

A photograph showing the silhouettes of two people in an office environment. One person is seated at a desk, facing right, with a laptop and papers visible. The other person is standing to the right, facing left. A globe is on the desk. The background is bright.

# Identifying Risk

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## Enhanced Data Analysis & Reporting

Kimberly Pyle  
Director, Policy & Performance  
FAA Air Traffic Organization

[Kimberly.Pyle@faa.gov](mailto: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



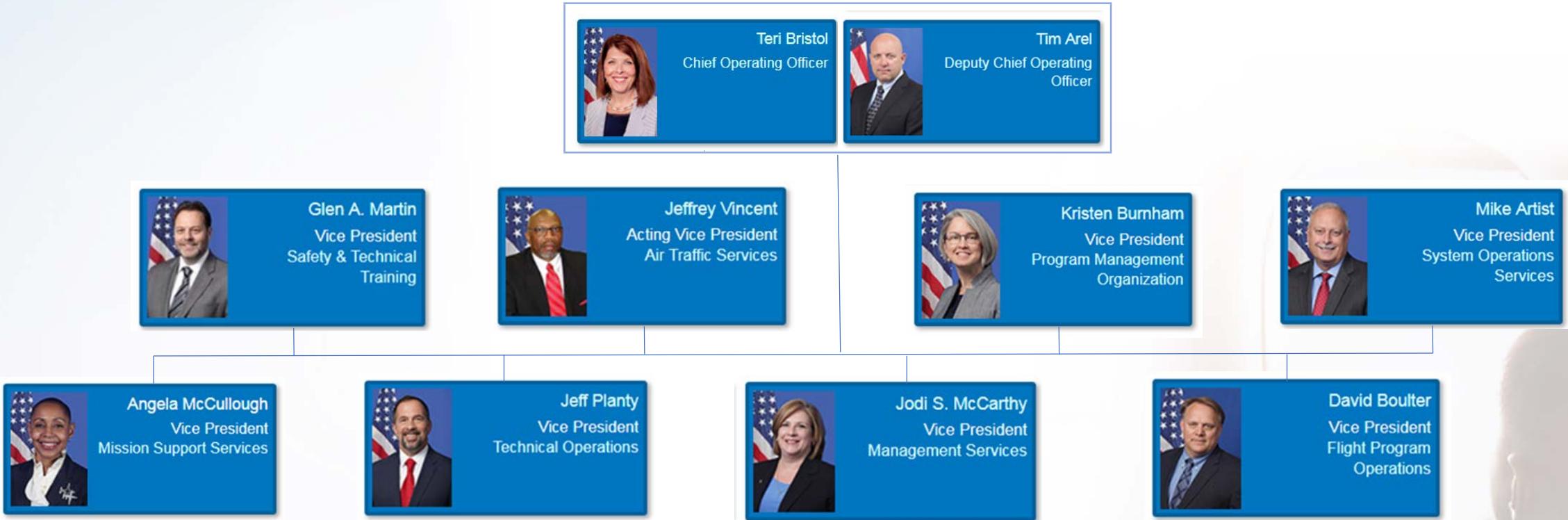
**AIR TRAFFIC  
SERVICES PROVIDER**

**7,000+**  
Takeoff and landings per hour

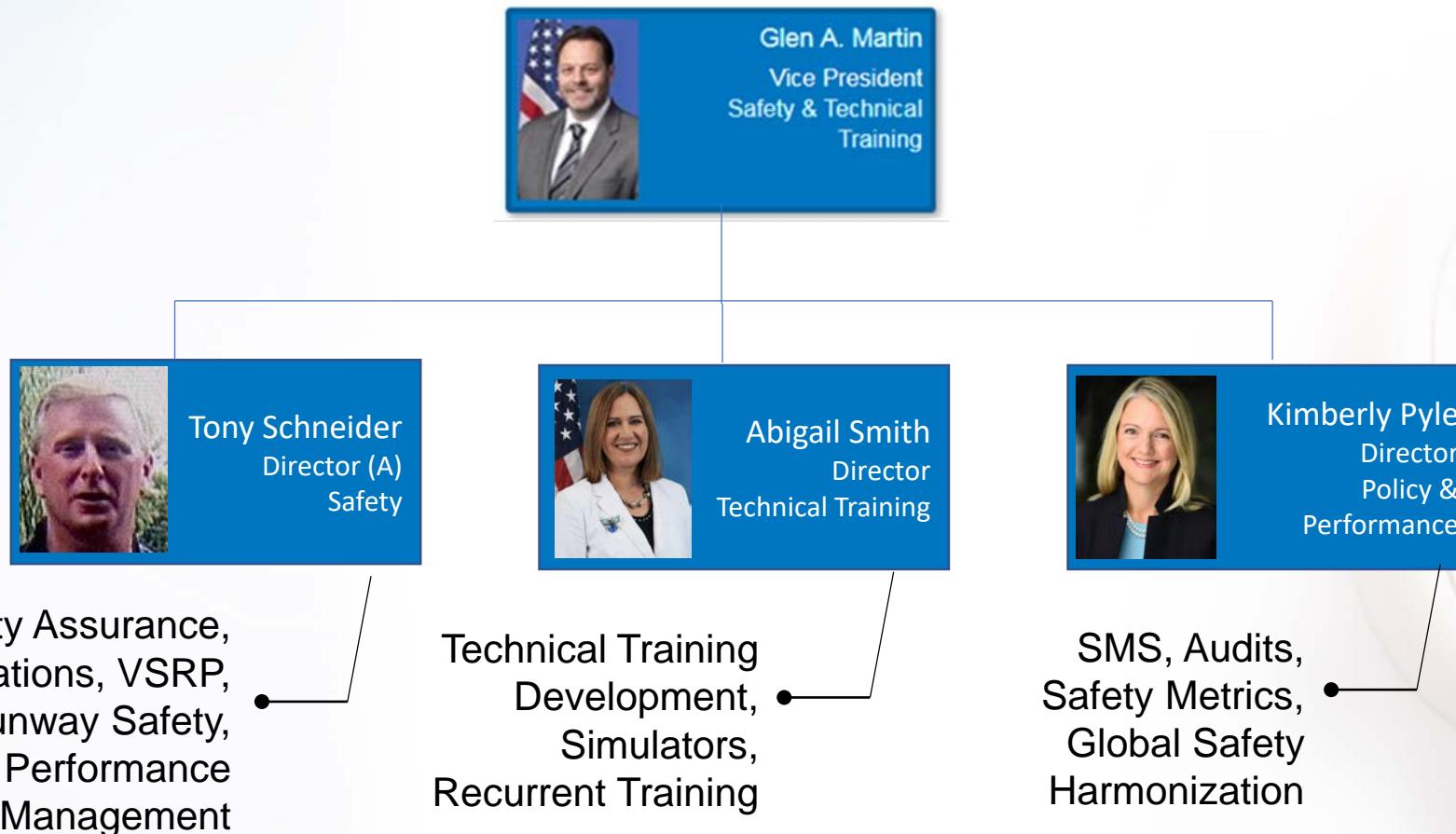
**660,000,000+**  
Passengers

**37,000,000,000+**  
Cargo revenue ton miles of freight/year

