



# **NORTHWEST MOUNTAIN REGION RUNWAY SAFETY PROGRAM**

**Idaho Falls Safety Seminar**

**June 12, 2001**

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# Definition of Runway Incursion

Any occurrence at an airport involving:

- **an aircraft**
- **a vehicle**
- **a person**
- **or an object**

on the ground that creates a collision hazard or results in loss of separation with an aircraft taking off, intending to take off, landing, or intending to land.



# Sedan versus DC-10





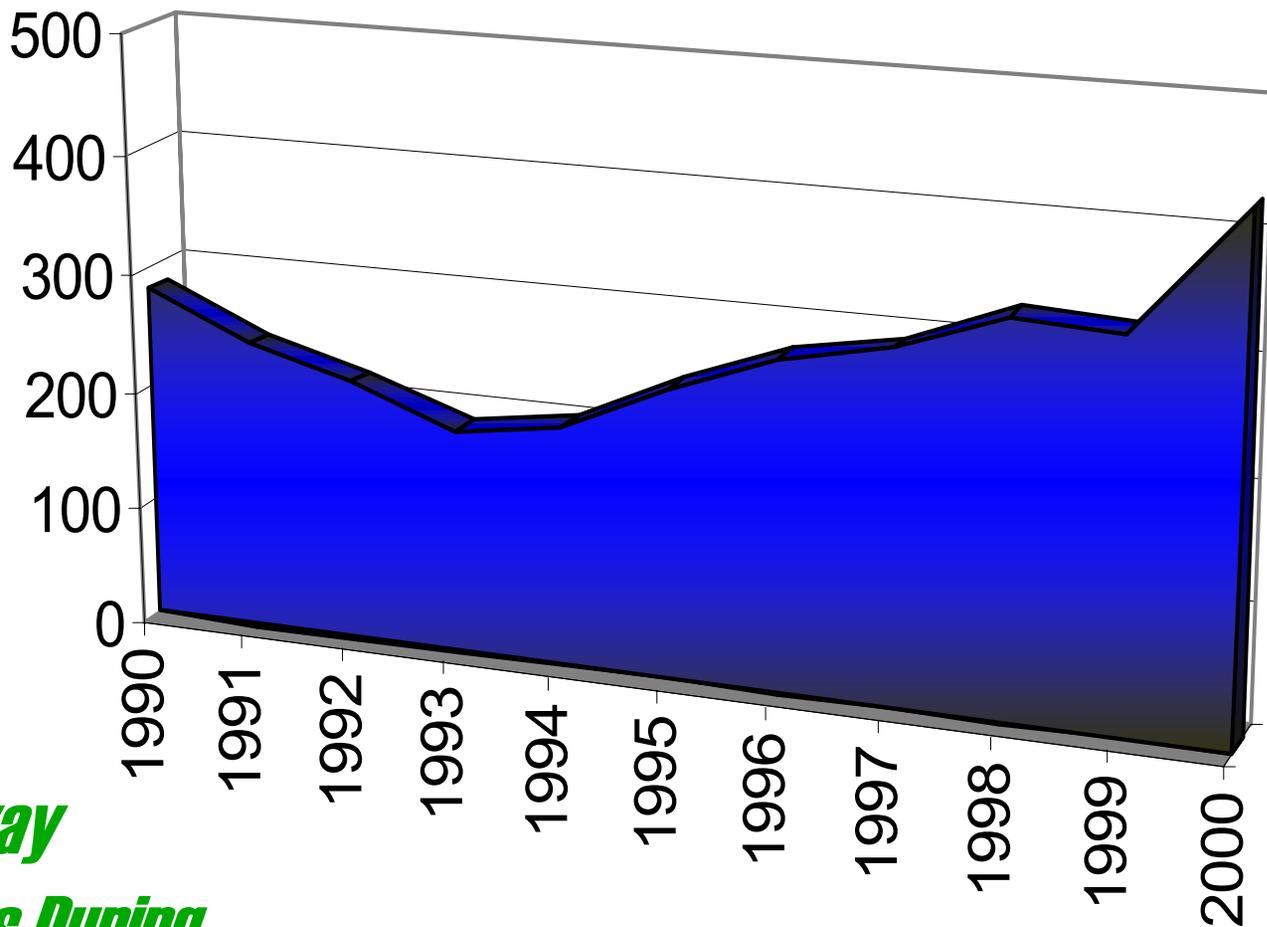
# Runway Incursion Types

Runway incursions result from three types of surface incidents:

- **Operational Errors (OE)**
- **Pilot Deviations (PD)**
- **Vehicle/Pedestrian Deviations (V/PD)**



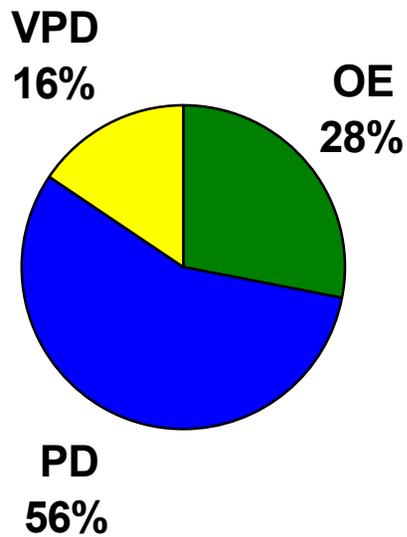
# Trends



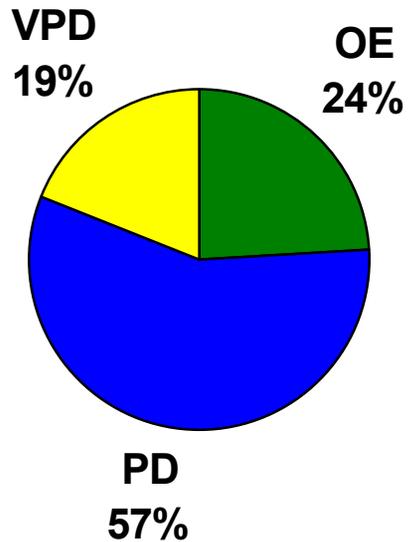
***431 Runway  
Incursions During  
CY 2000***



