



Identifying Risk

Enhanced Data Analysis & Reporting

Kimberly Pyle
Director, Policy & Performance
FAA Air Traffic Organization
Kimberly.Pyle@faa.gov



**Federal Aviation
Administration**

Organization

- **FAA: UNIQUE STRUCTURE**



REGULATOR

7,300+

U.S. commercial airlines
and air operators

3,300+

Federally-funded airports

867,450+

Active Pilots



AIR TRAFFIC SERVICES PROVIDER

7,000+

Takeoff and landings per hour

660,000,000+

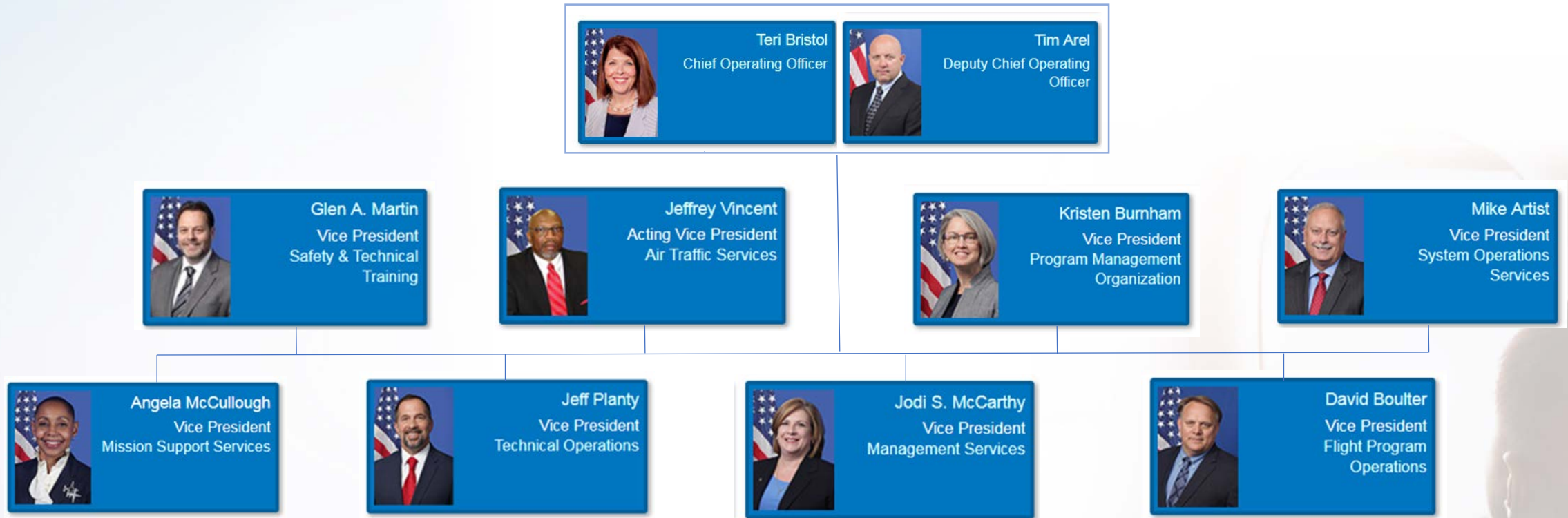
Passengers

37,000,000,000+

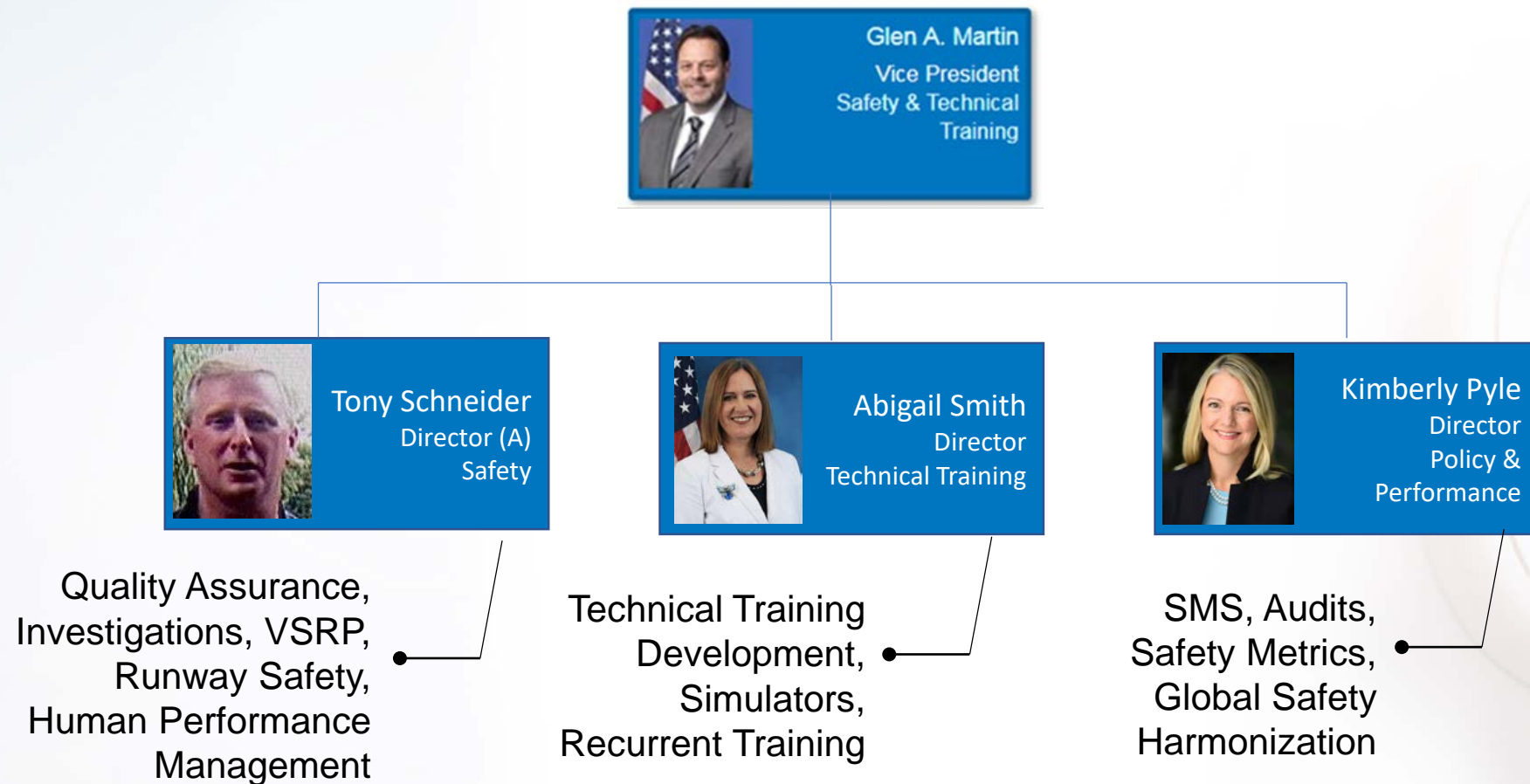
Cargo revenue ton miles of freight/year



Air Traffic Organization



Safety & Technical Training



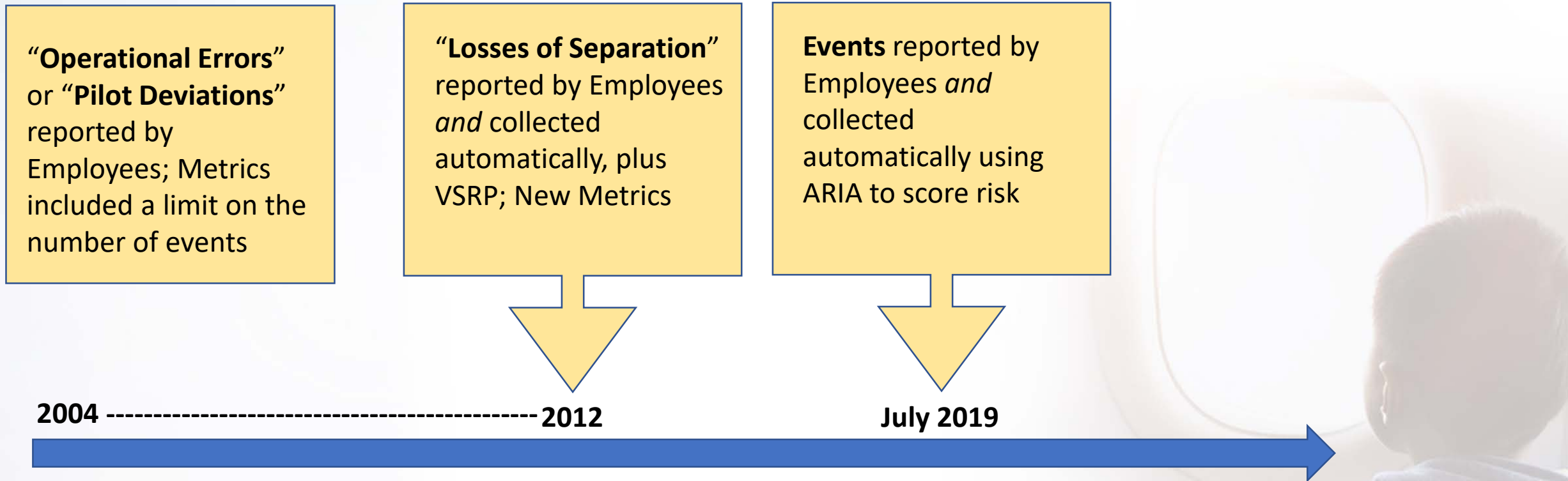
Safety Management System

- Driven by Data

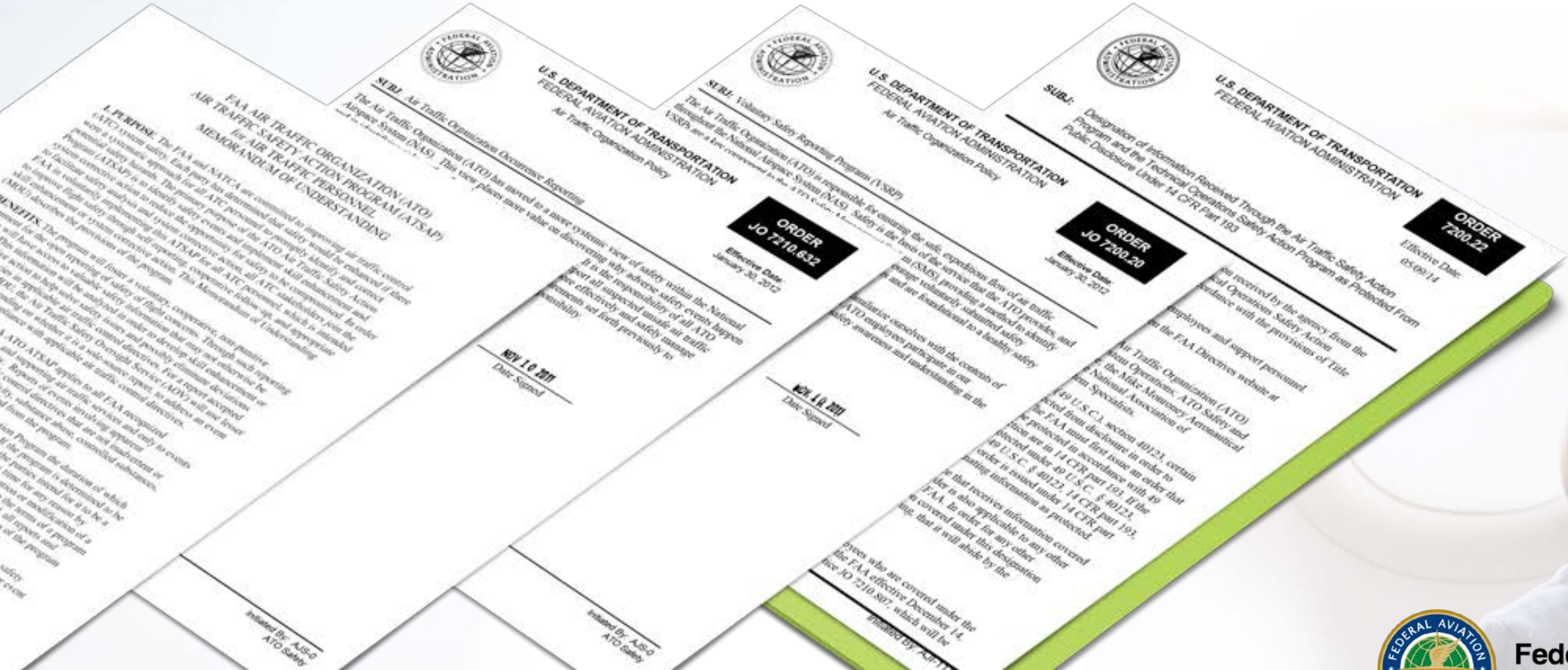


- Gathering Performance Data from Employee Reports *and* Automated Reporting

