We are Enjoying the Safest Period in Aviation History

Fatal Accidents (Per 100,000 departures)

11 million

7 million

0.11 per 100,000 departures


Departures (Millions)

0 0.02 0.04 0.06 0.08 0.1 0.12

Fatal Accidents (Per 100,000 departures)
Forensic Analyses Have Resulted in Solutions

Safety Enhancements

Training & Guidance

Reactive Wind Shear Systems

Predictive Wind Shear Systems

Wind Shear Accidents

- 727 Denver 8/7/75
- DC-9 Philadelphia 6/23/76
- 727 Doha 3/14/79
- New Orleans 7/9/82
- L1011 Dallas-ft. Worth 8/2/85
- DC-9 Charlotte 7/2/94
- DC-10 Faro 12/21/92

Example: Reduction in accidents due to wind shear
Accidents are Occurring Fewer and Farther in Between – a Good Thing!

- AAL, Cali
- ValueJet, Everglades
- Delta, Pensacola
- TWA, New York

But… We Need to do Better!
How Can We Improve Upon this Safety Record?

Source: Commercial Aviation Safety Team (CAST)
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 Data Management Objectives

- Share aviation safety data with data providers
- Acquire and process data quickly
- Protect data
- Use data to identify systemic safety issues
- Support objectives of safety initiatives
  - Commercial Aviation Safety Team (CAST)
  - International Helicopter Safety Team (IHST)
  - Others
Benefits of ASIAS

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

- **Evaluate Interventions**
  - Assess the probable effects of safety enhancements through simulation studies

- **Monitor Intervention Effects**
  - Assess the effectiveness of safety enhancements (SEs) in accordance with metrics established by various safety initiatives
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
Studies Completed or Underway

<table>
<thead>
<tr>
<th>Directed Studies</th>
<th>Runway Safety</th>
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<tr>
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<td>Terrain Awareness Warning System Study</td>
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<td>TCAS Resolution Advisories</td>
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<th>Current Safety Metrics Categories for CAST</th>
<th>Approach and Landing Risk Reduction</th>
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<td>Loss of Control</td>
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<td>Maintenance</td>
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<th>Initial Industry Benchmarks</th>
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<td>Airline Stability Metric</td>
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<td>TCAS Resolution Advisories</td>
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Aviation Safety Information Analysis and Sharing (ASIAS) Concept

Combining isolated data sources enable new insights to potential safety issues.

Derived Safety Metrics  Simulated Procedures  Observed Aircraft Tracks

Airspace and Airport Designs  Archived Weather  Integrated Performance Reports
Data Sources Supporting the Studies

**De-Identified FOQA Data**
- De-Identified ASAP Data

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

**Other Information**
- Bureau of Transportation Statistics
- Weather / Winds
- Manufacturer Data
- Avionics Data
- Worldwide Accident Data
# ASIAS Aggregates Proprietary Airline Safety Data for Systemic Analysis

**ASAP: Aviation Safety Action Program**

**FOQA: Flight Operations Quality Assurance**

## ASAP

**Event Types:** GPWS warning

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Aircraft</th>
<th>Location</th>
<th>Time</th>
<th>Altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPWS</td>
<td>2007</td>
<td>B737</td>
<td>JFK</td>
<td>100</td>
<td>30,000</td>
</tr>
</tbody>
</table>

**Description:**
- The approach was too high and the GPWS activated.
- The crew did not follow the recommended procedure.
- The aircraft was not able to land.

**Source:** Sagem, Inc

## FOQA

**Knots Over Vapp (500')**

- **Number of Flights**
- **Knots above Vapp at 500 feet**

![Graph showing knot distribution](source: Sagem, Inc)

**Recommended Changes:**
- **AVC Familiarity**
  - Type: Knots Above Vapp
  - AVC Control

**Event Types:**
- GPWS warning
- **Knots above Vapp**
- **Knots over Vapp (500')**

**Summary:**
- The crew did not follow the recommended procedure.
- The aircraft was not able to land.

**Source:** Sagem, Inc
Agreements are in Place Between MITRE and all Major Air Carriers
75% of 2008 NAS Operations are Covered by Current ASIAS Participants

21 ASIAS airlines with signed MOUs as of July 2008
Examples
ASAP Reports Provide Contributing Factors: Confusing Hold Short Lines With Multiple Runways

- Example with 3 closely-spaced runway ends and numerous hold short lines (highlighted)

*Image from Google Earth*
FOQA Data Provides Insight About Flights: Unstable Approaches
Aggregate Metrics Can Be Easily Generated and Analyzed
Integrated Data Enables a Shared Vision

- Traffic Alert and Collision Avoidance System (TCAS)
  Location and density maps
  - Reflects location at onset of TCAS Resolution Advisories (RAs)
  - Based on query of 2,261,922 FOQA flights
Data Fusion Provides Valuable Insights

- Traffic Tracks
  Source: FAA National Offload Program

- Minimum Vectoring Altitudes
  Source: Air Traffic Control

- Airport & Airspace Procedures
  Source: Air Traffic Control

- Safety Event Focus
  Source: Digital Flight Data, Safety Reports

- Weather
  Source: FAA & NOAA

- Terrain Source: National Elevation Data
ASIAS is Governed by Formal Principles

- Endorsement of voluntary submission of safety-sensitive data
- Procedures & policies established through collaborative governance
- Analyses approved by an ASIAS Executive Board
- Transparency – knowledge of how data are used
- Carrier/OEM/MRO data are de-identified
- Data used solely for advancement of safety
ASIAS Executive Board (AEB)
- Consists of two Co-Chairs (AVS & Industry)
- Representative of key stakeholders
- Consensus-based decision making
AEB – Roles & Responsibilities

- Guidance and Oversight of ASIAS program
  - Implementation of the working agreement for stakeholders
  - Provide strategic direction
  - Prioritization of ASIAS group activities
  - Focal point of product dissemination to appropriate stakeholders
  - Review and modify process as needed

- Primary interface between ASIAS analysts and stakeholders

- Coordinate analytical efforts among industry/government entities (e.g. EASA, CAA, etc)

- AEB to forward all analytical products to appropriate safety teams for in-depth analysis
ASIAS Executive Board Membership

Don Gunther (Industry Co-Chair)
Peggy Gilligan (Government Co-Chair)
Jay Pardee/Paul Russell (JIMDAT Co-Chairs)

- Government members:
  - John Allen, Director, Flight Standards Service, AFS-1
  - Dorenda Baker, Director, Aircraft Certification Service, AIR-1
  - Joseph Teixeira, Director, Safety Programs, Air Traffic Organization
  - Amy Pritchett, Director, NASA Aviation Safety Program

- Industry members:
  - Basil Barimo, Vice President, Operations, ATA
  - Rory Kay, Executive Air Safety Chairman, ALPA
  - Corky Townsend, Director Aviation Safety, Boeing Commercial Airplanes
  - Bob Young, Assistant Vice President of Civil Aviation, AIA
Summary

- We are in the midst of the **safest period** in aviation history
- Major causes of accidents have been addressed through forensic analysis – our task now is monitor hundreds of databases to assess aviation safety
- ASIAS provides for:
  - A *national aggregation* and analysis of individual airline safety data
  - *Integration* with other available data for improved contextual picture
  - Achieving a *predictive and prognostic ability* to identify risks and issues *before accidents and incidents occur*

Benefits all sectors of the aviation community
Additional Information

- FAA ASIAS Points of Contact:
  - Mike Basehore (FAA) - Mike.Basehore@faa.gov
  - Warren Randolph (FAA) – Warren.Randolph@faa.gov

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