and Helicopters	Aerobatic Maneuvers
500 feet – (CAT III)	156 Knots or less (180 mph) or gross weight of no more than 2,250 or other aircraft not listed above	Aerobatic Maneuvers
500 feet	All Aircraft not listed below	Non-Aerobatic Maneuvers (Flybys, Photo Passes, etc.)
100 feet	Ultralights, powered parachutes, paragliders	Non- Aerobatic Maneuvers



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Sterile aerobatic box



**Sterile
aerobatic
box**

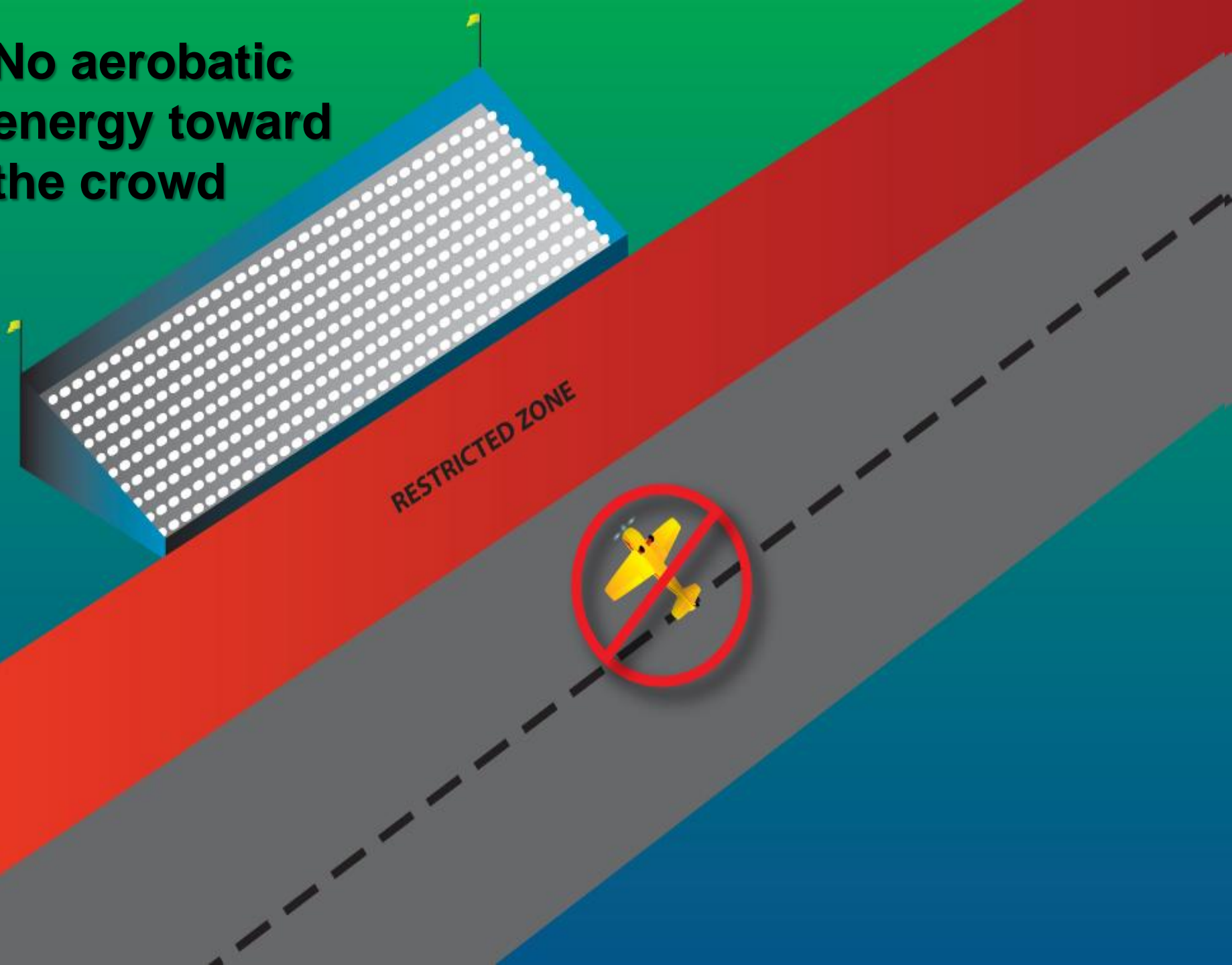
RESTRICTED ZONE



**No aerobic
energy toward
the crowd**



**No aerobatic
energy toward
the crowd**



**Rigorous
industry
evaluation
programs**



Rigorous Industry Evaluation Programs

- ❑ **Similar to those used by military, air carriers**
- ❑ **Aerobic Competency Evaluation (ACE)**
 - FAA program administered by ICAS and EAA
 - Peer evaluations once a year AND when moving to new altitude AND when adding a new aircraft
 - Altitude step-down process
 - ◆ 800 feet
 - ◆ 500 feet (after 8 shows at 5 sites)
 - ◆ 250 feet (after 12 shows at 6 sites)
 - ◆ No restriction (after 16 shows at 8 sites)
- ❑ **Formation and Safety Team (FAST)**
 - Demonstrate proficiency, adopt common procedures
 - Ground and flight evaluations required

Does it work?



