Aviation Safety Information Analysis and Sharing (ASIAS)

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Agenda

- Aviation Safety Information Analysis & Sharing (ASIAS) overview
- ASIAS products
- Fusion
- InfoShare
- Governance
- Protections
- Conclusion

Improving Aviation Safety

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 is Governed by Formal Principles

Data used solely for advancement of safety

Endorsement of voluntary submission of safety-sensitive data

Carrier/OEM/MRO data are de-identified

Transparency – knowledge of how data are used

Procedures & policies established through collaborative governance

Analyses approved by an ASIAS Executive Board

ASIAS Members

45 Air Carriers

ABX Air
Aerodynamics, Inc.
Air Transport Intl.
Air Wisconsin Airlines
Alaska Airlines
Allegiant Air
Aloha Air Cargo
American Airlines
Atlas Air
Cape Air
CommutAir
Compass Airlines
Delta Air Lines
Empire Airlines
Endeavor Air
Envoy Air
ExpressJet
FedEx Express
Frontier Airlines
GoJet Airlines
Hawaiian Airlines
Horizon Air
JetBlue Airways
Kalitta Air
Mesa Airlines
Miami Air Intl.
Mountain Air Cargo
National Airlines
Northern Air Cargo
Omni Air Intl.
Piedmont Airlines
Polar Air Cargo
PSA Airlines
Republic Airlines
Shuttle America
Silver Airways
SkyWest Airlines
Southern Air
Southwest Airlines
Spirit Airlines
Sun Country Airlines
Trans States Airlines
United Airlines
United Parcel Service
Virgin America

2 Maintenance, Repair and Overhaul

AAR Aircraft Services
HAECO Americas

5 Government

AMC—Air Mobility Command
FAA
NASA
Naval Air Force Atlantic
USAF Safety Center

18 General Aviation

1 Academia

University of North Dakota

11 Industry

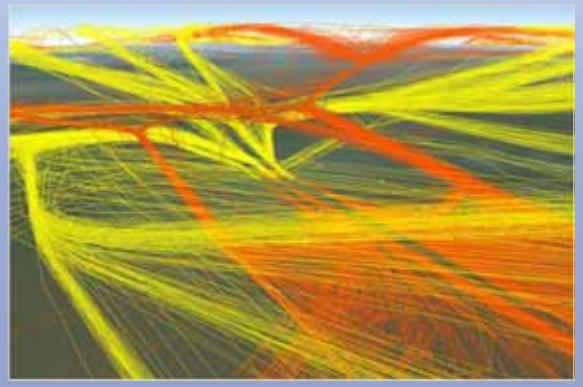
A4A—Airlines for America
AIA—Aerospace Industries Association
Airbus
ALPA—Air Line Pilots Association
APA—Allied Pilots Association representing Coalition of Airline Pilots Associations (CAPA)
Boeing
NACA—National Air Carrier Association
NATCA—National Air Traffic Controllers Association
RAA—Regional Airline Association
SAPA—SkyWest Airlines Pilot Association
SWAPA—Southwest Airlines Pilots' Association

Example Aviation Datasets

Airline Safety Reports

Aircraft Data

ATC Safety Reports



Radar

Weather

Infrastructure

Image Source:http://www.af.mil/shared/media/photodb/web/110427-F-BO262-911.jpg
Controller Image Source: http://www.faa.gov/air_traffic/technology/atop/atop_photos/

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Data Sources Supporting ASIAS Sharing and Analysis

De-Identified FOQA Data

11,165,000 FOQA Flights

De-Identified ASAP and ATSAP Data

ASAP Flight Ops
134,100 reports
ATSAP
60,900 reports

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

- **75,000,000 records**

Other Information

- Bureau of Transportation Statistics
- Weather / Winds
- Manufacturer Data
- Avionics Data
- Worldwide Accident Data

