FLIGHT SAFETY FOUNDATION

independent • impartial • international

The CFIT and ALAR   Challenge: Attacking the Killers in Aviation

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Director of Technical Programs

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What is the Flight Safety Foundation ??

- **Independent**

- **Non-Profit**

- **International**

Founded in 1947

FSF Goal:

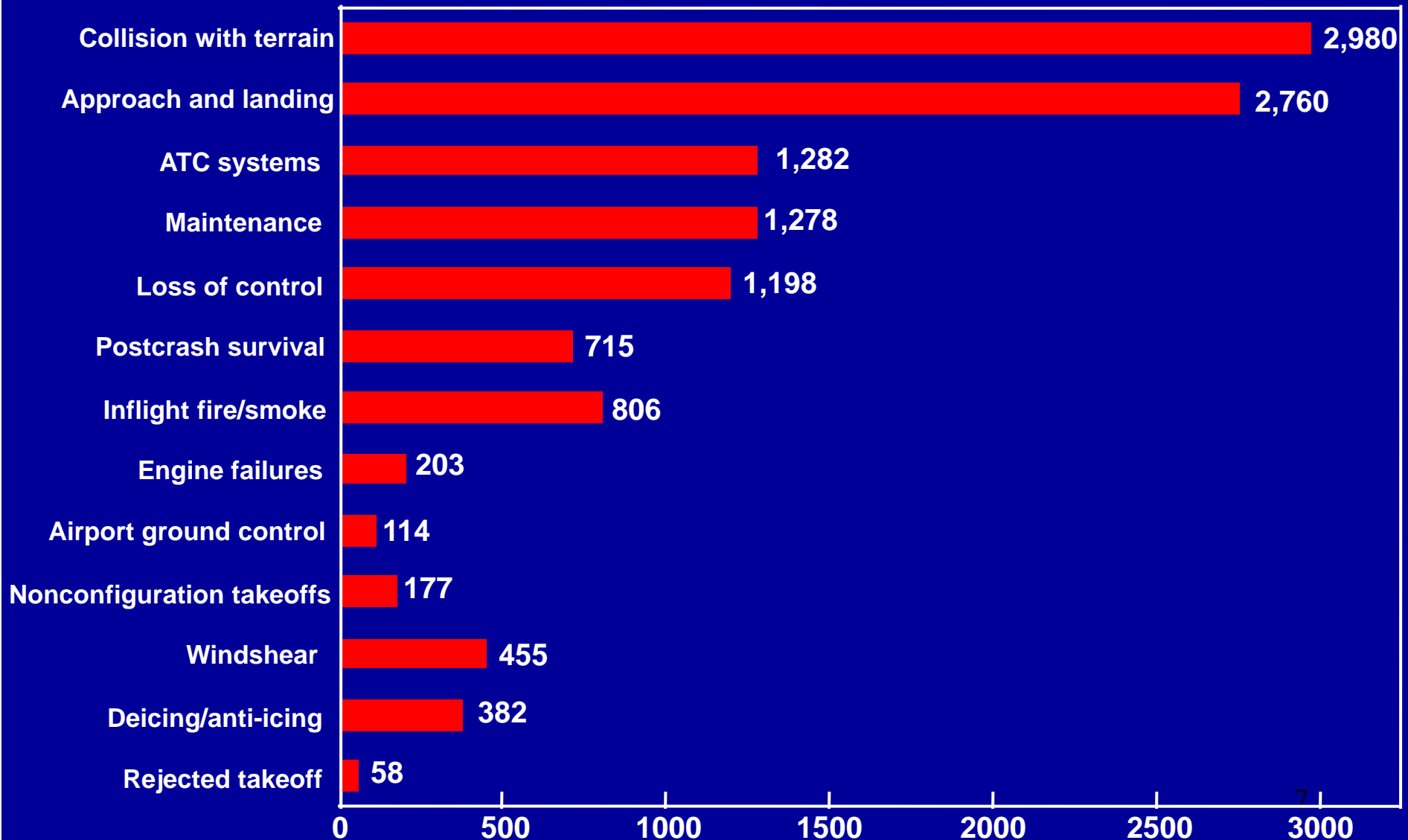Make Aviation Safer by Reducing the Risk of an Accident