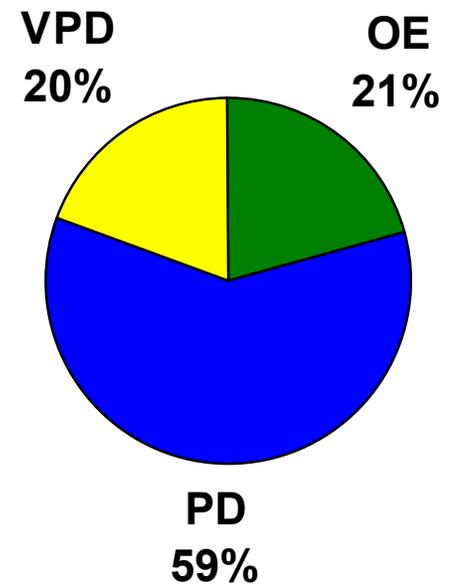
# Trends



1998



1999



2000

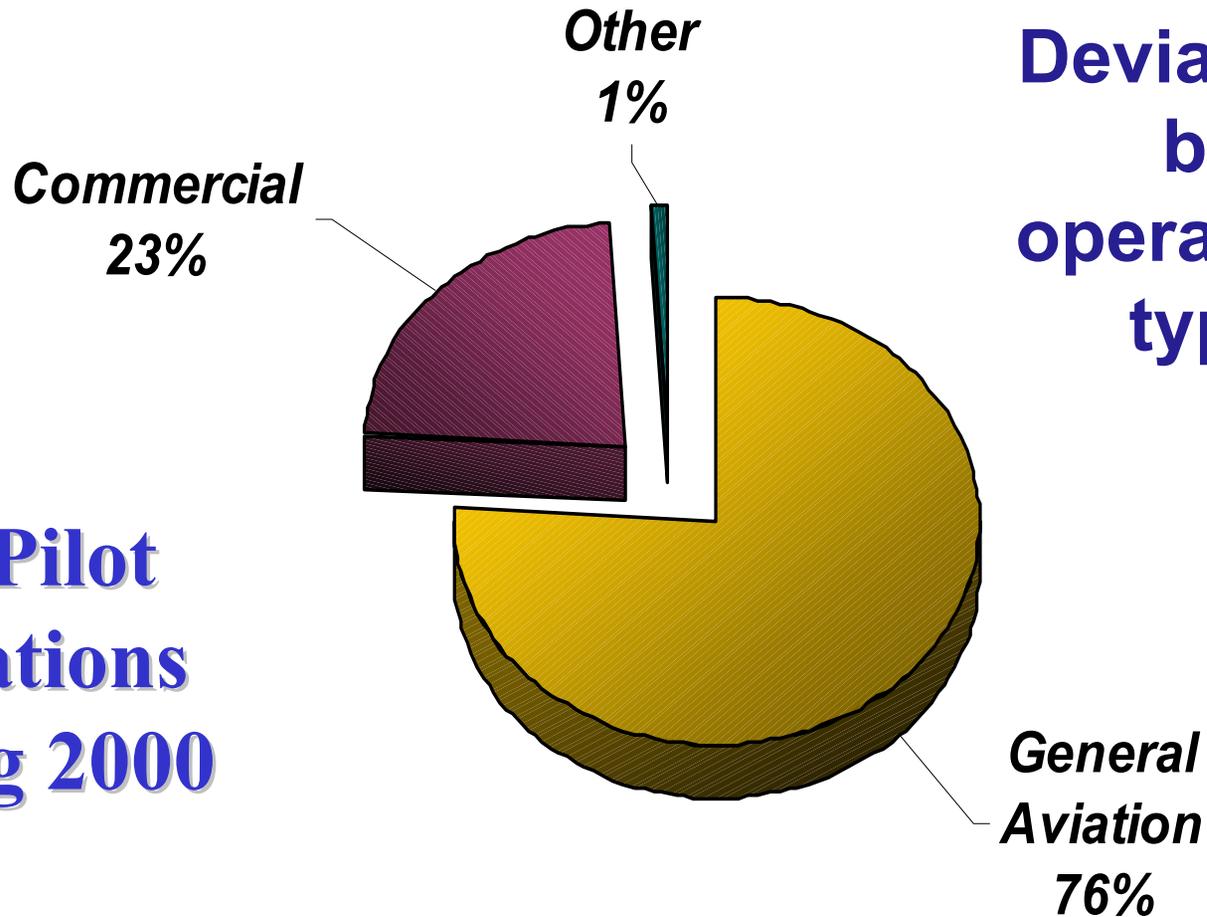
## Incursions by type



# Trends

## Pilot Deviations by operations type

**256 Pilot Deviations during 2000**





# Top Incursion Airports

## *CY 2000*

LOCATION	LOC ID	OPS	RI	RATE
North Las Vegas Arpt, NV	VGT	229,703	16	6.97
Montgomery Field/San Diego, CA	MYF	260,235	9	3.46
Fort Lauderdale Exec, FL	FXE	263,359	9	3.42
Merrill Field, Anchorage, AK	MRI	201,148	8	3.98
Long Beach Arpt, CA	LGB	416,766	8	1.92
Logan Arpt, Boston, MA	BOS	512,985	8	1.56
Los Angeles, CA	LAX	786,421	8	1.02
<b>Jeffco Arpt, Denver, CO</b>	<b>BJC</b>	<b>177,319</b>	<b>7</b>	<b>3.95</b>
Concord Arpt, CA	CCR	212,112	7	3.30
Orange Co/John Wayne Arpt, Santa Ana, CA	SNA	405,473	7	1.73
Santa Barbara, CA	SBA	163,865	6	3.66
Lambert Fld, St. Louis, MO	STL	490,779	6	1.22
Phoenix Sky Harbor Arpt, AZ	PHX	632,360	6	0.95
<b>Troutdale Arpt, OR</b>	<b>TTD</b>	<b>76,252</b>	<b>5</b>	<b>6.56</b>
Teterboro Arpt, NJ	TEB	272,201	5	1.84



# Top Incursion Airports

## *CY 2000*

LOCATION	LOC ID	OPS	RI	RATE
San Jose Arpt, CA	SJC	300,365	5	1.67
Bridgeport, CT	BDR	90,760	4	4.41
Greater Rockford Arpt, IL	RFD	94,571	4	4.23
McGhee Tyson Airport Knoxville, TN	TYS	152,330	4	2.63
Providence, RI	PVD	157,470	4	2.54
Sarasota/Bradenton Arpt, FL	SRQ	174,515	4	2.29
Palwaukee Muni, Chicago, IL	PWK	185,236	4	2.16
Albuquerque, NM	ABQ	233,632	4	1.71
Midway Arpt, Chicago, IL	MDW	303,192	4	1.32
<b>Salt Lake City, UT</b>	<b>SLC</b>	<b>370,681</b>	<b>4</b>	<b>1.08</b>
San Francisco, CA	SFO	437,186	4	0.92
Newark, NJ	EWR	461,457	4	0.87
Cincinnati-Covington Arpt, OH	CVG	486,590	4	0.82
O'Hare, Chicago, IL	ORD	914,131	4	0.44