# Air Traffic Organization



# Safety & Technical Training



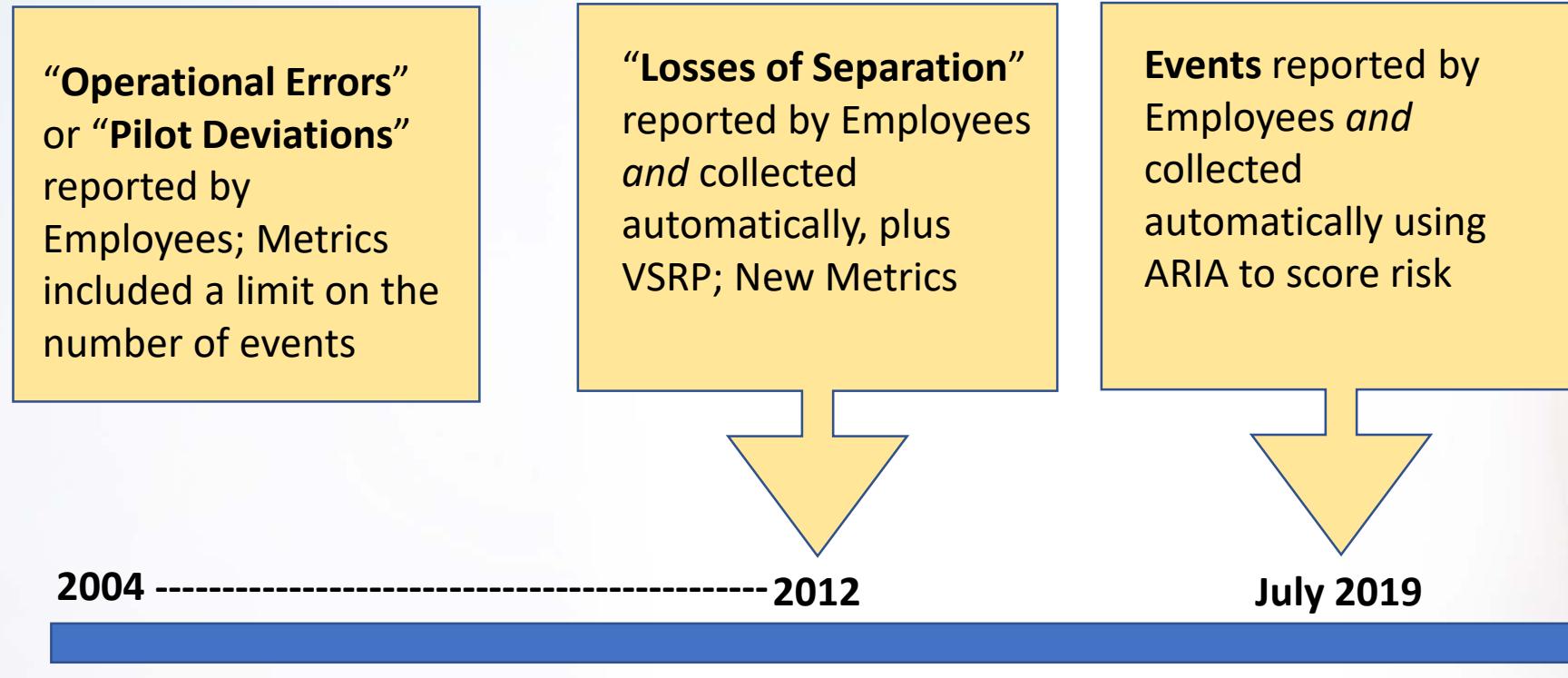
# Safety Management System

- Driven by Data



- Gathering Performance Data from Employee Reports and Automated Reporting

# Evolution of Safety Data Collection



Federal Aviation Administration

# 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

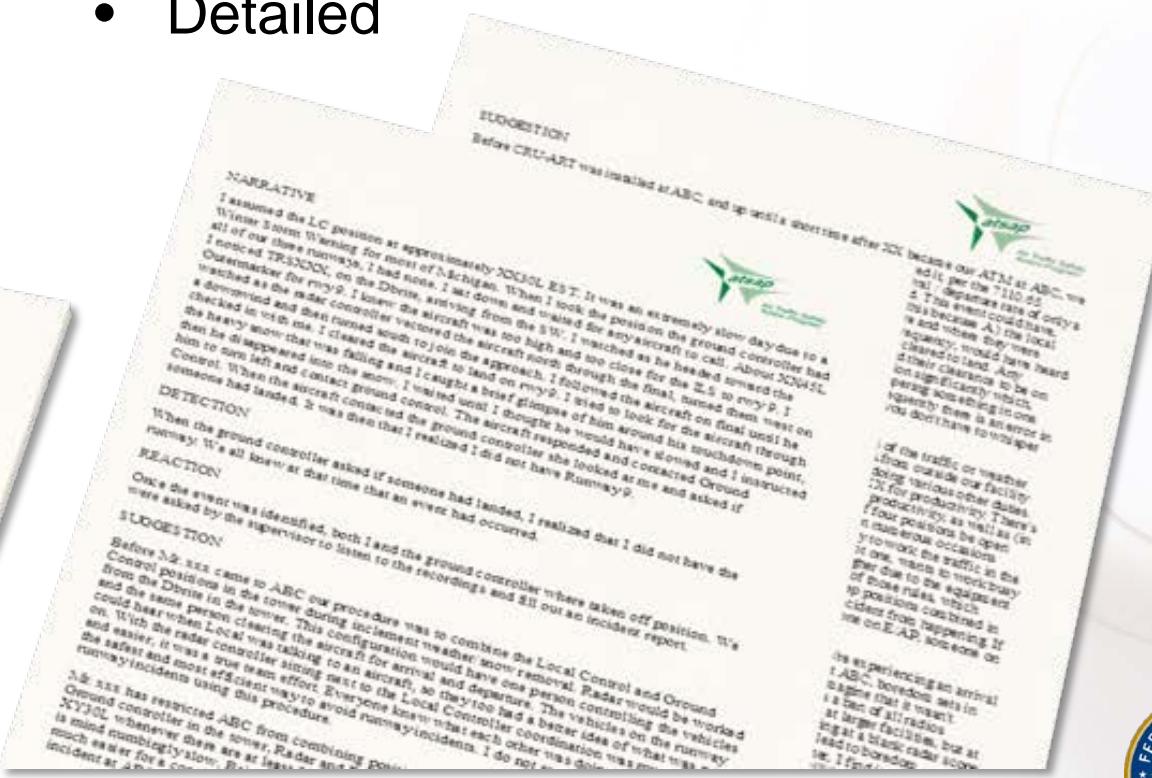
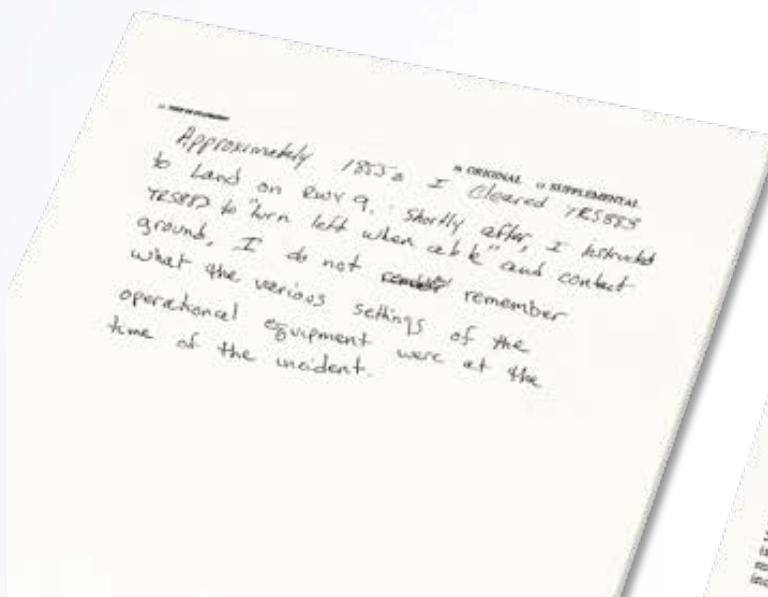
# Better Data Through Reporting

## BEFORE

- Short
- Vague

## AFTER

- Comprehensive
- Detailed



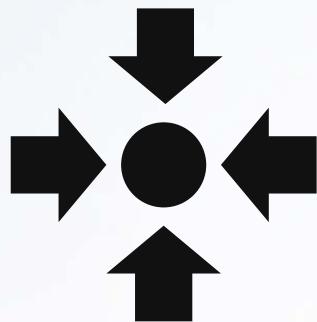
# Automated Detection & Reporting

- 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?

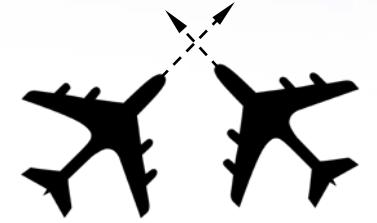
- Compliance does not equal risk
- Only detects one type of event
- Significant human review required
- Difficult to maintain



