

# Harvesting the full power of safety data



Aviation Safety Information  
Analysis and Sharing (ASIAs)



Commercial Aviation Safety  
Team (CAST)

Presented to: Global Runway Safety Symposium

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Federal Aviation  
Administration



# What is ASIAS.....

A collaborative Government and Industry initiative on data sharing & analysis to proactively discover safety concerns before accidents or incidents occur, leading to timely mitigation and prevention.



# ASIAS Functional Benefits

*With ASIAS, the aviation community will be able to . . .*

- **Identify Systemic Risks**
  - Establish safety baselines of current operations
  - Identify known and newly emerging system vulnerabilities
  - Monitor safety trends
- **Evaluate Identified Risks**
  - Estimate their probabilities
  - Assess their severities
  - Uncover event precursors
  - Diagnose event causation
- **Formulate Mitigations**
  - Assess the probable effects of various safety enhancements through simulation studies
- **Monitor Mitigation Effects**
  - Assess the effectiveness of SEs in accordance with metrics established by the CAST



# ASIAS is Governed by Formal Principles

Data used solely for advancement of safety

Non-punitive reporting



Airline data is de-identified

Analyses approved by an ASIAS Executive Board

# Types of Proactive Safety Analyses

**Directed  
Studies**

**Known Risk  
Monitoring**

**Safety Enhancement  
Assessment**

**Vulnerability  
Discovery**

**Benchmarking  
Operations**



**A Collaborative FAA-Industry  
ASIAS Executive Board (AEB)  
Provides Guidance and Oversight**



# Data Sources Supporting ASIAs Studies

## Proprietary Data

- ASAP
- FOQA
- ATSAP
- Manufacturers data
- Avionics data

## Safety Data



- Aviation Safety Reporting System
- Runway Incursion
- Surface Incident
- Operational Error / Operational Deviation
- Pilot Deviation
- Vehicle or Pedestrian Deviation
- National Transportation Safety Board
- FAA Accident/Incident Data System
- FAA Service Difficulty Reports

## ATC Information



- Traffic Management Reroutes and Delays
- Airport Configuration and Operations
- Sector and Route Structure
- Procedures
- **Surveillance Data for En Route, Terminal and Airport**
- **ASDE-X**

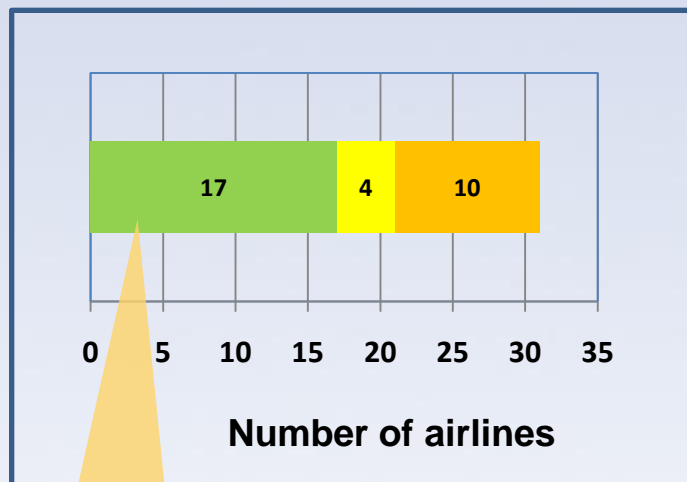
## Other Information



- Bureau of Transportation Statistics
- Weather / Winds

# Overview of Airline Programs Contributing Data to ASIAs

## FOQA



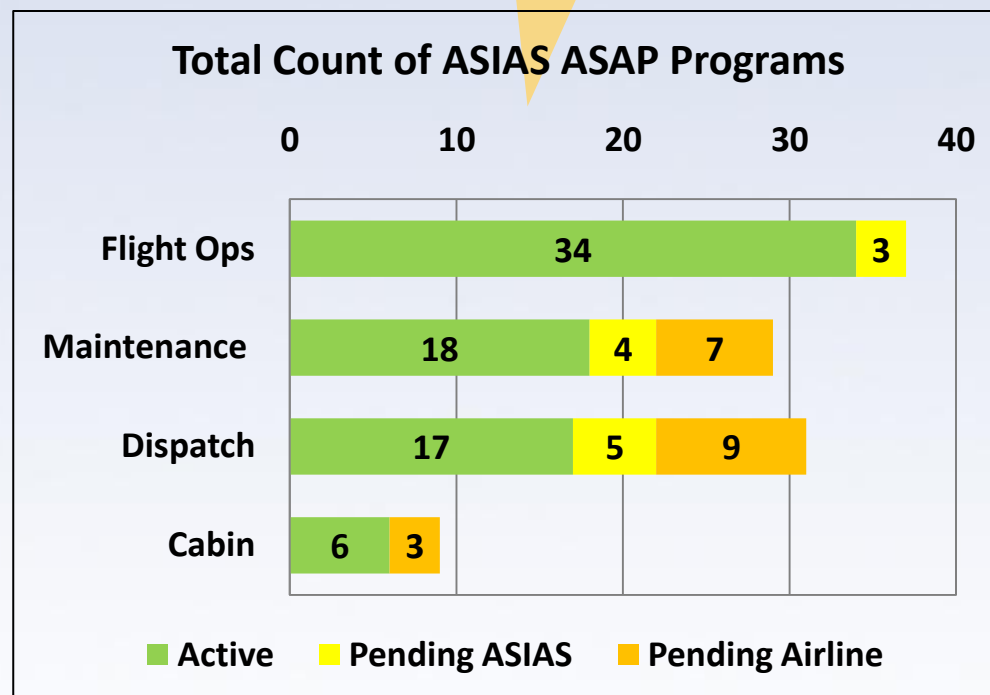
7.7 million operations  
available for analysis