ASIAS Products

Directed Studies

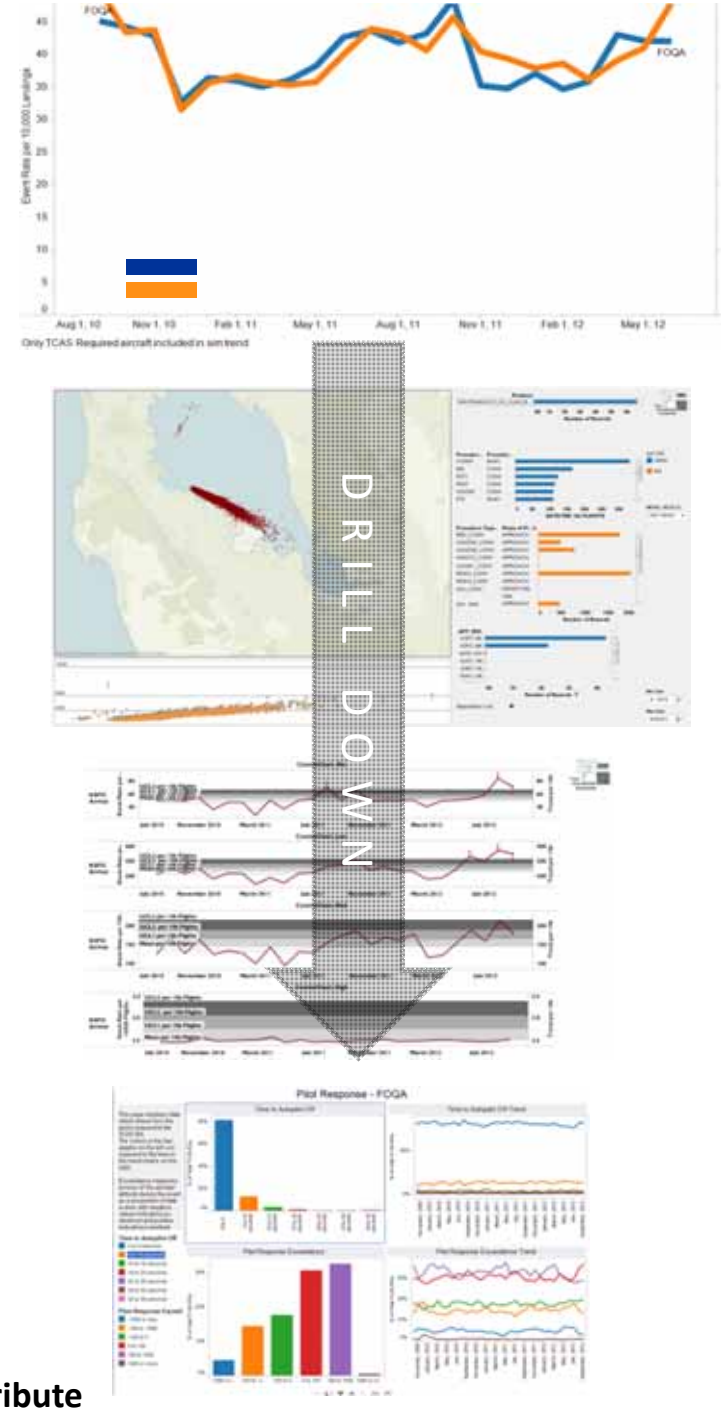
Vulnerability Discovery

Safety Enhancement Assessment

Benchmarks

CAST Metric Monitoring Strategy

1. Overall 3 year trend of TCAS-RAs
2. Geographic distribution and trend of TCAS-RAs)
3. Identify airports that are trending up
4. Utilize additional data sources to achieve additional insight & causal analysis capability
5. Characterize by severity
6. Monitor effectiveness of crew response



ASIAS FOQA Dataset Enables Trend Analysis of Common Events and Detection of Rare Events

Size and Breadth of FOQA Dataset Enables:

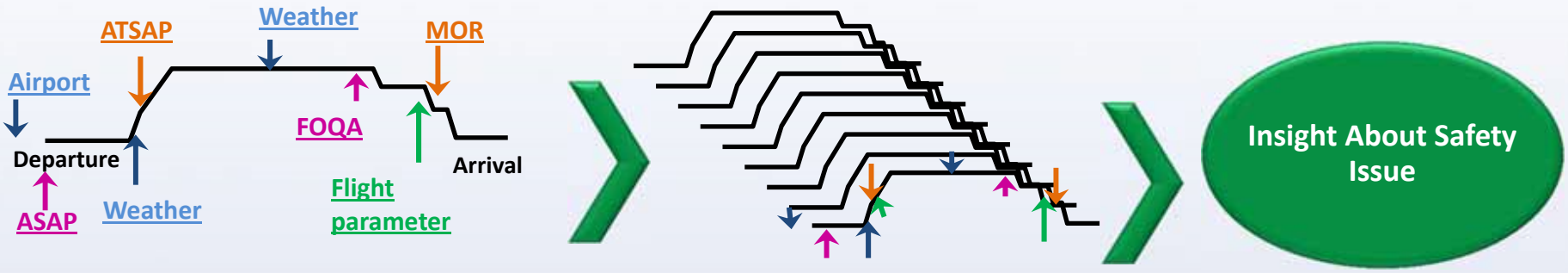
- **Quarterly Airline Benchmarking**
  - **Airline can compare its performance to rest of industry**
- **Monitoring Airport Rate Trends, by airport and month, for common events, such as unstable approach**
- **Detection of complex, rare safety events**
  - **Can reliably detect* very rare events, with underlying rates as low as 1 in 4.5 million**

*** detecting is the ability (with a probability of 95%) to observe at least one well-defined FOQA event, such as an overbank or near-Loss of Control**

Rare Event Detection Example– Loss of Airplane State Awareness

- Loss of Airplane State Awareness remains a primary contributor to commercial airplane accidents worldwide, but there are few accidents in the United States
- ASIAS FOQA data enabled detection of Loss of Airplane State Awareness precursor events in the US Commercial fleet, despite lack of accidents
- "Airplane state" defined by two main categories:
  - Attitude (roll and pitch angles and rates)
  - Energy (airspeed, vertical speed, altitude, power setting, and configuration)

Secure Fusion in ASIAS Provides Enhanced Insight About Safety Issues



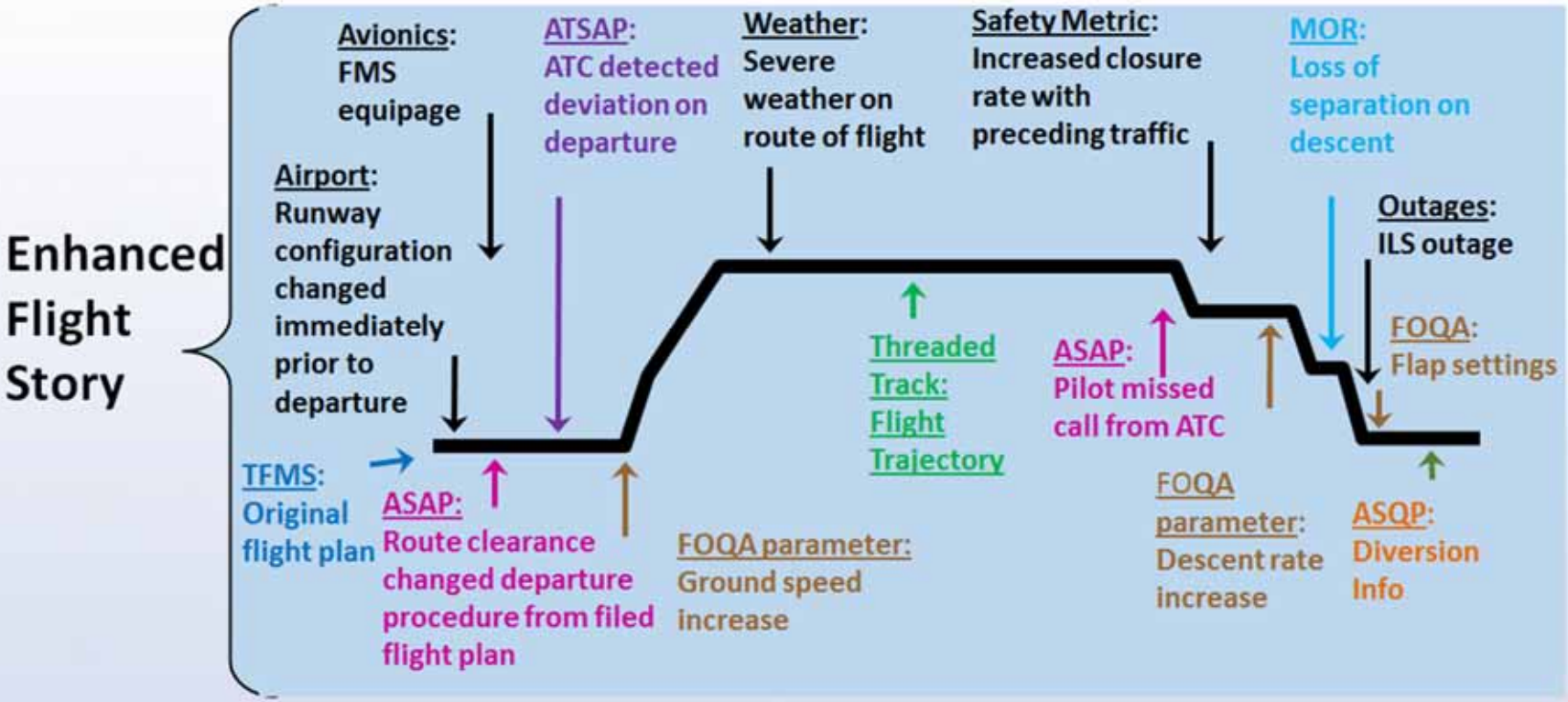
Multiple data sources can be securely fused at the flight