# 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?”*



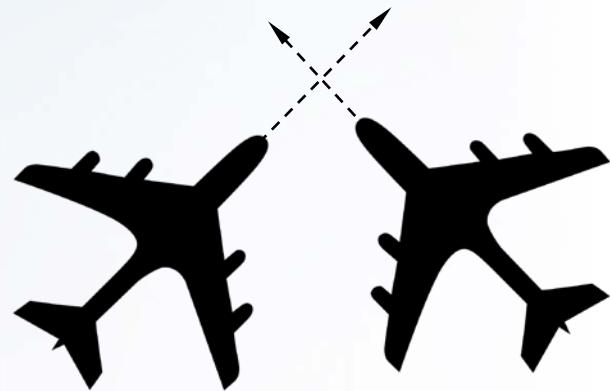
## Risk-based Safety Assurance

*“How much risk is associated with the observed behavior?”*

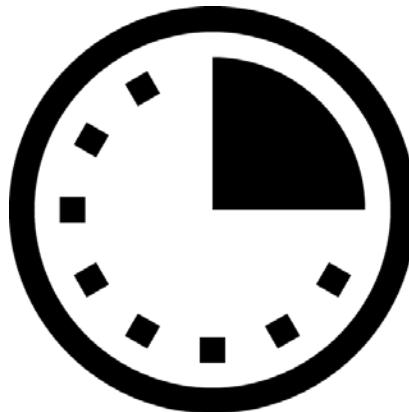
# Example: Compliant, High Risk



# Principles of a Risk-based Approach to Event Identification



**Find the  
Highest Risk  
Events**



**Reduce Time  
Validating  
Events**

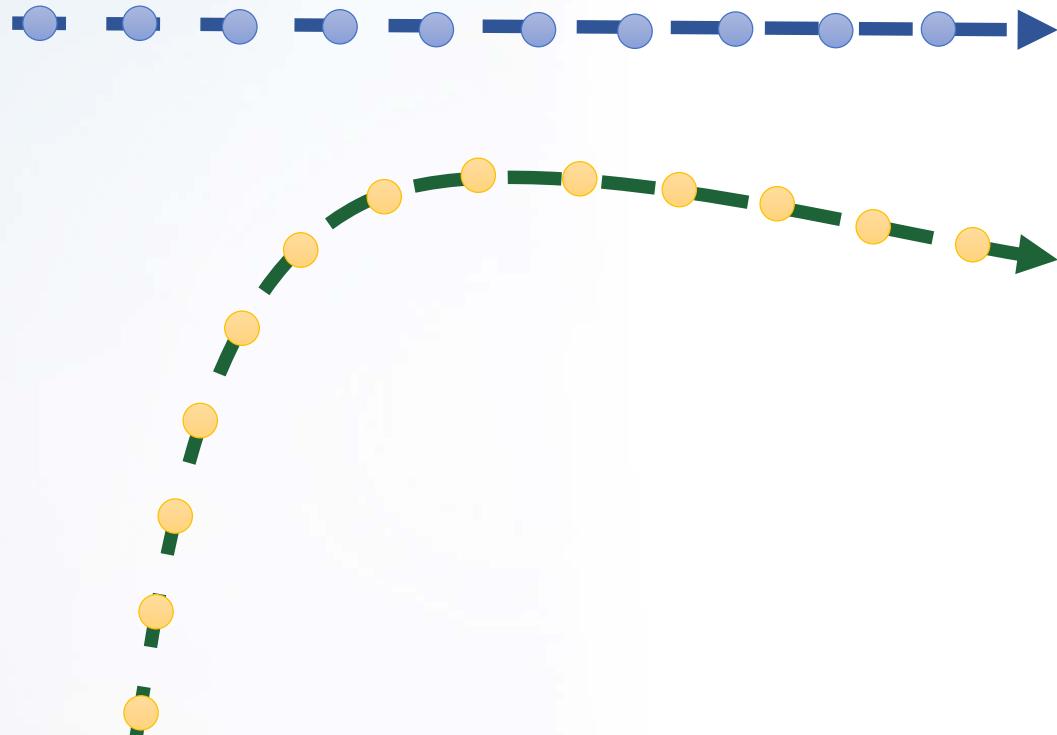
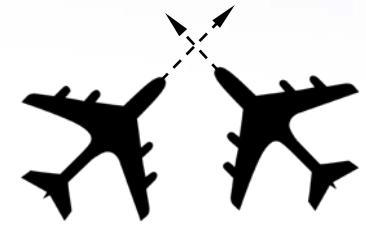