Prime Safety Concerns

- CFIT
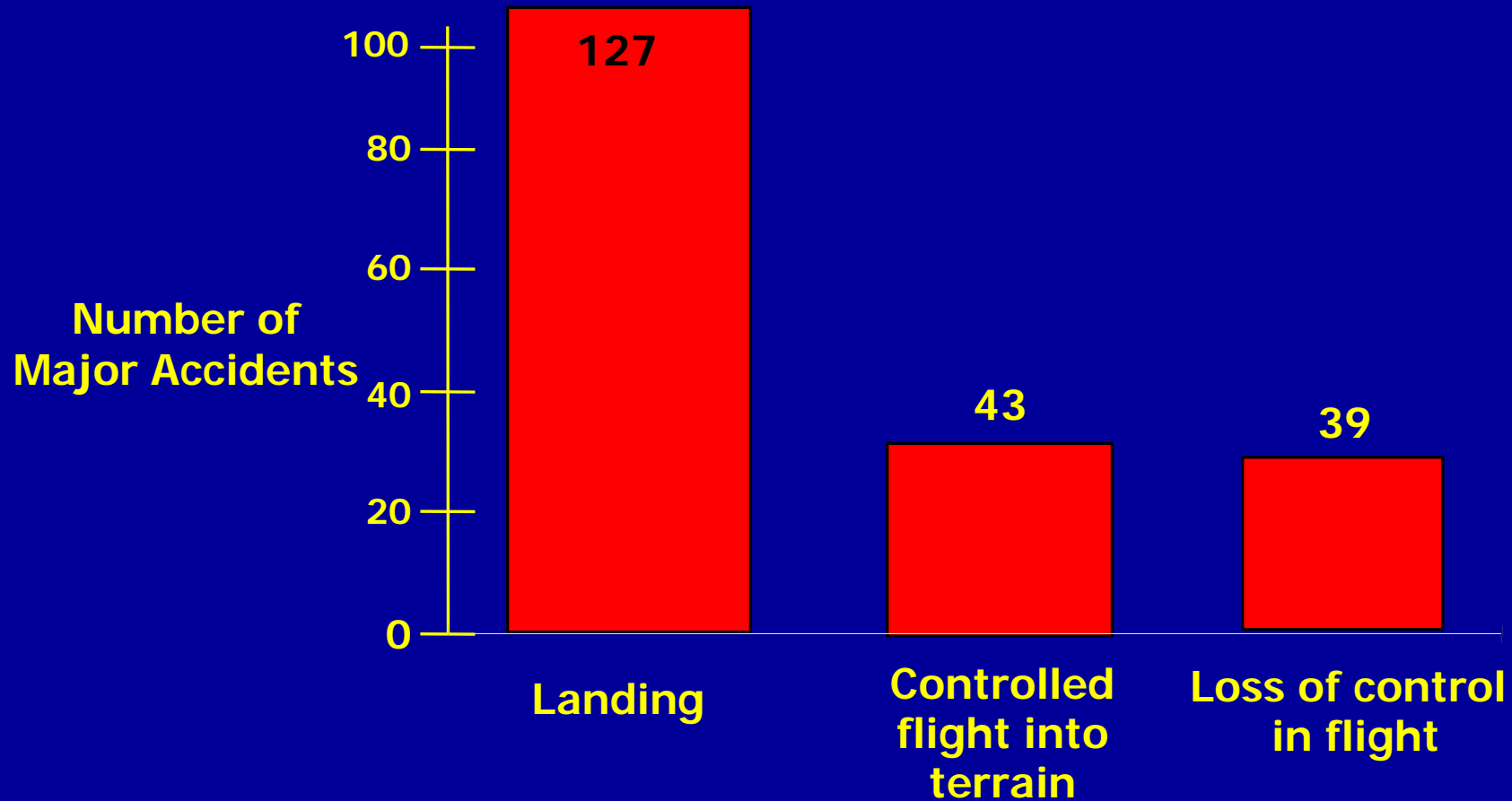
- Approach and landing

- Loss of control

- Human Factors

Safety Fatality Data - Circa 1992

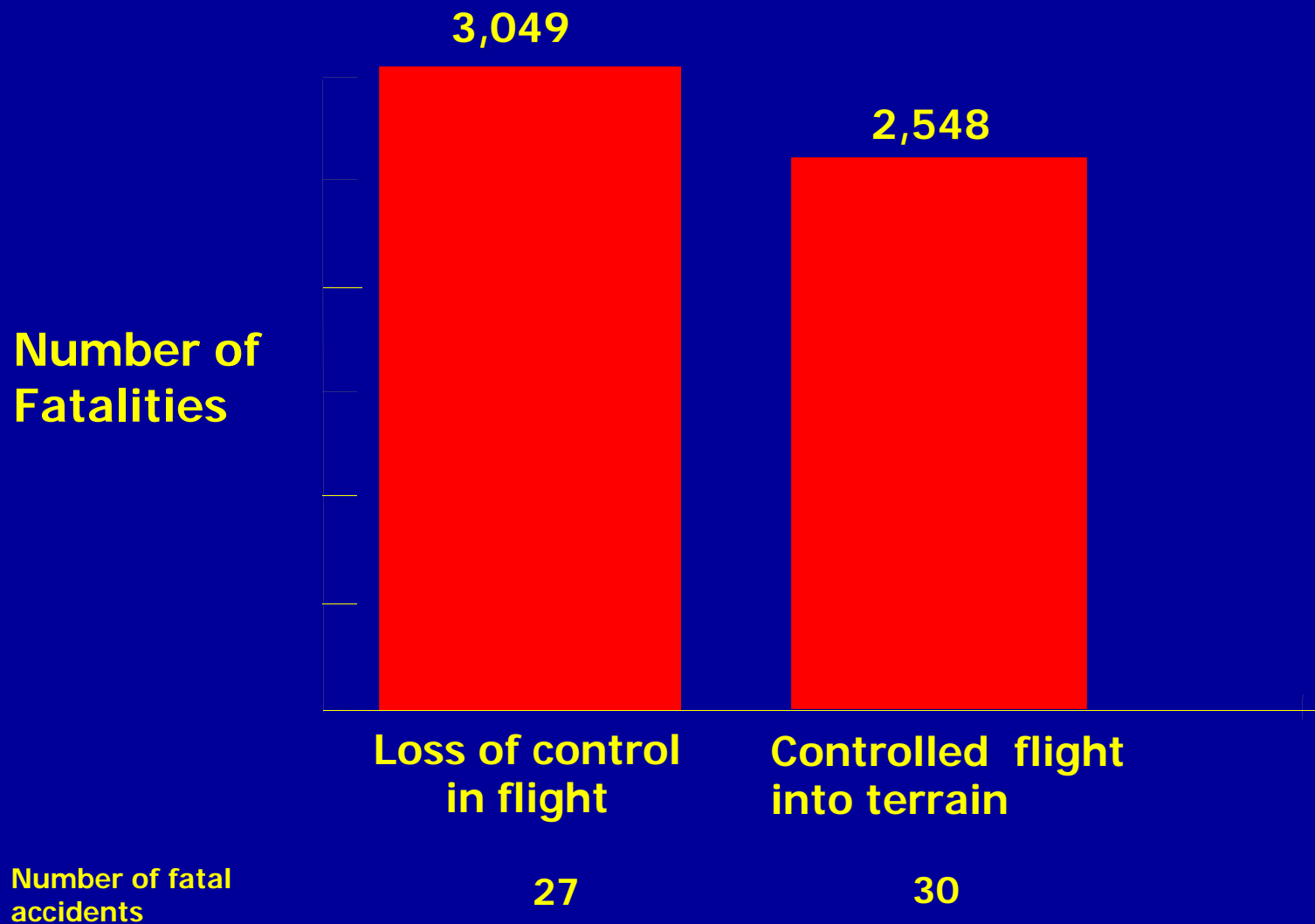| Category	Value
Collision with terrain	2,980
Approach and landing	2,760
ATC systems	1,282
Maintenance	1,278
Loss of control	1,198
Postcrash survival	715
Inflight fire/smoke	806
Engine failures	203
Airport ground control	114
Nonconfiguration takeoffs	177
Windshear	455
Deicing/anti-icing	382
Rejected takeoff	58