Evolution of Safety Data Collection



2012 Policy Changes



Voluntary Safety Reporting Introduced



Tech-Ops Safety Action Program
for Technicians



Confidential Information
Sharing Program with Airlines



Air Traffic Safety Action Program
for Air Traffic Controllers

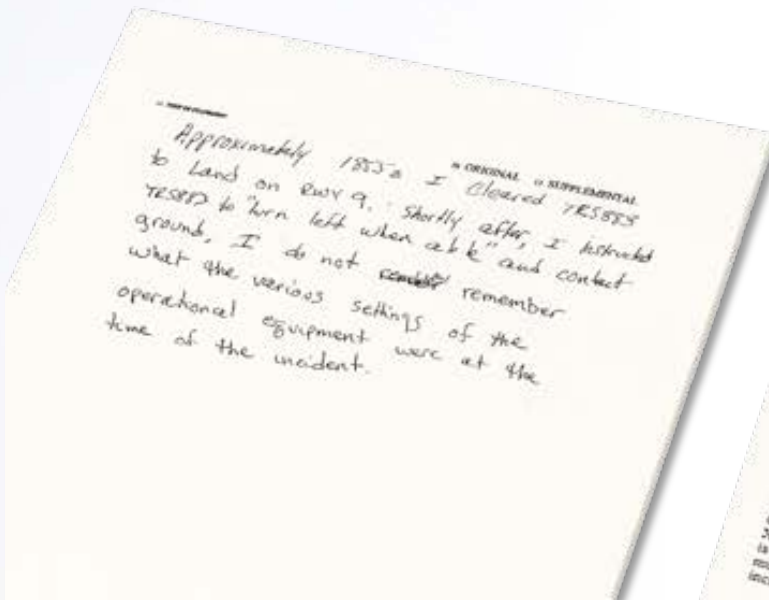
Better Data Through Reporting

BEFORE

- Short
- Vague

AFTER

- Comprehensive
- Detailed



Federal Aviation
Administration

Automated Detection & Reporting

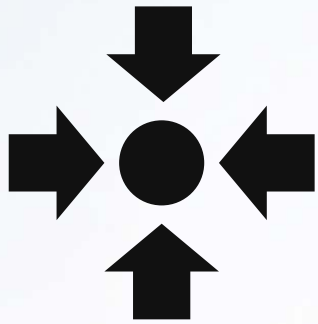
- Augmenting “Mandatory Occurrence Reports” by Employees
- Collected at the National Level
- Gathering significant data on compliance anomalies



Traffic Analysis and Review Program
(TARP) deployed in 2012



How does ATO leverage this technology?



Identify
Potential Loss of
Separation
Events