ASIAS aggregates across all de-identified flights

Fusion provides more insight into safety issues.

Integration of NAS-wide data sources provides a complete or 360° perspective of a targeted safety issue, enabling deeper understanding of systemic precursors.

Enhanced ASIAS Fusion Flight Story



Enhanced ASIAS Fusion Flight Story extends basic flight information to support a more complete set of information on factors associated with a flight.

InfoShare

- **Plenary Session**
  - 900-1000 registered participants
- **Domain Specific Tracks**
  - Flight OPS, Maintenance, Dispatch, Cabin, Ground Ops
- **Best Practices, Leadership sessions**
  - Directors of Operations/Chief Pilots/Directors of Safety
  - Directors of Maintenance/Chief Inspectors/Directors of Safety
- **Over a 100 safety topics and best practices**
- **Informs CAST & ASIAS of safety issues**
  - ASIAS leverages InfoShare to identify systemic risks
  - CAST leverages InfoShare to inform its safety risk portfolio

Critical Elements of a Successful Voluntary Safety Information Program

- Establish trust and build confidence
- Associate unions closely in the process
- Clear purpose – dedicated to safety, non-punitive
- Agreements documented in "Governance"
- Transparent and collaborative
- Act on the results! Demonstrate value

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Governance

- **Procedures & Operations (P&O) Plan**
  - Governs purpose, use and protection of data
  - FAA and Industry signatories
- **Memorandum of Understanding (MOU) between airlines and MITRE**
  - Defines airline specific data use
- **Operates with consensus approval of ASIAS Executive Board (AEB)**
  - Ensures all parties operate in accordance with P & O plan
  - FAA funded program, but Joint Industry/FAA decision making

Protections

- **14 CFR Part 193 Protection**
  - Protects data from Freedom of Information Act (FOIA)
  - Protection of voluntarily supplied data
  - FAA Orders provided addition protections for FOQA/ASAP
- **MITRE exempt from FOIA**
  - Federally Funded Research & Development entity
- **FAA re-authorization from Congress**
  - Protection of data in support of SMS program
  - Protection for *ASIAS* studies, metrics and safety analysis
- **CAST Part 193**
  - Information provided to CAST is protected by CAST's own Part 193 protection

Moving Forward

- History shows focused, data driven initiatives and cooperation have led to accident risk reductions
- Joint industry and government teams working together can further enhance the safety of our aviation system through the use of proactive safety data/information
- We have to embrace and encourage a culture of continuous improvement. We have to use innovation and new technology to identify and address risks – and we have to keep making air travel safer.

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