**Increase Risk  
Analysis  
Events**

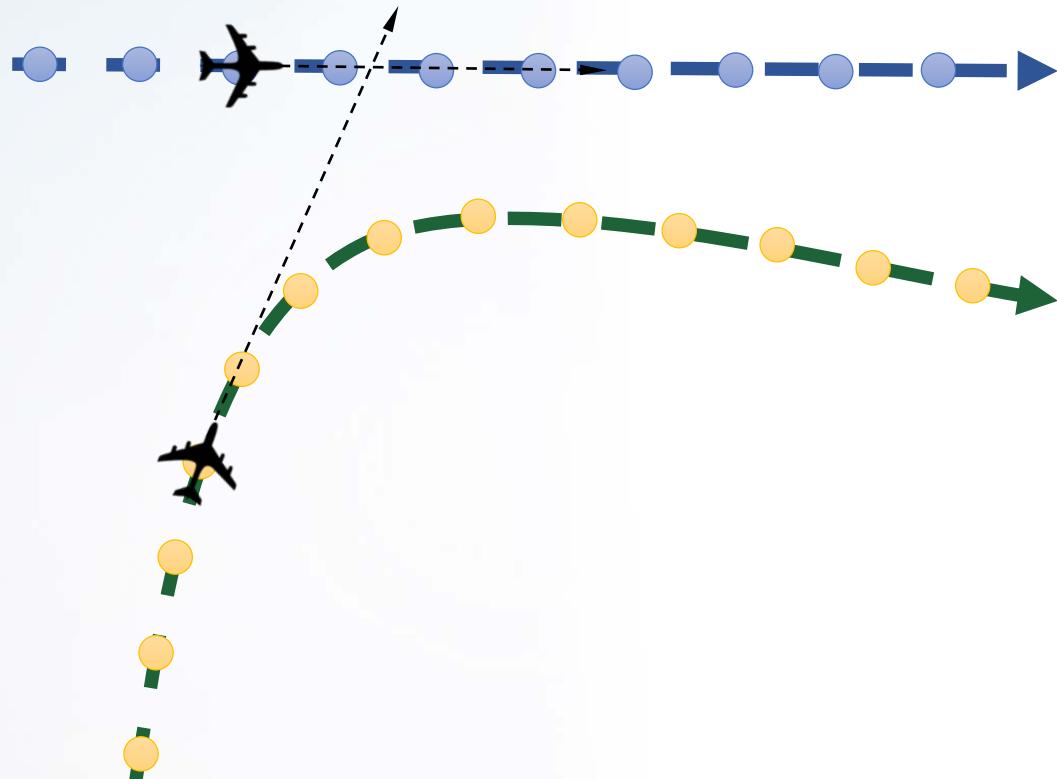
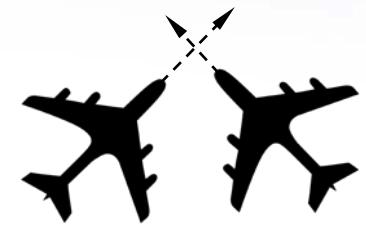
# Aviation Risk Identification and Assessment