# ANM AIRPORTS CY2000 RIs

• BJC	7	• ALW	1
• TTD	5	• EGE	1
• SLC	4	• <b>IDA</b>	<b>1</b>
• BFI	3	• PAE	1
• DEN	2	• PDX	1
• BOI	2	• PSC	1
• APA	2	• RNT	1
• RDM	2	• SEA	1
		• SFF	1



# Sweeper versus DC-9





# ***RISK ASSESSMENT***



# Why We Assessed Data

- As a result of feedback from 2000 Summit, needed to place runway incursions into another context
- Need a better way to track incursions
- Need a better understanding of where incursions happen
- Need a way to analyze data to get at causal factors
- Need to describe clearer picture of runway incursion incidents – *Not every incursion is a Tenerife*



# What Was Done

- Formed a team of “experts” to assess incursions in detail
- Developed four runway incursion categories – coordinated with ASD and other agency analysis activities (Dr. A. Barnett)
- Mitre and NASA ASRS observed and validated the process



# Definitions

- A** Separation decreases to a point where the margin of safety is so low that the participants barely avoid a collision.\*
- B** Separation decreases to a point where a significant potential for a collision existed.
- C** Separation decreases, or the potential for separation to decrease exists, but ample time and distance exist to avoid a potential collision.
- D** Meets the definition of a runway incursion, with little or no risk of a collision.

\* The data contained in category A includes all accidents that occurred as a result of runway incursions (1997-2000), one in LaGuardia, NY & one in Sarasota, FL.



# Assessment Process

Evaluated over 1350 incidents – all incursions during 1997 – 2000 – *one at a time*

- Projected airport diagram
- Projected all reported incident information
- “Walked-thru” incident and discussed event
- Reached Team consensus and assigned collision risk category (A-D)
- Asked 20+ questions for every incident to collect additional data
- Marked incident location on airport diagram

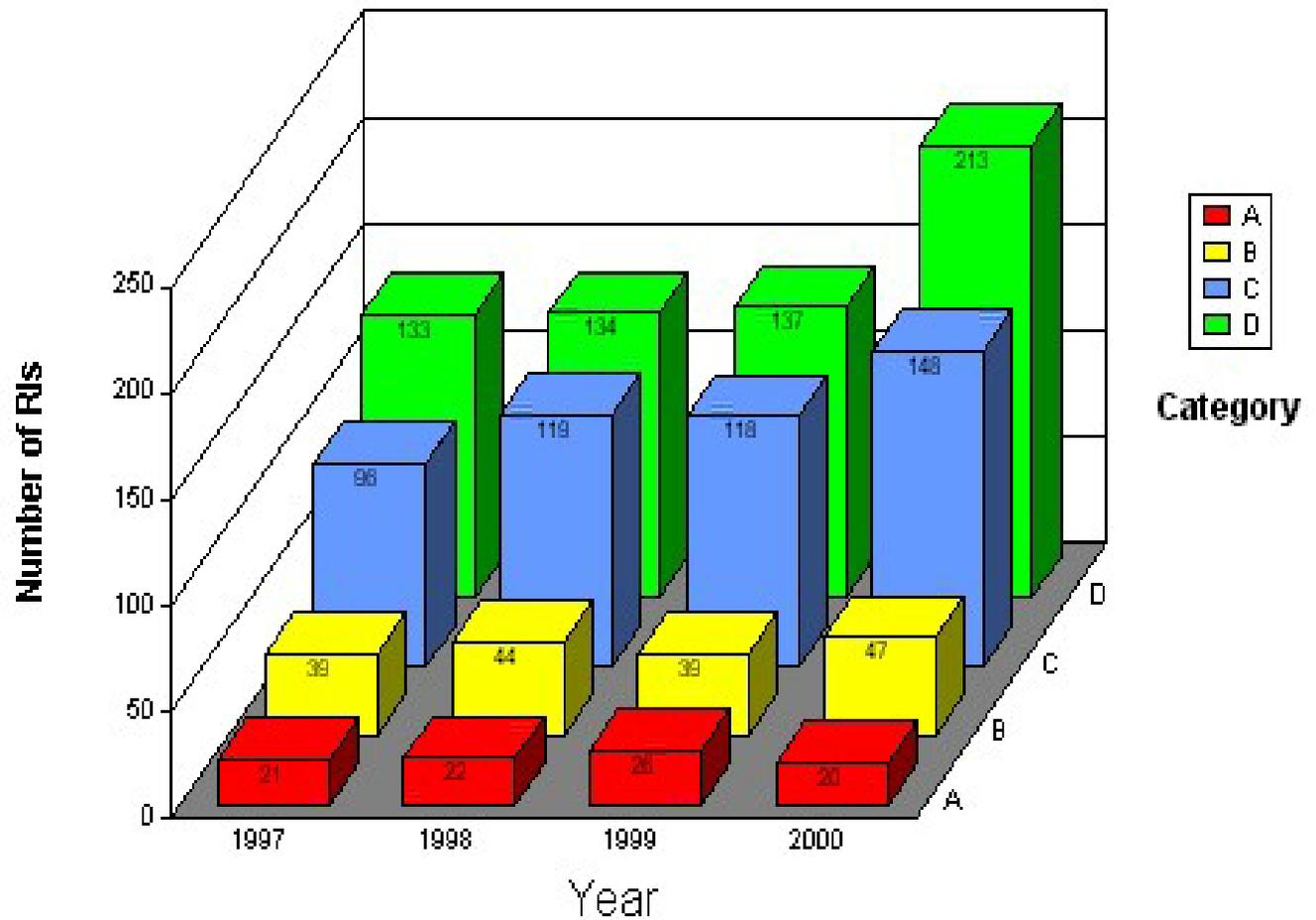


# Additional Details Now Available

- Airport
- Date & Time
- Incursion Type
- Operation Type
- Callsigns
- Type Aircraft
- Phase of Flight
- Combined Positions
- Construction
- Foreign Carrier
- Non-Pilot
- Vehicle Type
- LAHSO
- Intersecting Runways
- Confusing Intersection
- Low Visibility
- Training (pilot/controller)
- Hold Short