Scale: 0, 500, 1000, 1500, 2000, 2500, 3000

CFIT ALAs

Map location of CFIT accidents/incidents
From runway threshold, 40 accidents/incidents

Runway threshold →

5

10

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Tracks where a map display would have probably helped pilot(s) identify and correct problem

Fatal accident track

Incident track
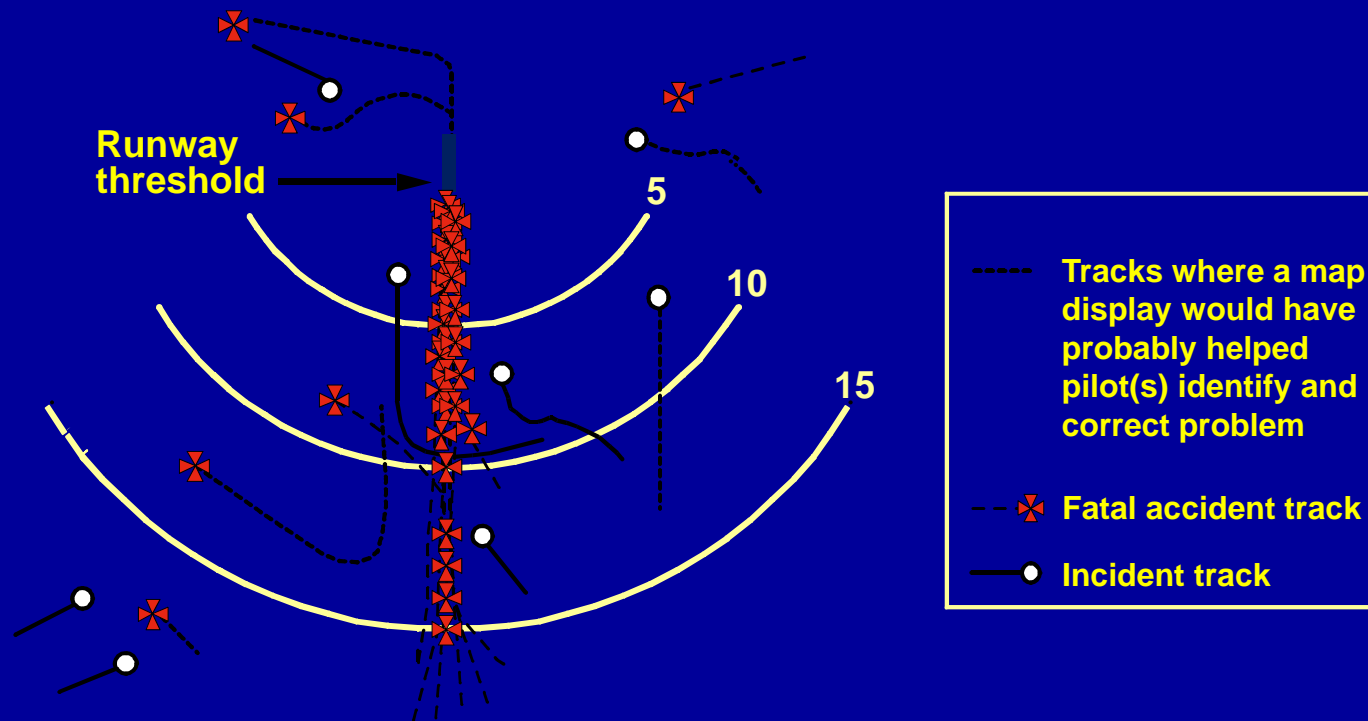
In most of the CFIT accidents, the airplane was lined up with the runway.