North American Air Show Spectator Fatalities, 1951-2011



**Final resting spot
of wreckage**



**Initial point
of impact**



**Non-Fatal accident
Captain Chris Stricklin in
USAF Thunderbirds F-16 at
Gunfighter Skies Air Show
September 14, 2003
Mountain Home AFB, ID**

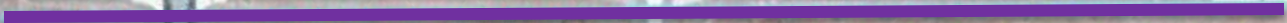
1,500 foot line



1,000 foot line

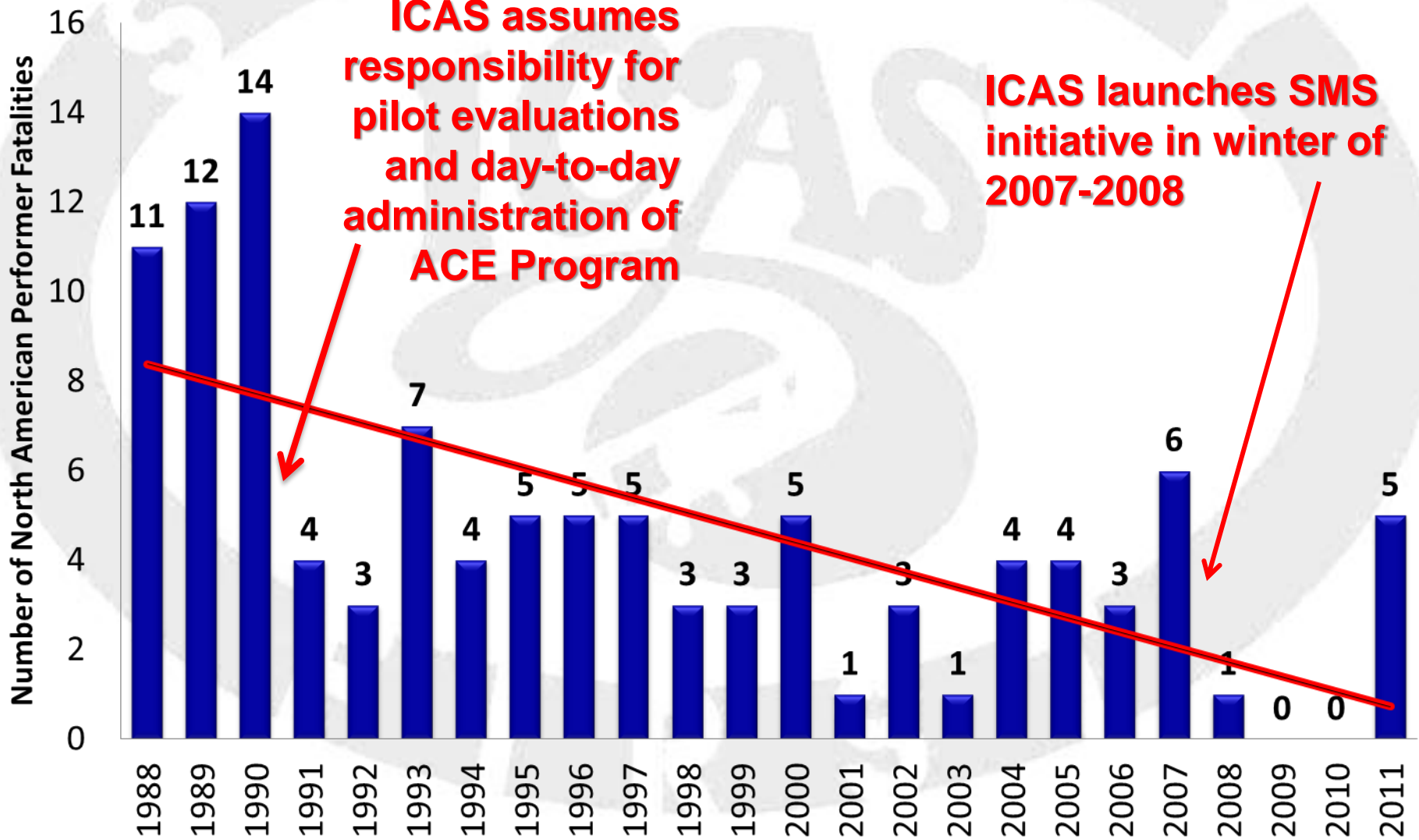


500 foot line



Spectator Area

North American Air Show Performer Fatalities, 1988-2011



ICAS Safety Management System Initiative

- “Safety First” industry awareness program**
- Full-time Director of Safety**
- Education and training**
- Data generation efforts**
 - ◆ ICAS Confidential Reporting System
 - ◆ ICAS Safety Incident Procedures
- Identifying and mitigating root causes of incidents and accidents**

Summary

- Closely monitored by federal regulators**
- Time-tested spectator safety program that has produced superlative spectator safety record**
 - Separation distances
 - No aerobatic energy toward crowd
 - Sterile aerobatic box
 - Rigorous industry evaluation programs
- Industry has routinely and pro-actively addressed safety concerns within air show community**
- Industry recently adopted and is implementing Safety Management System philosophy and procedures**



Questions?