Review events
where
< 66% separation
maintained



Quality
Assurance Staff
validate all "Risk
Analysis" events



Conduct Risk
Analysis Process

Benefits of the Current System

- Insight into system performance drove procedural changes



Opposite Direction Operations

Converging Runway Operations

What are the Limitations of the Current System?

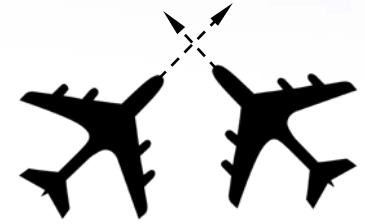
- Compliance does not equal risk
- Only detects one type of event
- Significant human review required
- Difficult to maintain



SFO Wrong Surface Approach Replay



How does Risk-based Safety Assurance Differ from Compliance-based?



Compliance-based Safety Assurance

"Does this violate a rule or regulation?"



Risk-based Safety Assurance

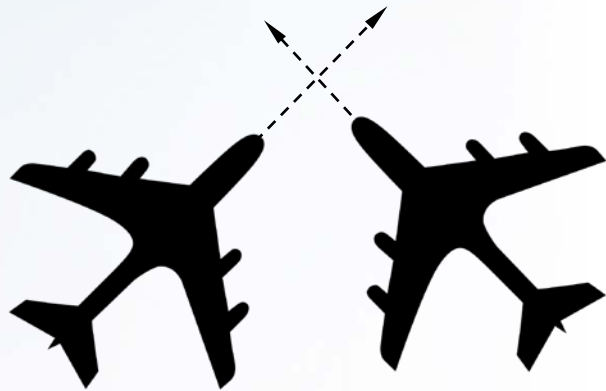
"How much risk is associated with the observed behavior?"