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CFIT ALAs

Vertical profile of some CFIT accidents/incidents

3⁰

Altitude (feet)

3000

2000

1000

0

Outer marker, 5nm

10 9 8 7 6 5 4 3 2 1 0
Distance to runway threshold (nm)

200 180 160 140 120 100 80 60 40 20 0
Average time (seconds)
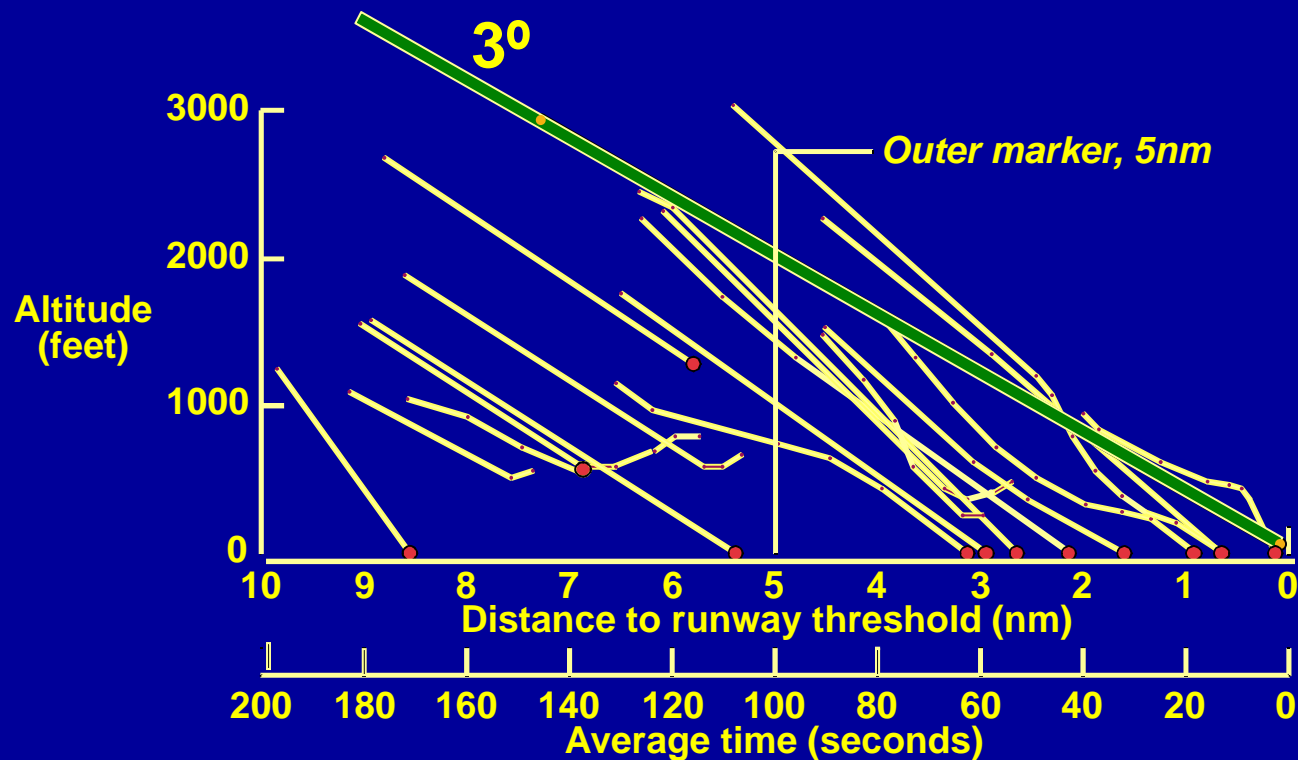
There was a lack of vertical situation awareness

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CFIT Recommendations
Circa 1996

- Colored contours on approach charts

- Non-precision approach design

- Use of ground proximity warning systems, including domestic operations

- Early GPWS updated or removed from service

- Worldwide application of MSAW

- Use of radio altimeter

- MVA information provided to aircraft in electronic format

- Minimum performance standards for English language for controllers

- Language training programs need to be standards driven

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CFIT Recommendations
(cont.)

➢ **Removal of three-pointer and drum-pointer altimeters**

➢ **Standard use of hectopascals for barometric pressure**
  → **Use four-digits to express altimeter settings**