### Key

- Activated
- Pending ASIAs action
- Pending airline action

83,000 ASAP & 30,000 ATSAP  
reports available for analysis

## ASAP



As of 7 April 2011

# ASIAS Members

## 38 Airlines

Air Wisconsin Airlines  
AirTran Airways  
Alaska Airlines  
American Airlines  
American Eagle  
Atlantic Southeast Airlines  
Chautauqua Airlines  
CitationAir  
Colgan Air  
Comair  
CommutAir  
Compass Airlines  
Continental Airlines  
Delta Airlines  
Empire Airlines  
ExpressJet  
Frontier Airlines  
GoJet Airlines  
Gulfstream International

Hawaiian Airlines  
JetBlue Airways  
Mesa Airlines  
Mesaba Airlines  
Miami Air International  
Piedmont Airlines  
Pinnacle Airlines  
PSA Airlines  
Republic Airlines  
Shuttle America  
SkyWest Airlines  
Southwest Airlines  
Sun Country Airlines  
Trans States Airlines  
United Airlines  
United Parcel Service  
US Airways  
USA 3000  
Spirit Airlines

## Government

FAA  
NASA  
USAF Safety Center

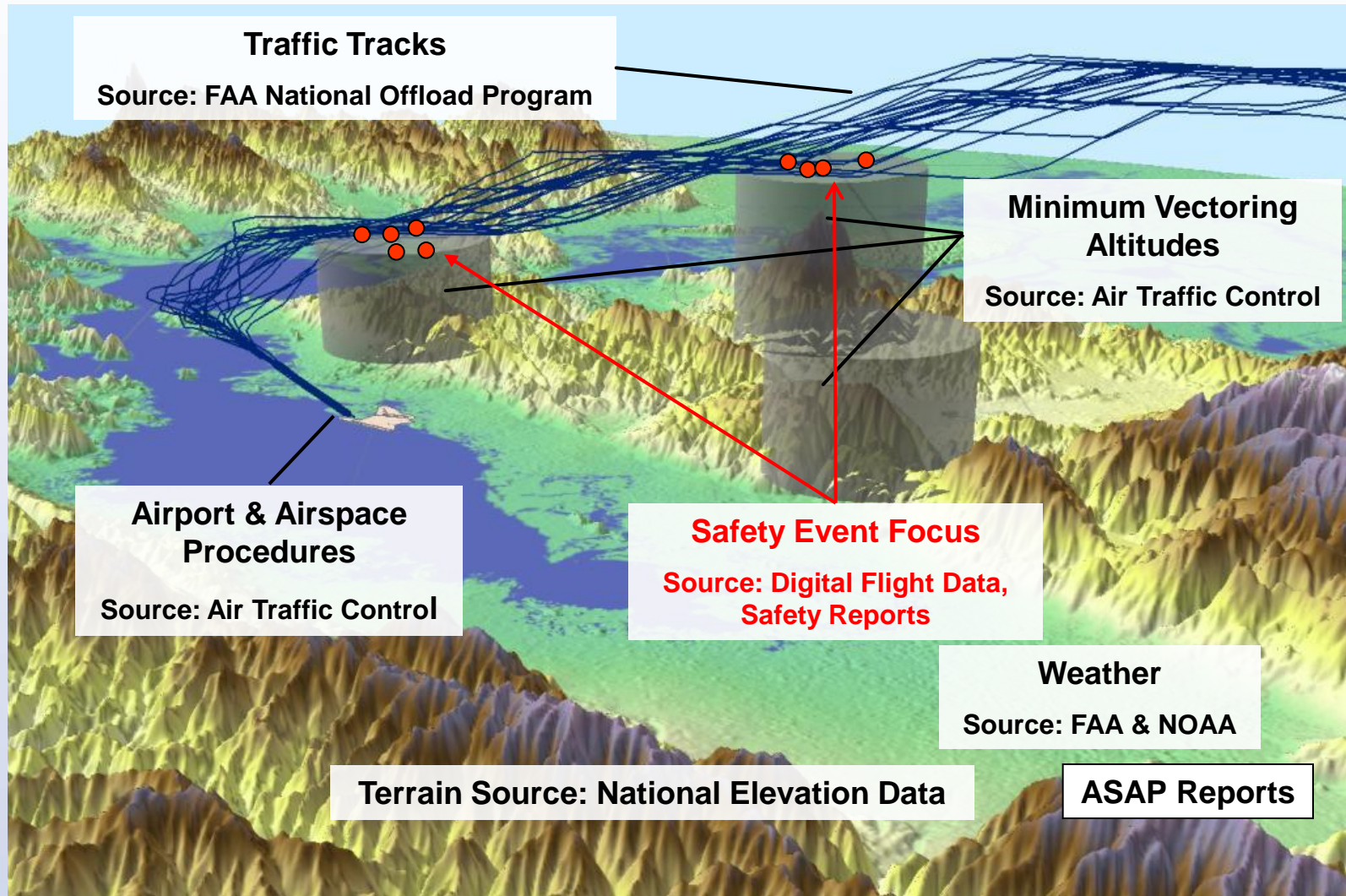
## Industry

AIA  
ALPA  
APA  
ATA  
Bell Helicopter Textron  
Boeing  
NATCA

As of 7 April 2011



# Data Fusion Provides Valuable Insights to Future Threats (Precursors)



The success of information sharing relies on collaboration between voluntary safety programs.



## Unstable Approach Criteria - Severity Levels 1000 to 500 ft HAT and 500 to 50 ft HAT:

*****		
Category	Criteria	Threshold
ILS	1. Above Glideslope	> 1 dot high for 5 sec