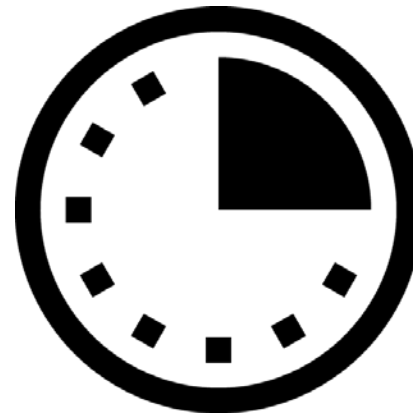
Example: Compliant, High Risk



Principles of a Risk-based Approach to Event Identification



**Find the
Highest Risk
Events**



**Reduce Time
Validating
Events**



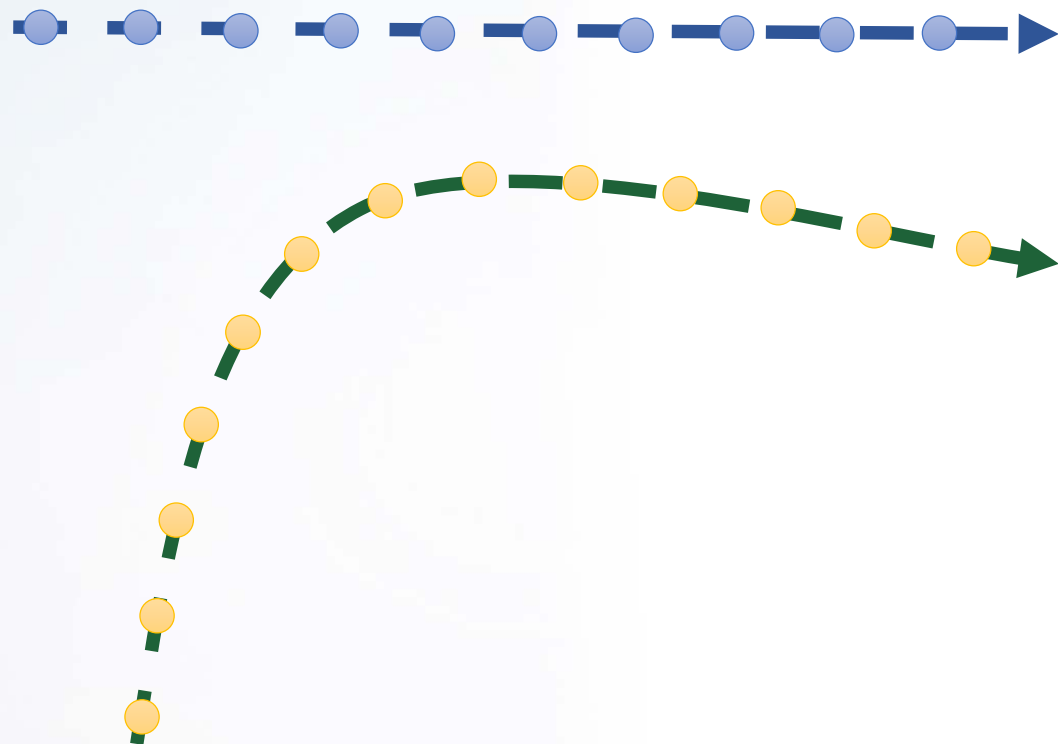
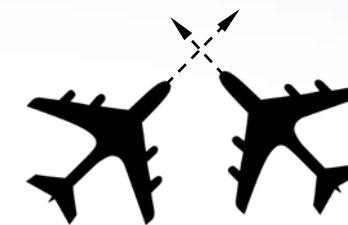
**Increase Risk
Analysis
Events**



Aviation Risk Identification and Assessment



How does ARIA Calculate Risk?

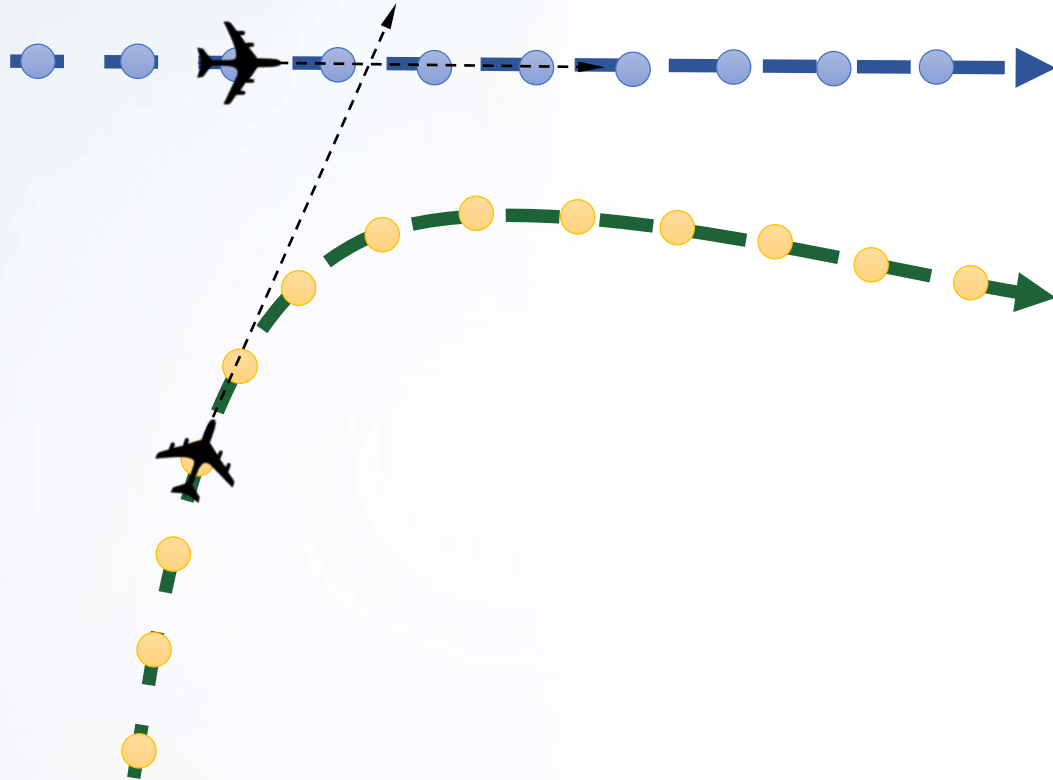
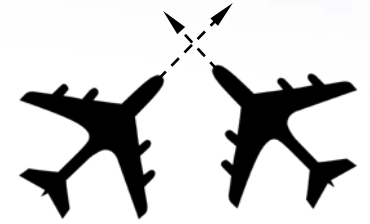