  → **Checklist reminders for hPa vs. inHg at transition levels**

➢ **Active support of:**
  → **Terrain data base development**

  → **GPS/GNSS usage**

  → **HUD usage**

  → **Development of enhanced and synthetic vision**

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CFIT Products

Over 3000 packages distributed
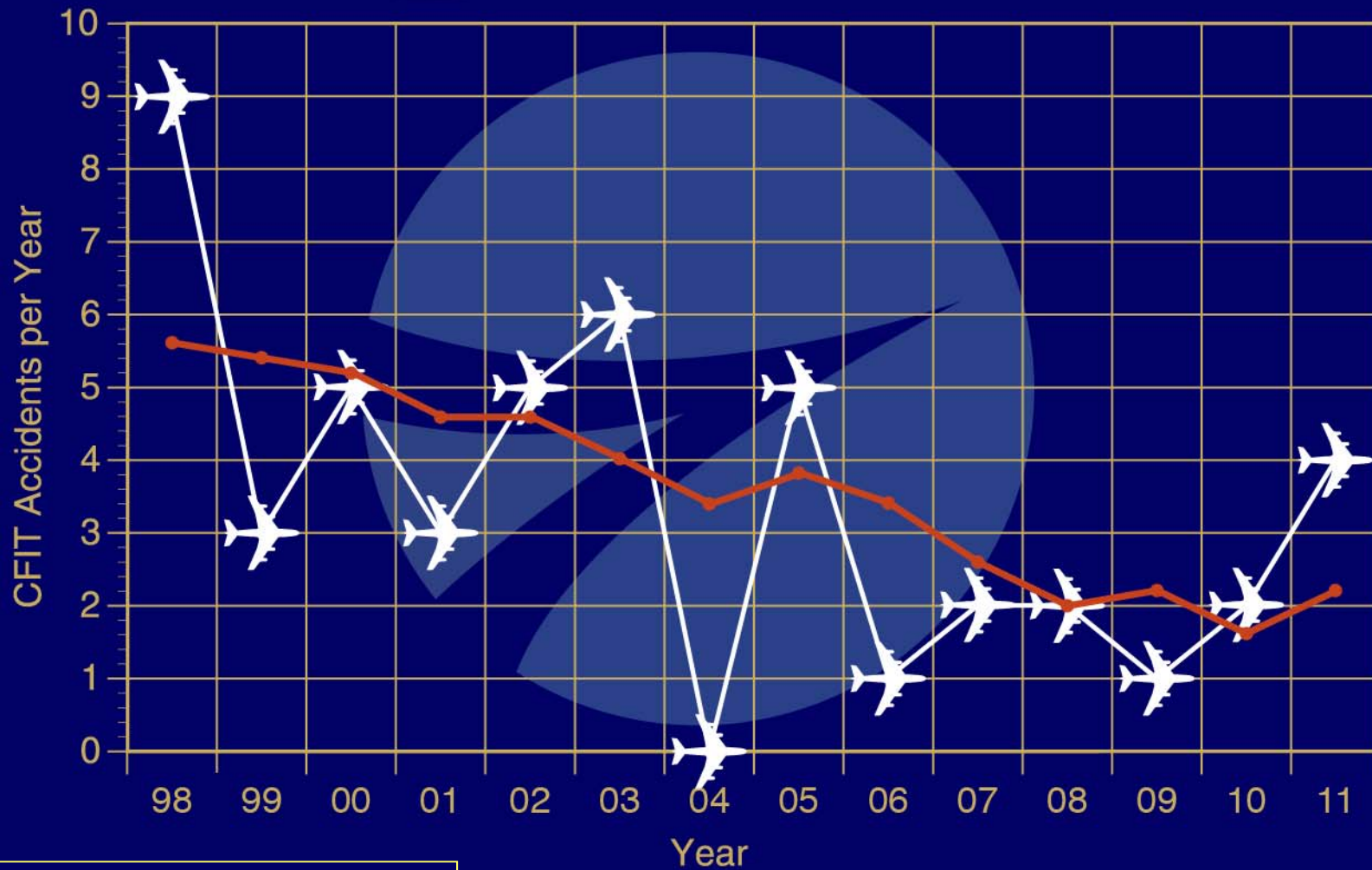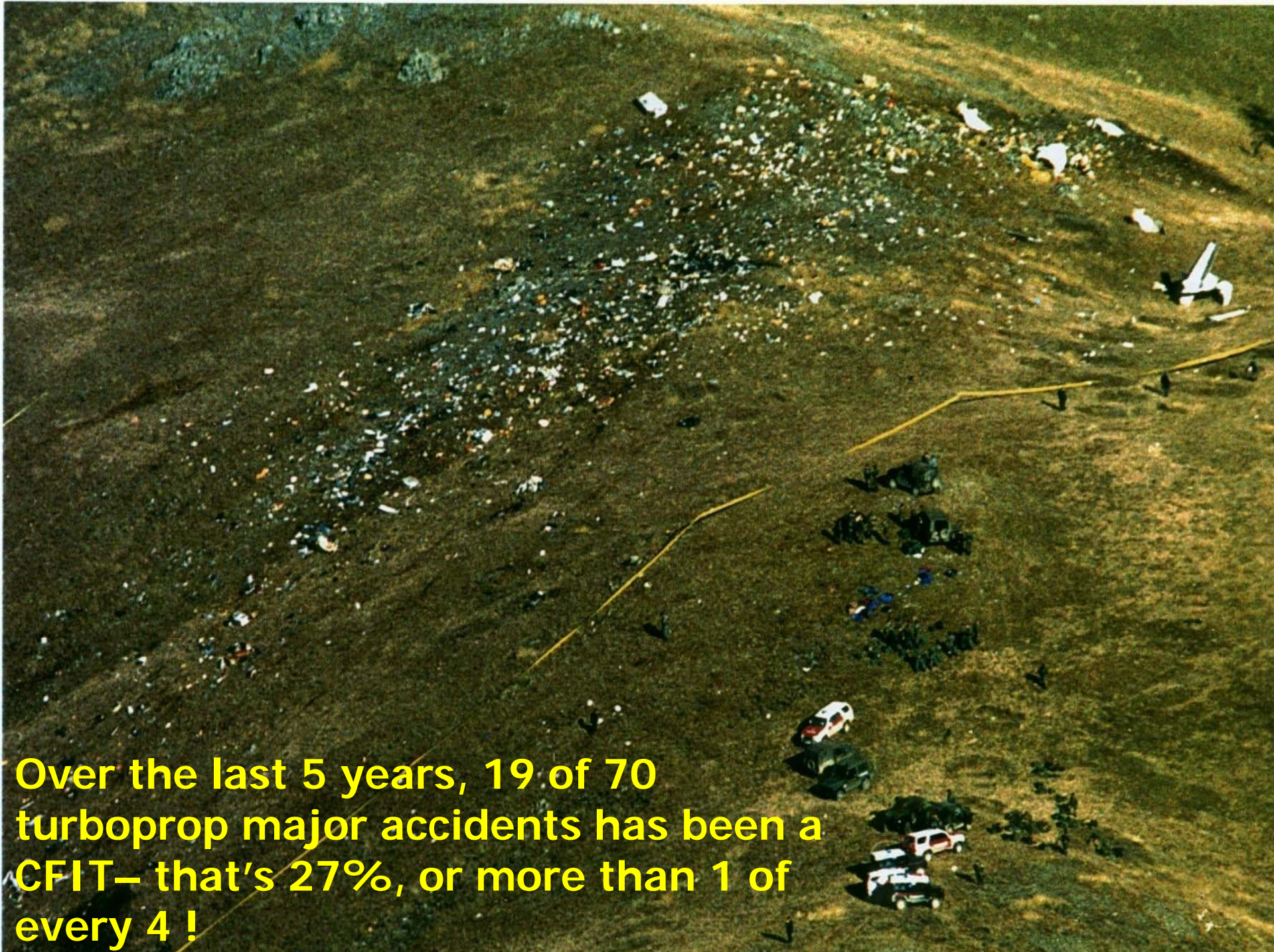
Over the last 5 years, 19 of 70 turboprop major accidents has been a CFIT– that's 27%, or more than 1 of every 4 !