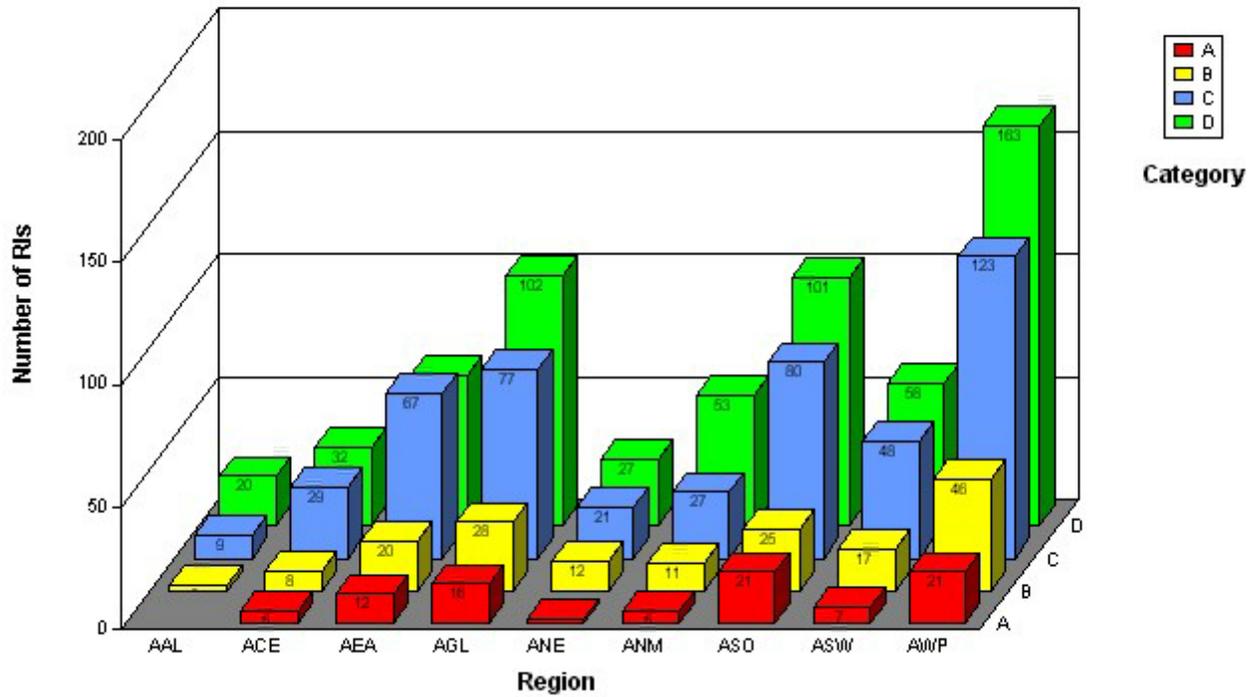


## National Runway Incursion INCIDENTS



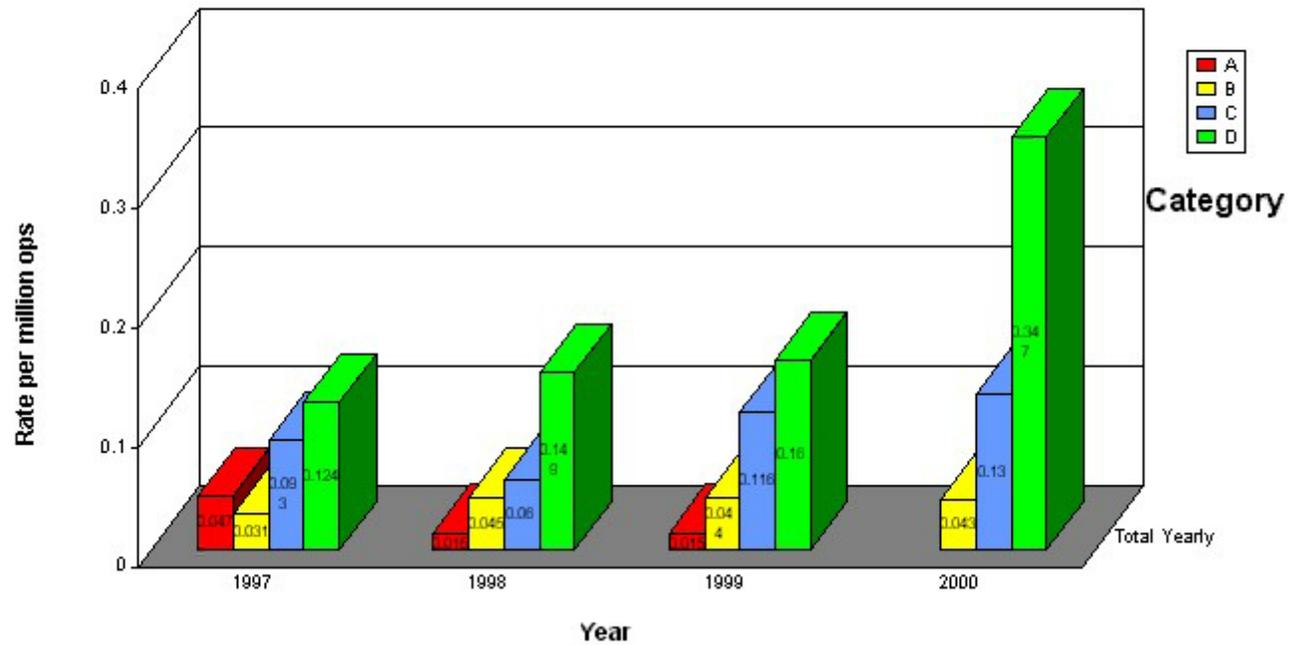


### REGIONAL Runway Incurion INCIDENTS 1997 - 2000



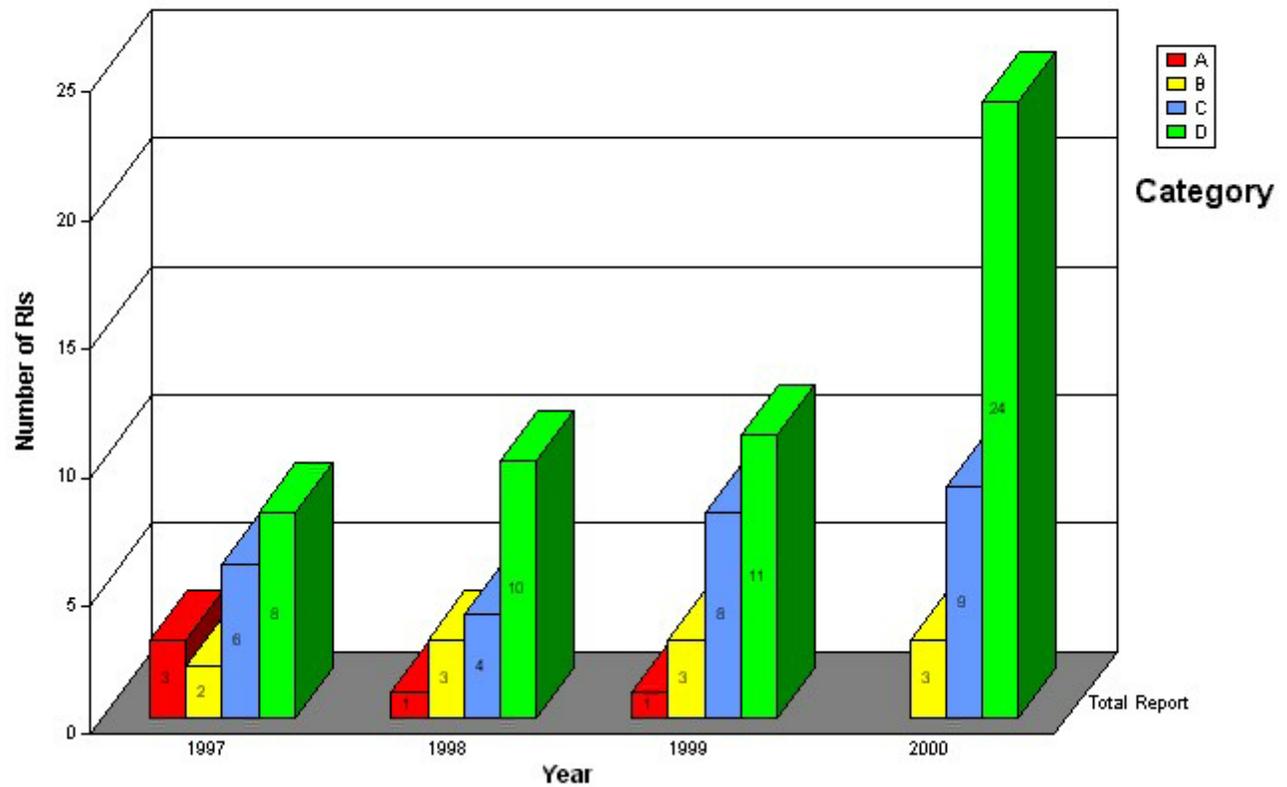


### Northwest Mountain Region Runway Incursion RATE



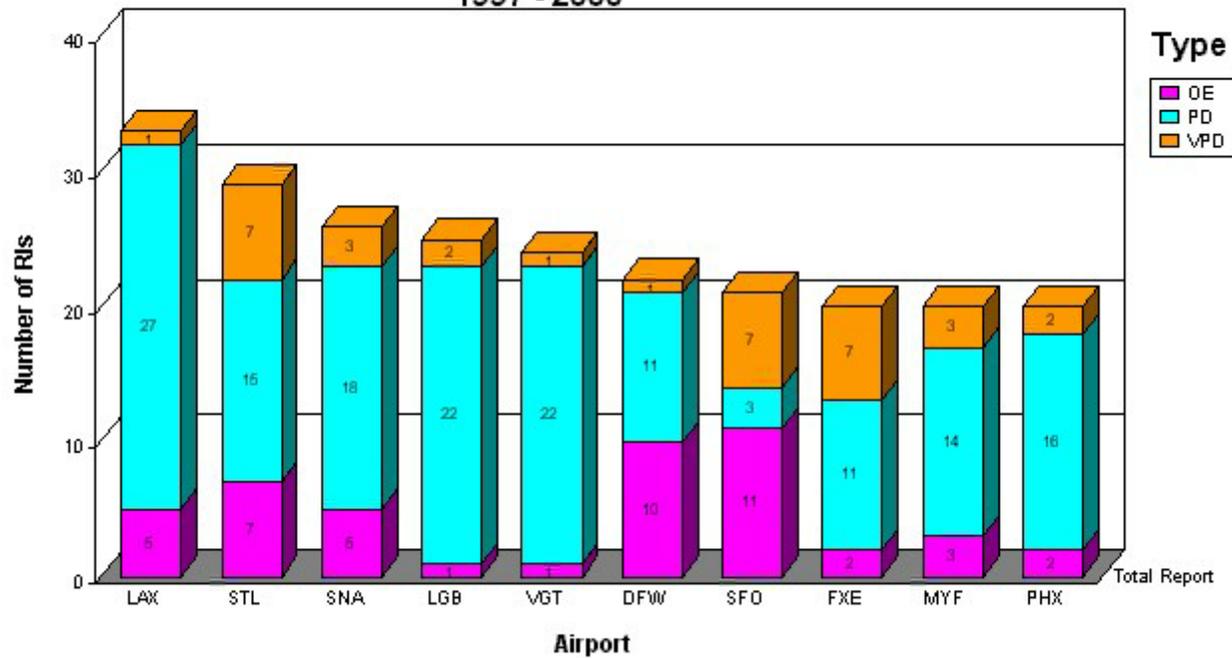


### Northwest Mountain Region Runway Incursion INCIDENTS





Top 10 Airports  
Runway Incursion TYPE  
1997 - 2000





# Primary Causes of Runway Incursions

- Breakdown in Pilot/Ground Vehicle/Controller Communications
- Lack of Airport Familiarity
- Loss of Situational Awareness



# What Happened with My Suggestion?

- Nearly 1,000 recommendations from:
  - Regional Workshops / National Summit
  - NTSB / JSAT / GAO /aviation industry; etc
- ‘Rolled up’ into 50 larger solutions
- Ten Action Items for fast track implementation

Became the TOP TEN



# Top Ten Initiatives

- 1. Enhanced Operational Tower Controller Training
  - LOB: Air Traffic
  - Modify existing OJT training course to place a higher priority on maintaining situational awareness and prioritization when applying anticipated separation
  - Computer Based Instruction-Develop Runway Incursion specific training to be administered prior to local control certification and establish recurring training requirements.
  - Status: Finalizing workgroup participants with NATCA



# Top Ten Initiatives

- 2. Foreign Air Carrier Pilot Training, Education and Awareness
  - LOB: Flight Standards
  - Program to increase awareness and prevention of RIs within international aviation community
    - Two Tasks:
      - Develop fast process for inspectors to determine a pilot's level of English proficiency
      - Identify a process that will help foreign air carriers to achieve a 50% + compliance with level 2 English proficiency (2002 – 2005)
  - Status: Focal point (Bob Hall – DFW) is assembling team from IFOs, contractors, and ICAO to establish charter. Action plan expected 2/01.