Risk

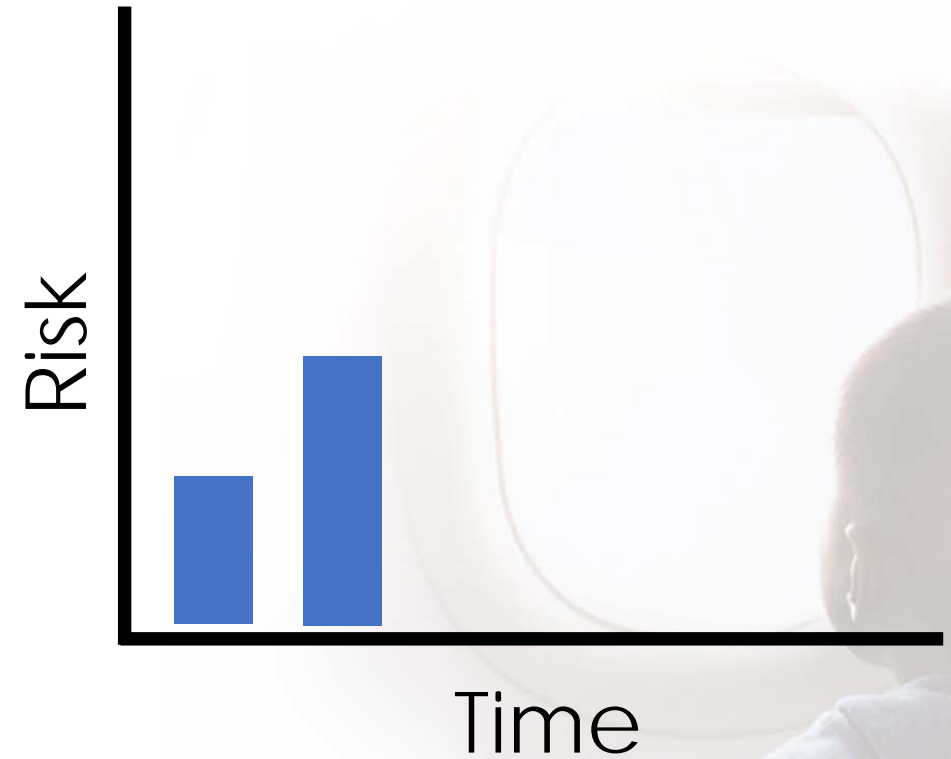
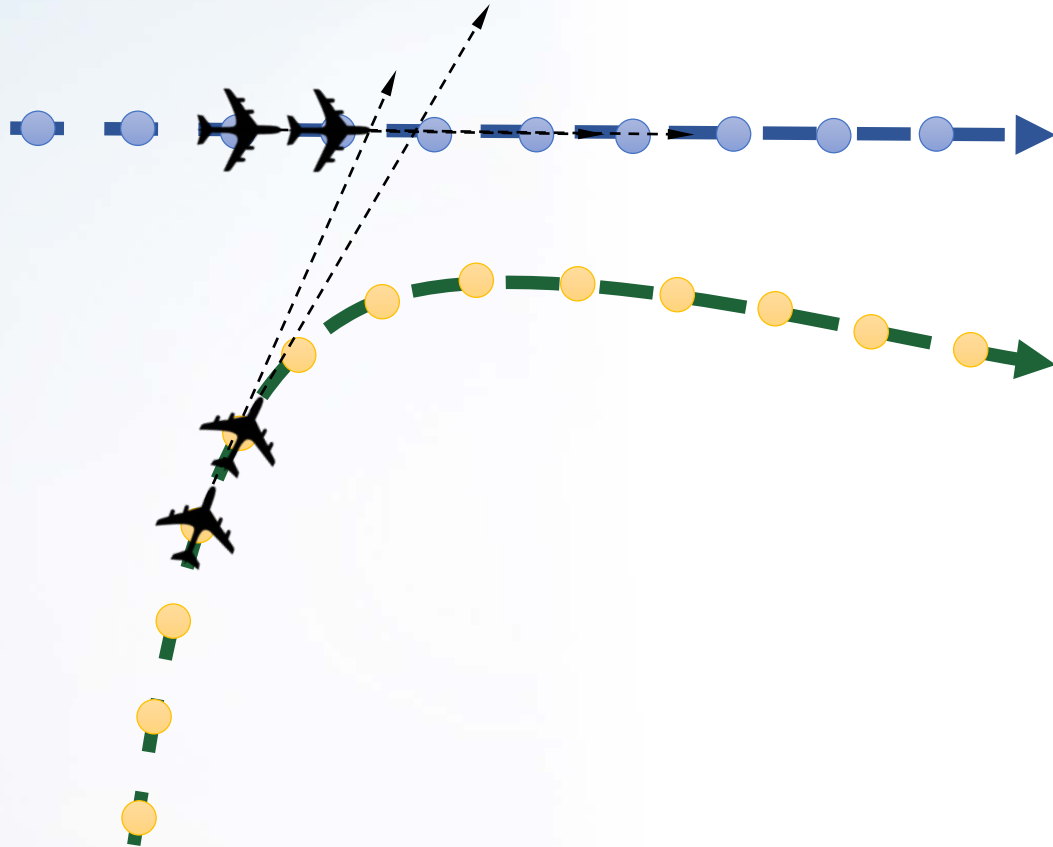
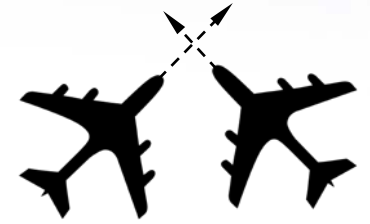
Time