CFIT IMPLEMENTATION SHORTFALLS

*   Size of Training Aid intimidating to some. Not user friendly

*   No means of tracking distribution after first tier

*   No means of measuring success of Training Aid

Top 5 ALA Types

✈ **CFIT (includes landing short)**

✈ **Loss of Control**

✈ **Landing overrun**

✈ **Runway veer off**

Runway Excursions

✈ **Non-stabilized approach**

Interesting ALA Facts

- Approach and landing (from outer marker in to landing) comprise 4% of the flight time, yet account for 45% of the hull losses

- The ALA rate for freight, ferry, and positioning flights (no pax) is 8 times higher than the rate for pax flights

- The accident risk is 5 times greater for commercial aircraft flying a non-precision approach compared with those flying a precision approach

- In 75 % of the ALA accidents, a precision approach aid was not available or not used
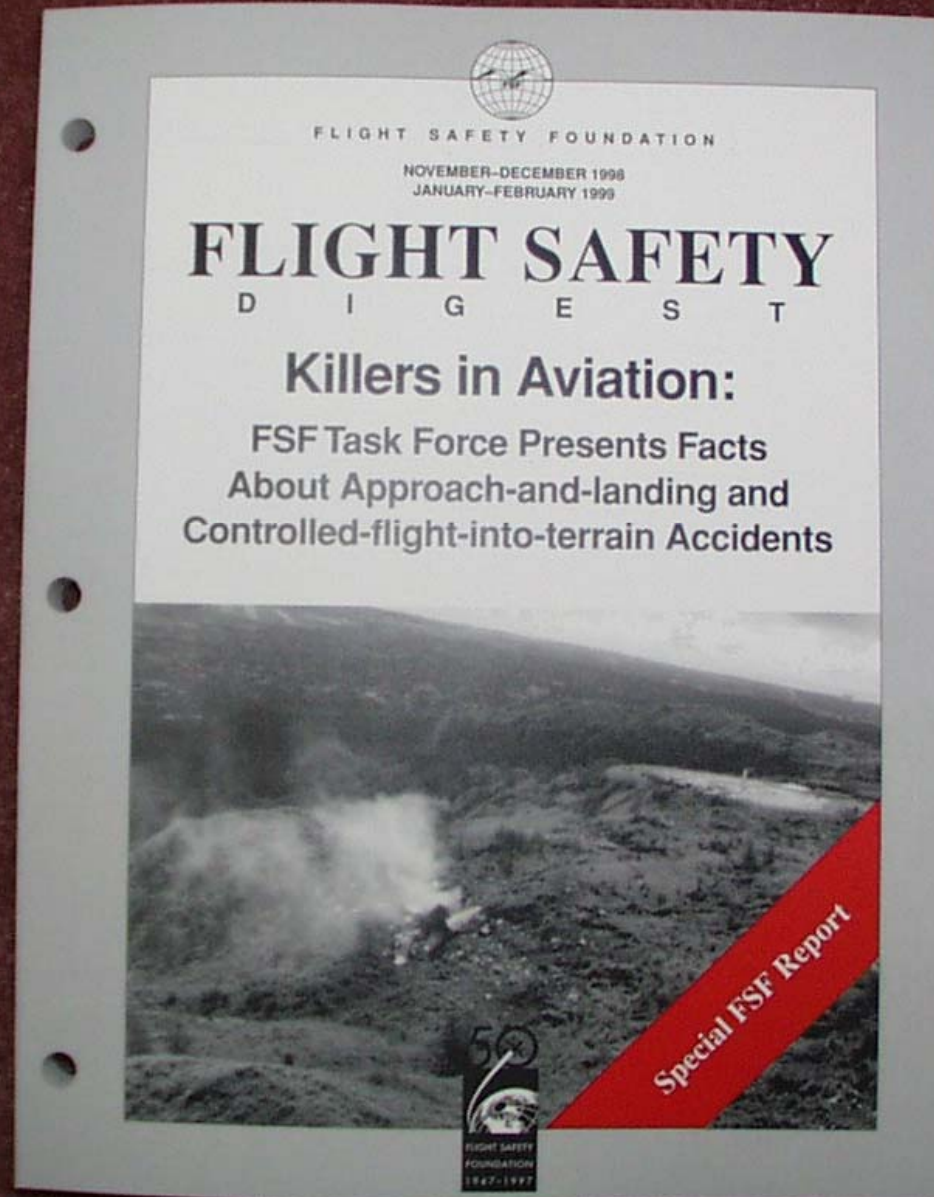
FSF ALAR Report