# Top Ten Initiatives

- 3. Advisory Circular for Airport Surface Operations
  - LOB: Flight Standards
  - Standard operating procedures for airport surface operations. Applicable to Part 121, 129, 125, 135, and 91 operators. Covers cockpit issues such as planning, situational awareness, techniques for transiting complex intersections, intra-cockpit coordination and communications with ATC.
  - Status: Completed and signed by AFS-1. Currently in Federal Register for 30 day comment period. AC will be published after reviewing comments at the end of the 30 day period.



# Top Ten Initiatives

## 4. Airport Markings

- LOB: Airports
- Increase the visibility of runway hold line markings. Change existing A/C to require double-sized markings (outlined in black with glass beads) at all certificated and towered airports.
- Status: Change to AC has been accomplished







# Top Ten Initiatives

## 5. Education, Training, and Awareness for Pilots, Controllers, and Vehicle Operators

- LOB: ATS-20
- Develop a resource library of RI materials available at RSP Web Site and linked to other aviation safety sites.
- Status: Final workgroup was conducted December 5, 2000. Estimated completion date is March 30, 2001.



# Top Ten Initiatives

## 6. Memory Enhancement Techniques for Tower Controllers

- LOB: Air Traffic
- Techniques to enable tower controllers to manage working memory more effectively
- Status: Finalizing workgroup participants with NATCA



# Top Ten Initiatives

- 7. Pilot – Controller Phraseology Review
  - LOB: Air Traffic
  - A comprehensive assessment of required pilot - controller surface operations phraseology. Objective is to reduce communications workload by condensing, modifying, or eliminating verbiage. Includes harmonizing phraseology with ICAO.
  - Status: Finalizing workgroup participants with NATCA.



# Top Ten Initiatives

- 8. Improved Pilot Evaluation and Testing
  - LOB: Flight Standards
  - Evaluate ground operations performance and test for knowledge of signs, lighting, and marking during all initial certification check flights. Flight instructors and Designated Pilot Examiners will test surface operations knowledge during recurrent evaluations.
  - Status:
    - Airline Transport Pilot and Certified Flight Instructors Practical Test Standards have been modified
    - Private, Commercial, and Instrument Practical Test Standards are in the process of being modified
      - Projected completion expected by end of June 01



# Top Ten Initiatives

## 9. Air Traffic Teamwork Enhancement (ATTE) Training for Tower Controllers

- LOB: Air Traffic
- Conduct ATTE training at 10 facilities that have the highest number of RIs resulting from operational errors.
- Status: Finalizing workgroup participants with NATCA

ATTE Facilities: BOS, BUR, DFW, LGA, MDW, MKE, PBI, SFO, SJC, & TEB



# Top Ten Initiatives

- 10. Technology Assessment

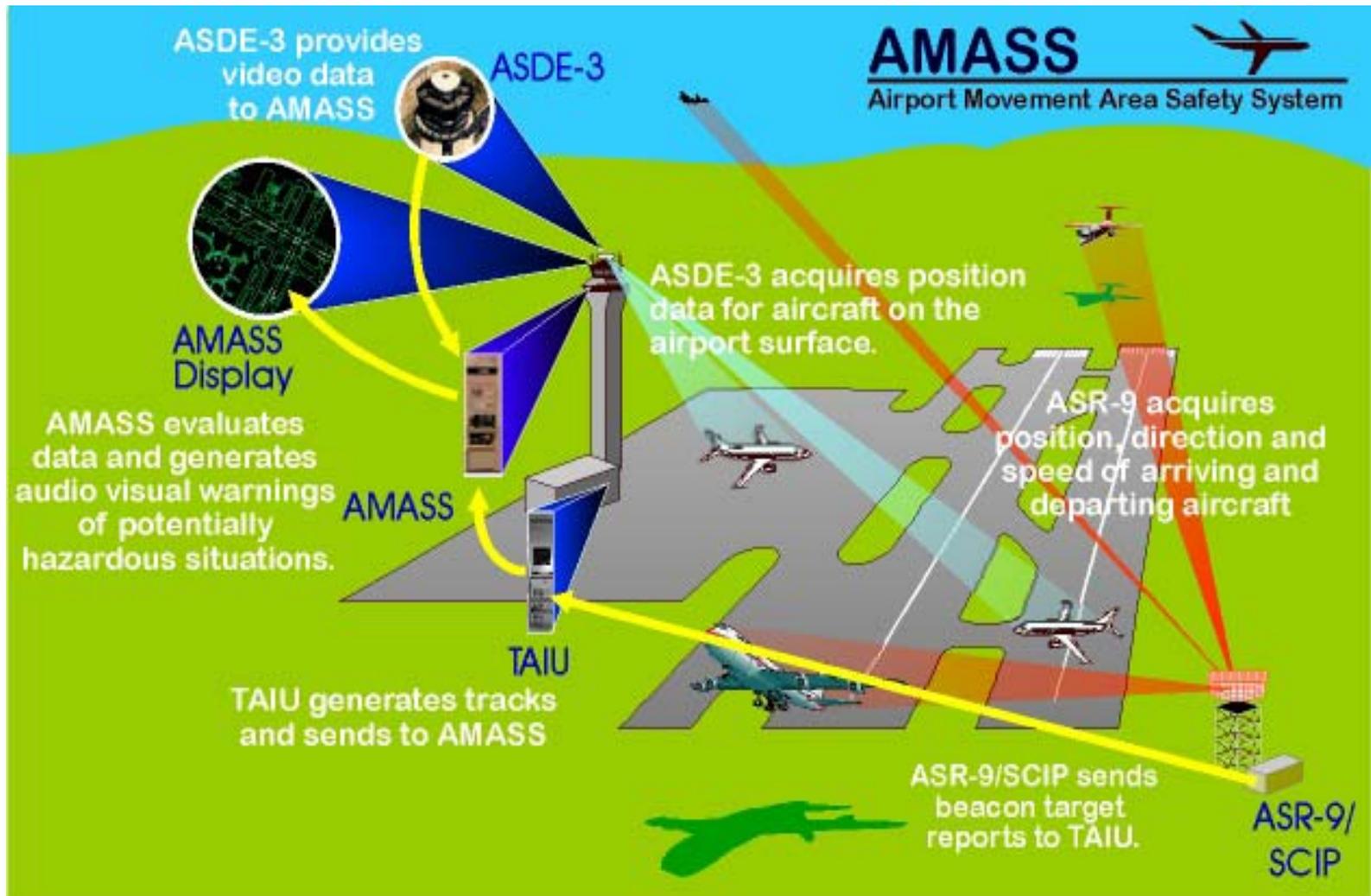
- The FAA has a number of technology programs underway aimed at improving runway safety. They include the following:

- Airport Surface Detection Equipment, Model 3 (ASDE-3)

- Airport Movement Area Safety System (AMASS)

Operational June 6, 2001 at SFO

- Airport Surface Detection Equipment, Model X (ASDE-X)



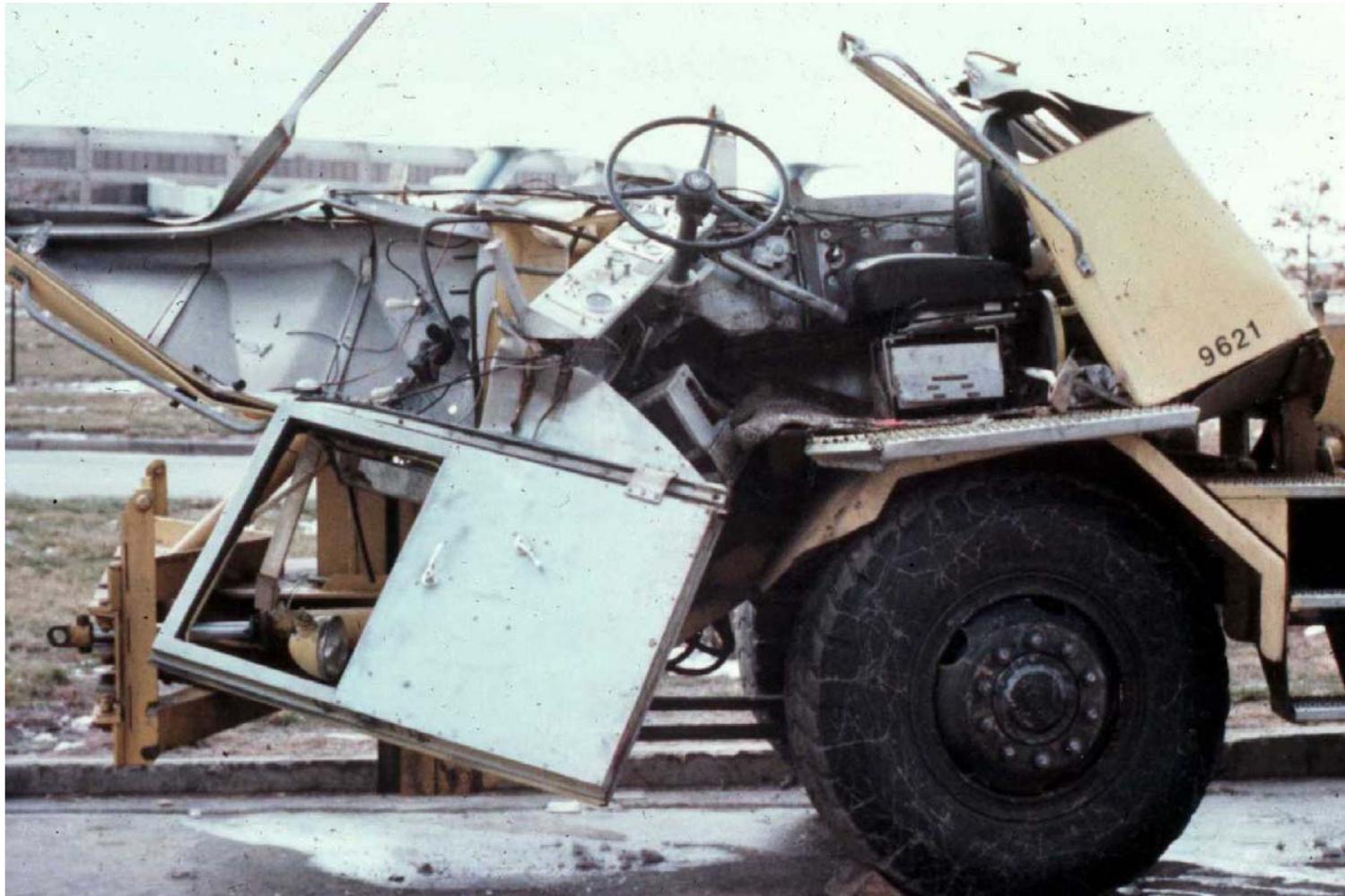


# Top Ten Initiatives

- 10. Technology Assessment Continued
  - Safeflight 21 (SF-21)
  - In addition, the FAA issued a Broad Agency Announcement (BAA) seeking proposals for new and emerging runway safety technologies.



# Snow Plow versus Wingtip





# Runway Safety Program

[www.faa.gov/runwaysafety](http://www.faa.gov/runwaysafety)

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# Runway Safety Program

*on the ground*

## Create your own Airport Runway Safety Website, *FREE!*

In an effort to promote safer surface operations, the Runway Safety Program now offers all airports, regardless of size or use, the ability to create their own websites. Airports can now inform the flying public about airport hot spots, local procedures, operations, runways specifications, communications, and much more. Airports will even have the option of posting pictures and diagrams. ▶ [create website](#)



## Airport Signs, Markings & Lighting

Knowing airport signs, markings & lighting is the cornerstone to safe surface operations. Take a few minutes and review the current standards. ▶ [view](#)





# Runway Safety Program

*the cockpit*



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## Airport Taxi Diagrams

To reduce runway incursions, the FAA has teamed up with the AOPA Air Safety Foundation to make taxi diagrams available for more than 330 of the busiest U.S. airports.