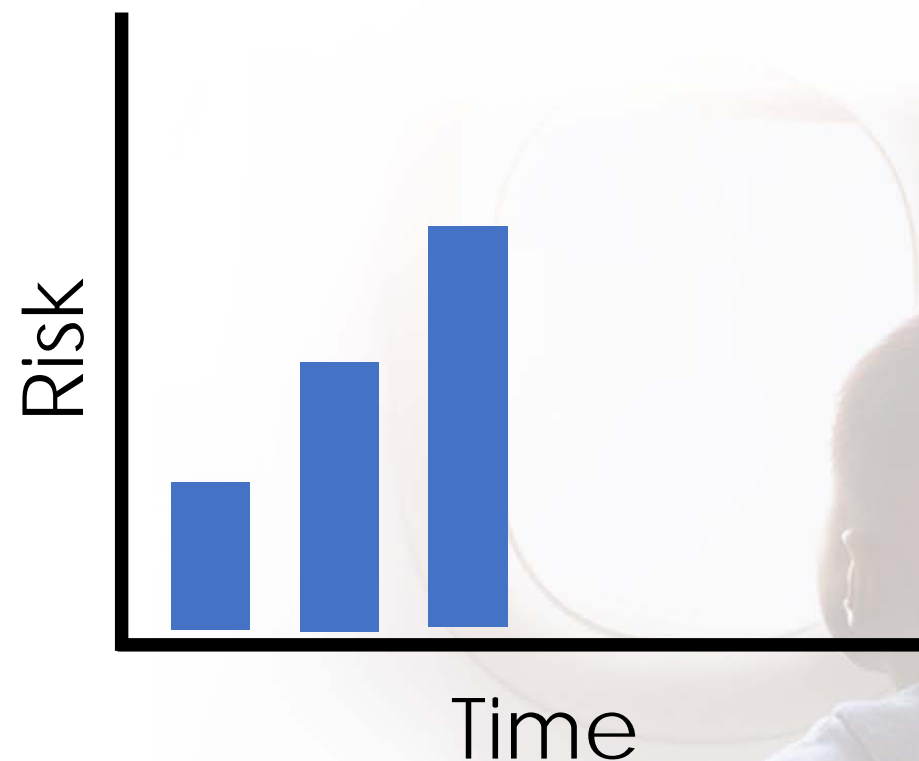
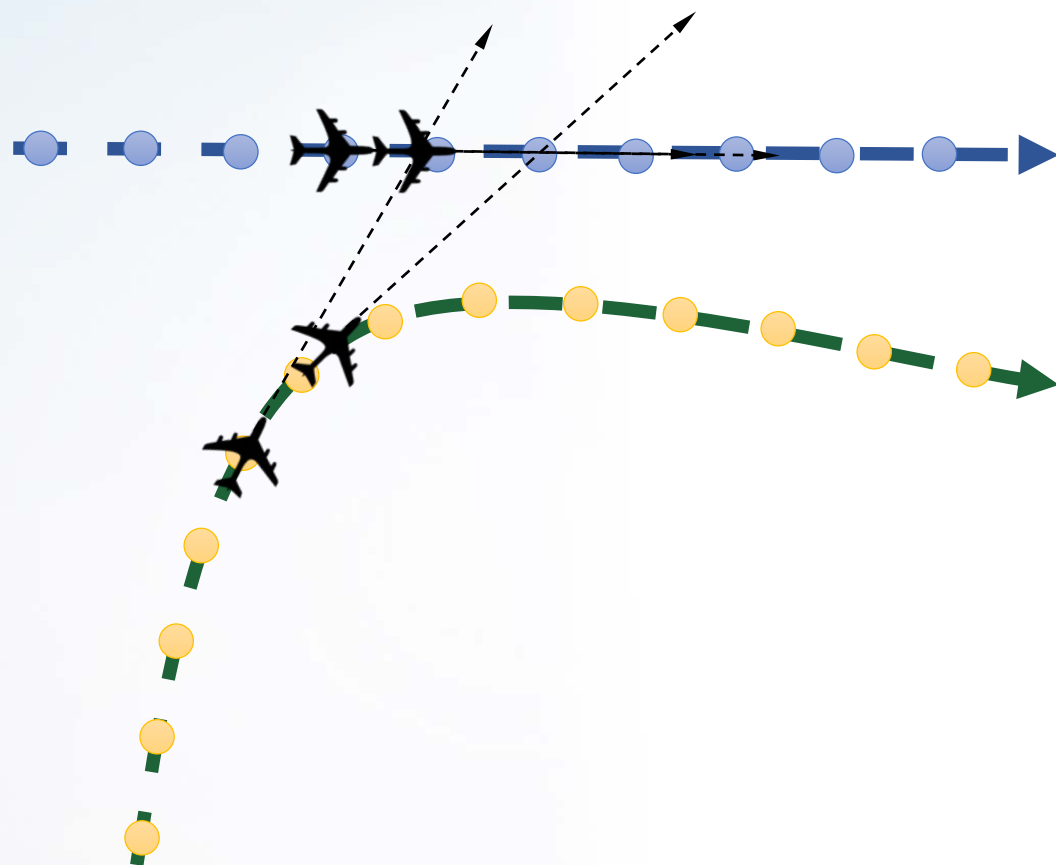
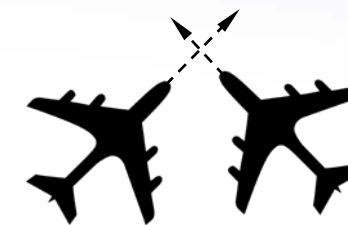
How does ARIA Calculate Risk?



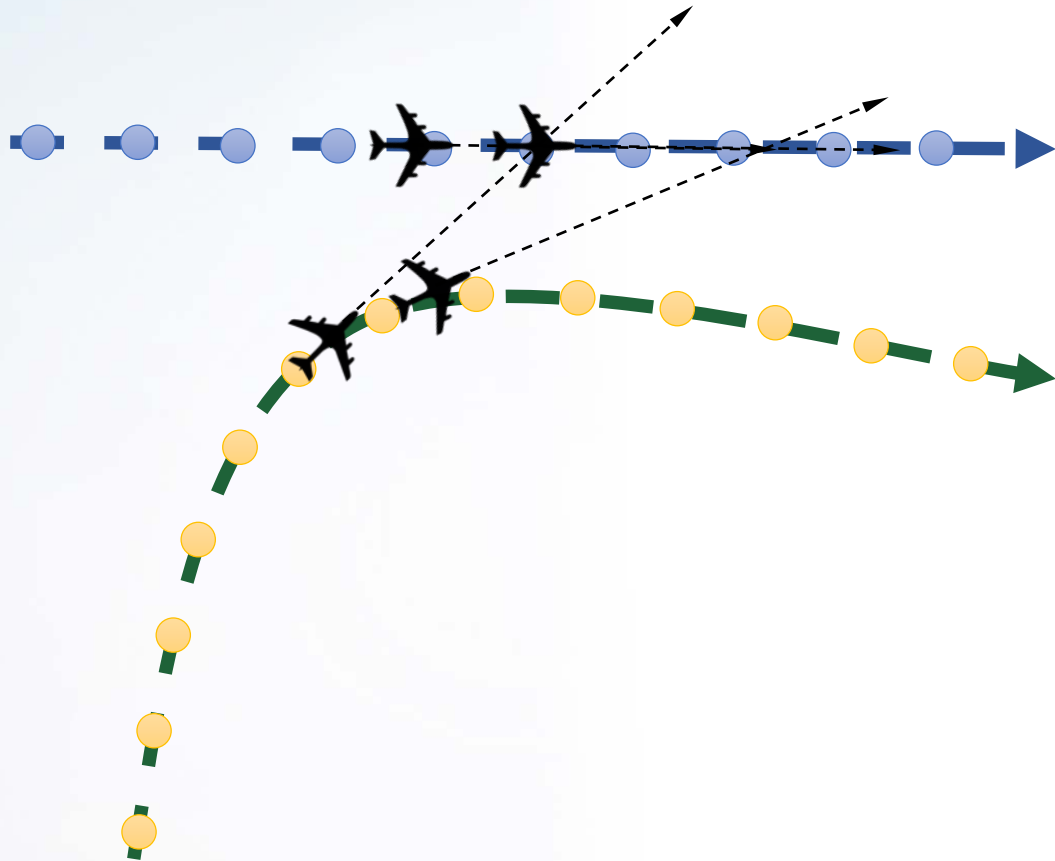
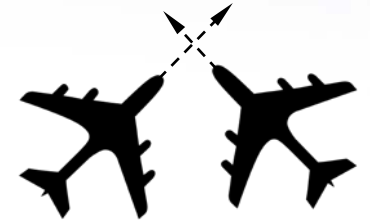
How does ARIA Calculate Risk?