ALAR Conclusions

→ **SOP**

→ **Missed Approach**

→ **Unstable Approaches**

→ **Communications**

→ **Environment**

→ **Radio Altimeter**

→ **Safety Data Monitoring**

→ **Information Sharing**

CFIT/ALAR ACTION GROUP (CAAG)

<u>Members from</u>:

SAS	IFALPA
ALPA	BAE Aerospace
Gulfstream	Honeywell
Boeing	Airbus
NBAA	USAirways
American Airlines	MasAir Cargo (Mexico)
Rockwell Collins	ICAO
AT&T Aviation	FSF
ATC, Netherlands	JAA
FAA	Delta Airlines

CFIT/ALAR Action Group Goals

- **Implement CFIT/ALAR interventions Regionally**

- **Identify Regional Team Leaders:**

  1. Person or Organization who is a native speaker of the predominant regional language

  2. Active in the region's aviation community

  3. Has contact and creditability in the region

CFIT/ALAR Action Group Goals

- **Develop Tool Kit (to address commercial, corporate, and cargo carriers as well as airports, ATC, and regulators)**

- **Insure integration/coordination with CAST, JSSI, and other regional safety initiatives**

- **Assist in regional implementation planning**

RTL Assist Organizations

- IFALPA

- ALPA

- IFATCA

- IATA

- ICAO

- MANUFACTURERS

- LOCAL REGULATORS

        + OTHERS

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Tool Kit Contents

- **34 Briefing Notes**

- **PowerPoint Briefs (with speaker notes)**

- **Videos on ALA and CFIT**

- **Reference Material (over 2,600 pages)**

- **Links to ALA data sites**

- **SOP Template**

- **CFIT and ALA Awareness Checklists**

- **Risk Reduction Guide**
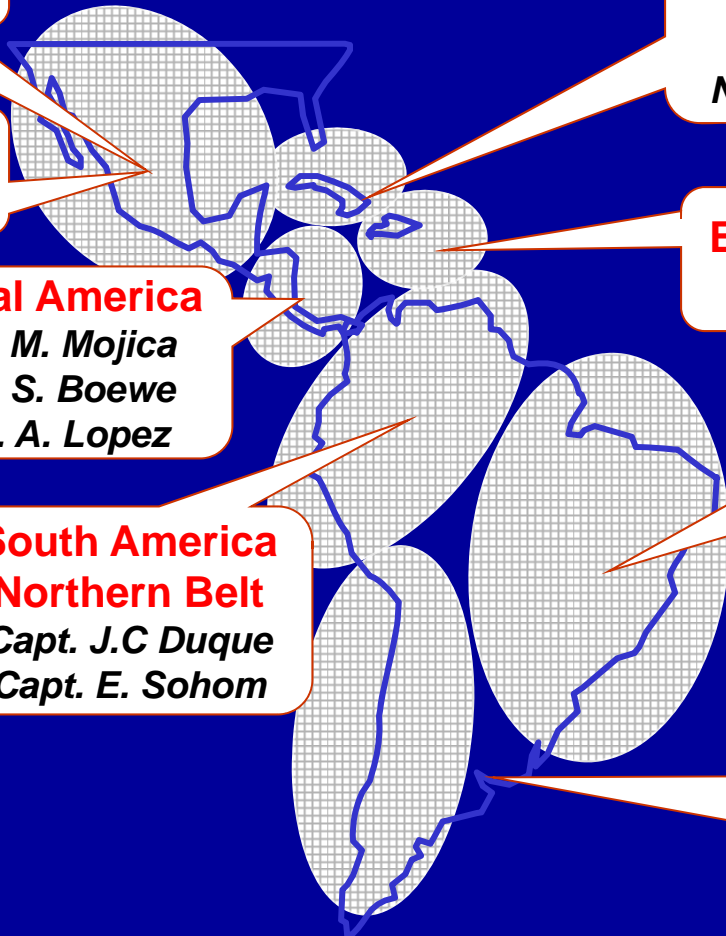
ALAR Tool Kit Workshops

Location	Host/Region	Date
Miami	PAAST/Latin America	Nov 2000
Mexico City	MASAir/Latin America	June 2001
Bangkok	AAPA/Asia-Pacific	Sept 2001
Nairobi	AFRASCO/Africa	Nov 2001
Johannesburg	SAA/South Africa	Nov 2001
Cairo	ICAO/AACO Middle East	Mar 2002
Reykjavik	Iceland FSF/Iceland	May 2002
Perth	ASFA/ Australia	Sept 2002
Melbourne	ASFA/ Australia	Sept 2002
Beijing	CAAC/China	Sept 2002
Dakar	ASECNA/IATA/ West Africa	May 2003
Moscow	FSFI/Russia	July 2003
Brussels	Eurocontrol/ERA/Europe	Dec 2003
Dubai	Emirates/Persian Gulf	Feb 2004
Bahrain	Gulf Air/Persian Gulf	Feb 2004
Korea	Korean Air/North Asia	June 2004
Alexandria, VA	Corporate Aviation	Oct 2004
Christchurch	Air New Zealand/South Pacific	July 2005
Anchorage	Medallion Foundation/Alaska	Aug 2005
Abu Dhabi	Gulf Air/Persian Gulf	Sept 2005
Muscat	Gulf Air/Persian Gulf	Sept 2005
New Delhi	Indian DGAC/South Asia	Jan 2006
Caracas	ALTA/Venezuela	August 2006
Tokyo	ATEC/Japan	December 2006
Baku	FSFI /Balkans	September 2007
Bangladesh	COSCAP South Asia	December 2007
Perth	ASFA/Australasia	May 2008
Melbourne	ASFA/Australasia	May 2008
Brisbane	ASFA/Australasia	May 2008
Tripoli, Libya	AFRIQIYAH/North Africa	July 2008
Pretoria, South Africa	IFALPA/Africa	October 2009
Taipei, Taiwan	FSF-T/Taiwan	November 2009
Manila, Philippines	AAPA/Pacific	October 2010
Bangkok, Thailand	IFALPA/ Pacific	December 2010