	2. Below Glideslope	> 1 dot low for 5 sec
	3. Localizer Deviation	> 1 dot left/right for 5 sec
Airspeed	4. High Speed	> (Vref + 20 kts) for 3 sec
	5. Low Speed	< Vref for 3 sec
ROD	6. High Descent Rate	> 1000 ft/min for 3 sec
Thrust	7. Low Thrust Descent	N1 < 35% for 5 sec; N1 < 5 <sup>th</sup> Percentile by Fleet Type
Configuration	8. Late Flap Extension	Any flap movement > 2 degrees
	9. Late Gear Extension	Any gear movement
	10. Speed Brakes Deployed	Any deployment of speed brakes
Attitude	11. Unstable Pitch	Abs( Pitch ) > 15 degrees for 3 sec; StDev( Pitch Rate ) > 1.25
	12. Unstable Roll	Roll > 40 degrees for 3 sec; StDev( Roll Rate ) > 3.5
	13. Unstable Yaw	StDev( Yaw Rate ) > 1.25
GPWS	14. GPWS Alert	Any GPWS Alert





This dashboard shows the rate of unstable approaches by airport.

The Event Type dropdown lets the user select between the unstable approach events to view.

The Severity Level dropdown lets the user select different altitude bands to view the unstable approach results by.

The user can show only CONUS, non-CONUS, or both airports on the display.

A filter on the minimum number of flights at a landing airport allows the user to remove airports with fewer than the specified number of flights.

**NOTE: THESE RESULTS ARE BASED  
ON NOTIONAL DATA TO ILLUSTRATE  
FUNCTIONALITY.**

#### Event Type

Unstable Approach Exceeding 3 Criteria

#### Severity Level

500 to 50 ft HAT

#### Go-Around

(All)