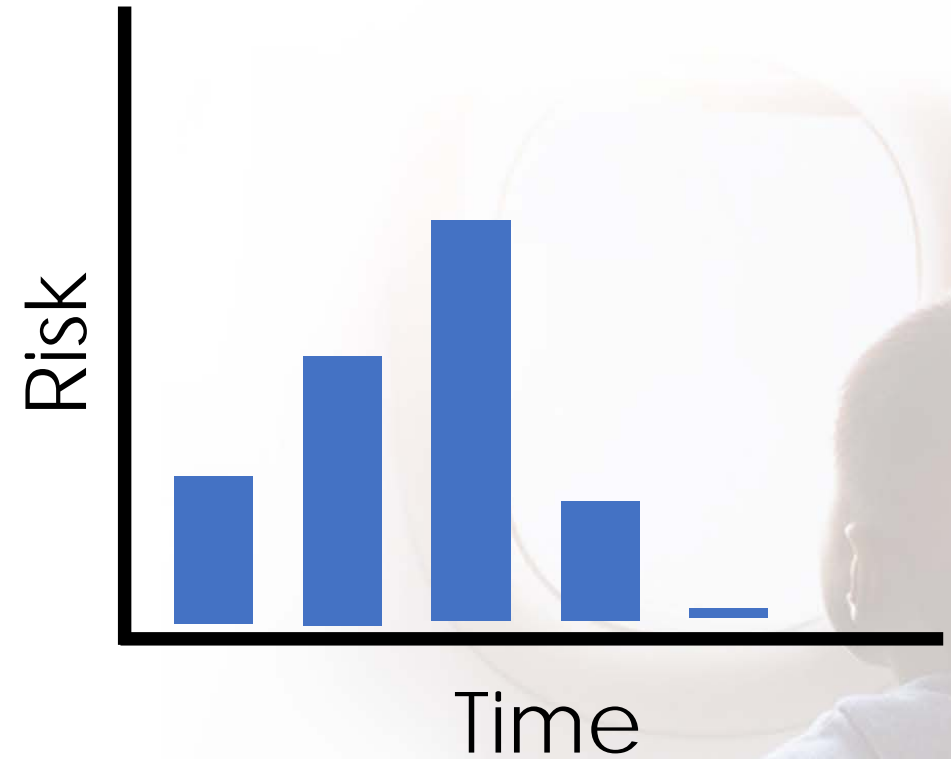
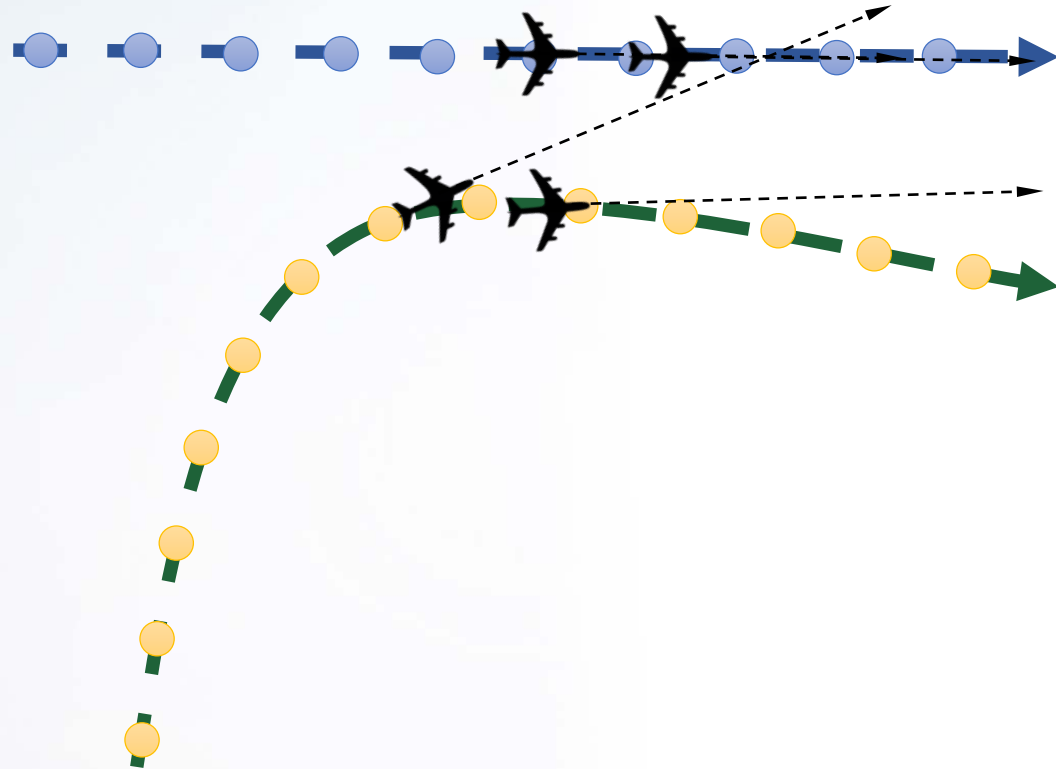
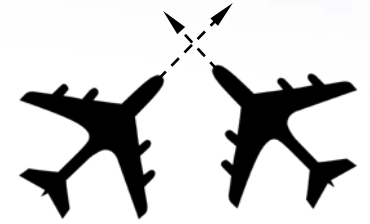
How does ARIA Calculate Risk?