*The best part...it's free!* [view](#)



Great Idea!

## Operations at Towered Airports

This graphic-intensive Safety Advisory discusses the procedures for operating at towered airports. Learn about airport lighting, signs, markings, communications, procedures, charts, and much more. [view](#)



## Airport Signs, Markings & Lighting

Knowing airport signs, markings & lighting is the cornerstone to safe surface operations. Take a few minutes and review the current standards. [view](#)





# Runway Safety Program

*statistics & data*

## STATISTICAL DATA

- [Runway Incursion Totals CY00 vs. CY99 \(Updated Daily\)](#)
- [Regional Runway Incursion Totals - CY00 \(Updated Daily\)](#)
- [Runway Incursion Totals CY88 vs. CY99](#)
- [2000 Runway Incursion Reduction Goal](#)
- [Runway Incursions by Category \(1988-1999\)](#)
- [Runway Incursions by Month \(1997-1999\)](#)
- [Runway Incursion Rates with Total Operations \(1988-1999\)](#)
- [Quarterly Operational Errors \(1997-1999\)](#)
- [Quarterly Pilot Deviations \(1997-1999\)](#)
- [Pilot Deviations by Part \(1997-1999\)](#)



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The cover image for the National Blueprint for Runway Safety. It features a collage of aviation-related elements: a small propeller plane flying in the upper left; a large commercial jet engine and fuselage section in the lower center; a white airport ground support vehicle with the number '8' on the side in the lower left; a tall black and white tower in the center right; and a white architectural blueprint of an airport terminal overlaid on the background. The text "National Blueprint for Runway Safety" is prominently displayed in the center, with a smaller FAA Runway Safety Program logo below the word "for".

**National  
Blueprint**

for



**Runway  
Safety**

October 2000

[www.faa.gov/runwaysafety](http://www.faa.gov/runwaysafety)



# Pickup Truck versus B-747





Local Problems  
require local  
Solutions

IDAHO FALLS TOWER\*  
118.5 257.8  
GND CON  
121.7

ELEV  
4726

ELEV  
4725

17

167.0°

4050 X 150

35

ELEV  
4726

CFR  
STATION

TWR  
4829

PASSENGER  
TERMINAL

ELEV  
4740

ELEV  
4728

203.1°

A-1

A

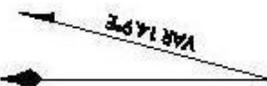
A-2

9001 X 150

RWY 2-20  
S140, T175, ST175, TT270  
RWY 17-35  
S43, T58

FIELD  
ELEV  
4740

JANUARY 1995  
ANNUAL RATE OF CHANGE  
0.1°W



43°31'N

43°30'N

112.04°W

112.05°W

CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES.  
READBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.

ELEV  
4738

203.1°

2

A-3

A

A-4

A

A-5

A

A-6

A

A-7

A

A-8

A

A-9

A

A-10

A

A-11

A

A-12

A

A-13

A

A-14

A

A-15

A

A-16

A

A-17

A



# Surface Incident 1/23/2000

Nxxx entered Delta airspace at IDA without establishing two way radio communication. He then landed on closed runway 35. He then taxied without clearance to the terminal ramp which is a secure area and parked. Nxxx deplaned a passenger in this secure area. He then called with a working radio for taxi clearance. Tower gave clearance for taxi and departure. Nxxx was observed departing south. Departure clearance for Nnnn on Runway 2 was cancelled and aircraft held on account of Nxxx unauthorized approach and landing. No conflicts were reported.



# Runway Incursion 8/06/2000

Four teenager pedestrians crawled under Runway 2 from the west then ran back across the runway in front of Nxxx, Lear Jet LJ45 while the aircraft was on roll out. Closest proximity not reported.

**AIRCRAFT MOVEMENT AREA**



**DO NOT PROCEED  
WITHOUT CLEARANCE  
FROM PAINE TOWER**

**VEHICLES REQUIRE A  
FLASHING AMBER BEACON**

AIRCRAFT MOVEMENT AREA  
DO NOT PROCEED  
WITHOUT CLEARANCE  
FROM PAINE TOWER  
VEHICLES REQUIRE A  
FLASHING AMBER BEACON



**AIRCRAFT TAXIWAY  
TOWER CLEARANCE REQUIRED**







GATE  
E-3

**YOU ARE ENTERING AN AIR OPERATIONS AREA  
AUTHORIZED VEHICLES & PERSONNEL ONLY**

VIOLATORS MAY BE PROSECUTED UNDER SNOHOMISH COUNTY CODE 15.08.651

STOP ON YELLOW LINE UNTIL GATE IS FULLY CLOSED BEHIND YOU

UNESCORTED FOLLOW-THROUGH VEHICLES ARE PROHIBITED  
PLEASE REPORT VIOLATORS TO AIRPORT SECURITY 353-1606

DO NOT CROSS  WITHOUT ATC AUTHORIZATION

YIELD TO ALL AIRCRAFT  
SPEED LIMIT 15



# WHAT CAN YOU DO

- SUPPORT THE ANM RUNWAY SAFETY PROGRAM BY:
  - EMPHASIZING THE IMPORTANCE OF PREVENTING RUNWAY INCURSIONS
  - DISCUSSING THE RSP AT MEETINGS WITH YOUR STAKE HOLDERS AND EMPLOYEES
  - PROVIDING PROMPT ATTENTION TO SURFACE INCIDENT PREVENTION TEAMS AND SURFACE INCIDENT PREVENTION PLAN REQUIREMENTS



# WHAT CAN YOU DO

- INVITE THE ANM RSP TEAM TO YOUR AIRPORT TO HELP WITH DEVELOPING PROBLEM AREAS



# ANM Points of Contact

## (ANM Runway Safety Team)

- *Runway Safety Program Manager, ANM-1R, Jim Greene, (425) 227-1369 Jim.k.greene@faa.gov*
- *Airports Division, ANM-600, Mark Taylor, (425) 227-2625 Mark.taylor@faa.gov*
- *Flight Standards, ANM-200, Mary Hoy, (425) 227-2262 Mary.Hoy@faa.gov*
- *Airway Facilities Operations, ANM-400, Willie Eigner, (425) 227-2336 Willie.eigner@faa.gov*
- *Air Traffic Control, ANM-500, Don Bringmann, (425) 227-2550 Donald.bringmann@faa.gov*

We Listen....

We Respond