#### Min. Landing Airport Flight Count

1000

#### Airport Location

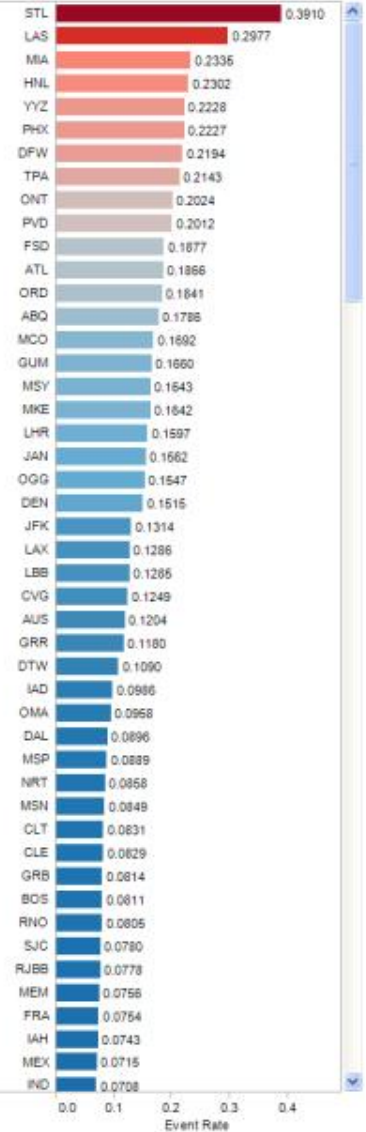
- ☒ (All)
- ☒ CONUS
- ☒ Non-CONUS

#### Airport Map



Event Rate  
0.0005 0.3910

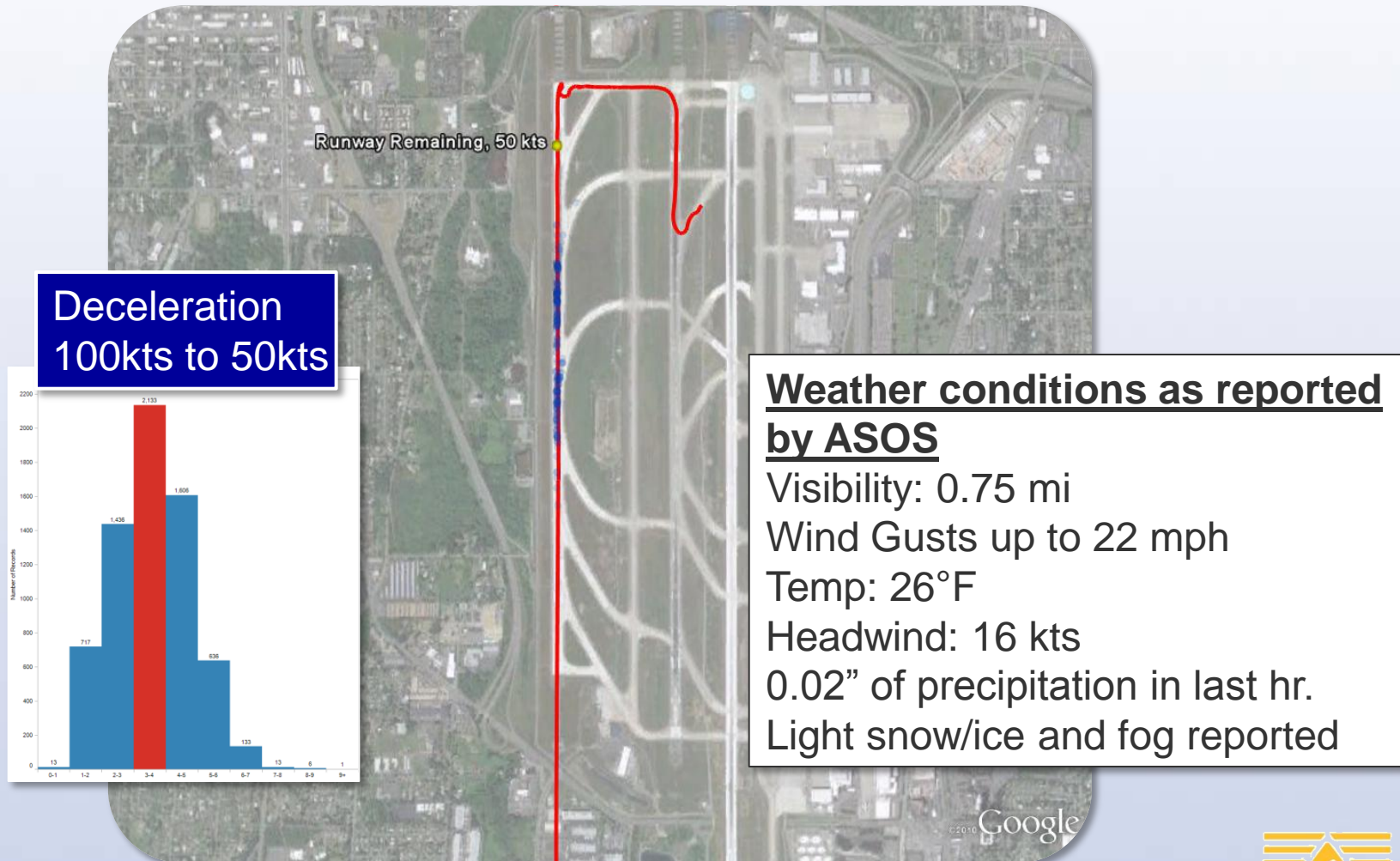
#### Airport List





# Risk of Runway Overrun (RoRO) Metrics, r50

Notional  
Data



# Threaded Track Example Continued

Notional  
Data

25 knots  
232'  
remaining

50 knot Point  
901' remaining



# Follow on ASIAS Activity

- Complete Unstabilized approach study detailed “drill down”
- Complete Abnormal Runway Contact (ARC) study
- Complete Risk of Runway Overrun study
- Evaluate linkages between these three studies
- Monitor Effectiveness of solutions