**34 ALAR Workshops
5 ALAR Seminars**

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Validation

- **ICAO 33rd Assembly:**
  - **"The ALAR Tool Kit has been assessed as containing extremely valuable accident prevention material which will greatly assist accident programs."**

- **Copy sent with each IATA Safety Report**

- **CAST:**
  - **"Develop an ALAR JSIT Training Guide, using the Flight Safety Foundation's CFIT and ALAR training guide . . . "**

ALAR Updated Data

- **1995 through 2010**
  (original 1985-1996)

- **All ALA accidents versus only fatal accidents (1,270 versus 287 data points)**

- **Fitment of safety equipment less of a factor**

- **More precision approaches (Less NPA)**

- **Top factors still there – slightly different order**

- **Best News: ALA rate down, fatal rate down**

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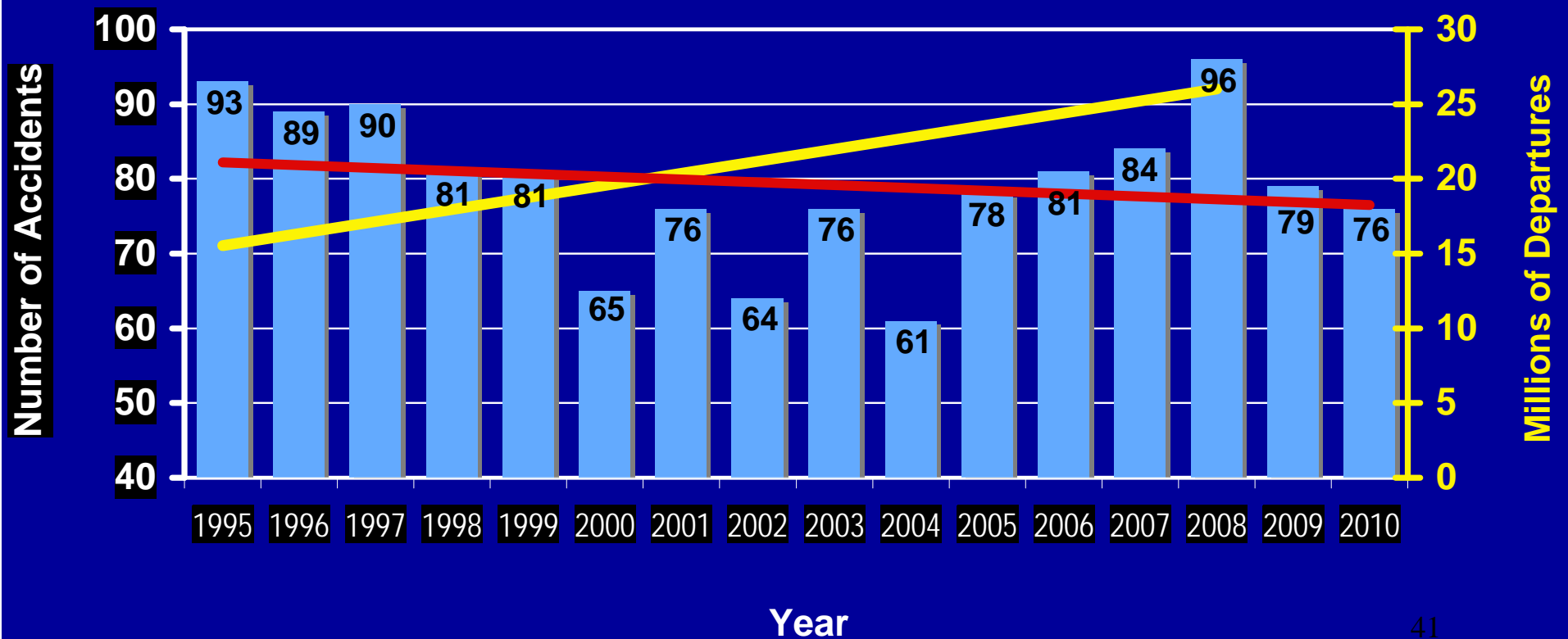
Reducing the Risk of
RUNWAY EXCURSIONS

REPORT OF THE RUNWAY SAFETY INITIATIVE

ALAR Tool Kit Distribution

- FSF   11,700
- Boeing   875
- Airbus   5,200
- Cessna   120
- SAAB   60
- Dassault   400
- Gulfstream   1,000
- BAE Systems   350
- Fairchild-Dornier   150
- NBAA   300
- Mexican Pilots(ASPA)   1,000
- German Airline Pilots   35
- Medallion Foundation   32

- ALPA   100
- ICAO   10,000
- FAA   4,000
- IATA   800
- Air Safety Australia   150
- Flight Safety Intl   600
- Friendship Fund   2,500
- Bahrain Royal Flight   300
- Aer Lingus   450
- Emirates   1,400
- Korean Air   100
- Gulf Air   550

Total: 42,172

Making Flying Safer By Reducing The Risk of an Accident

Photo by Samuel Lo