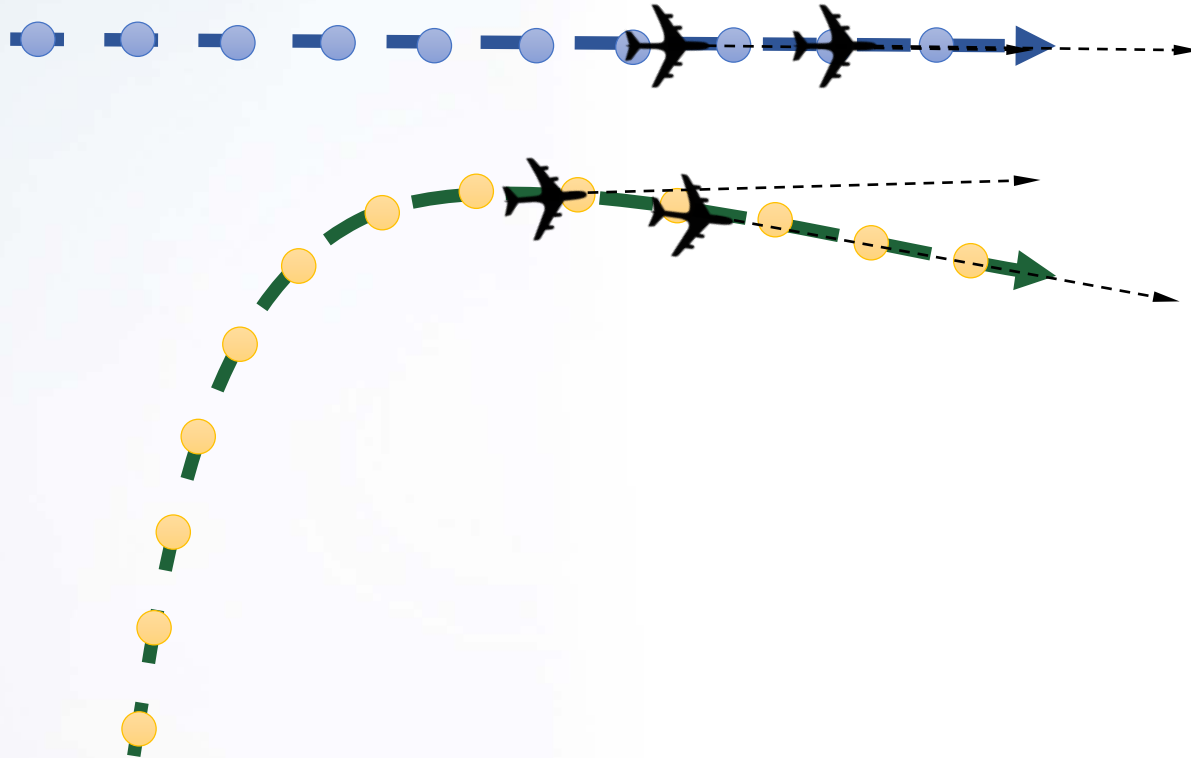
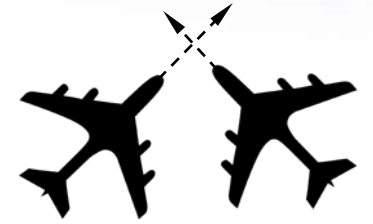
How does ARIA Calculate Risk?



How does ARIA Calculate Risk?



How does ARIA Calculate Risk?



Principles of a Risk-based Approach to Event Identification



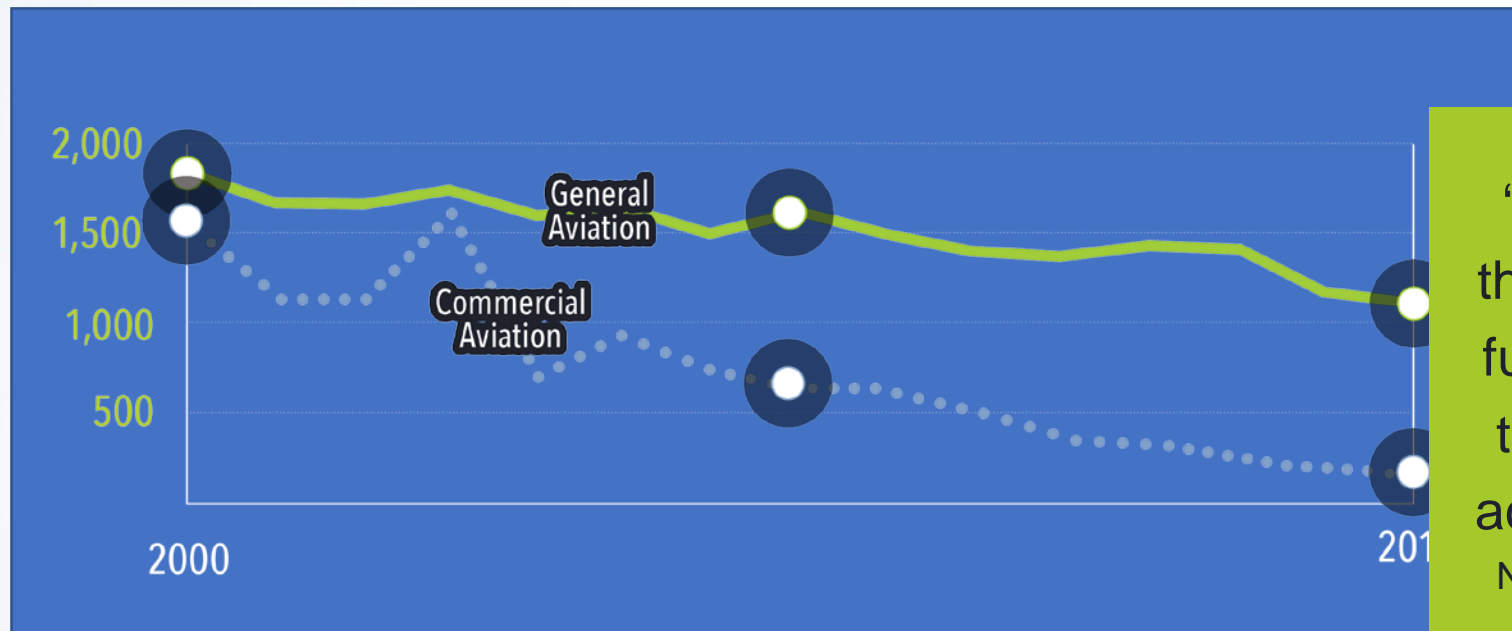
Next Steps

- ARIA is currently integrated into FAA Quality Assurance processes
- ATO plans to use ARIA to identify airborne events beginning July 2019
- Surface version of ARIA is currently going through V&V
- Use ARIA data to assist FAA with barrier performance
 - Neutral taxonomy in RAP process will allow us to gather data
 - Options for each barrier are: Effective, Degraded, Failed, N/A, Not Scored



Data Fuels Corrections that Enhance Safety

- PROVIDING DRAMATIC RESULTS



“Collaboration and the use of more data fuels the corrections that drive down the accident rate.” - former NTSB Chairman Chris Hart

Source: NTSB. Accident Rates are per 100,000 Flight Hours. Flight hours compiled by FAA.





Identifying Risk

Enhanced Data Analysis & Reporting

Kimberly Pyle
Director, Policy & Performance
FAA Air Traffic Organization
Kimberly.Pyle@faa.gov



**Federal Aviation
Administration**