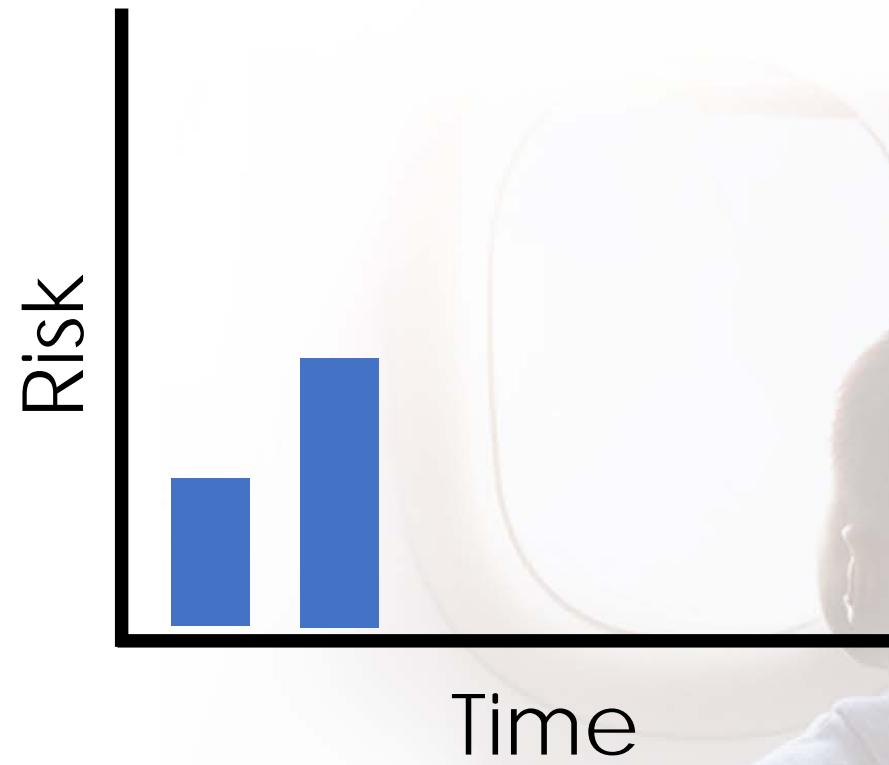
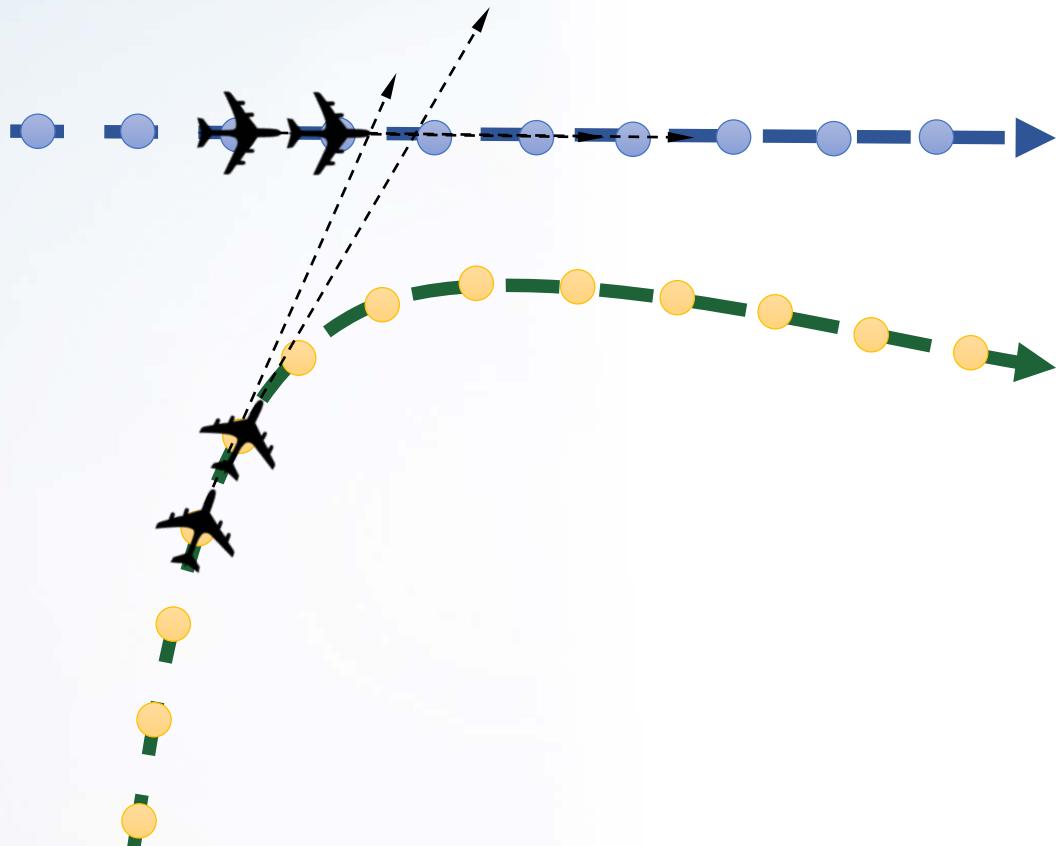
# How does ARIA Calculate Risk?



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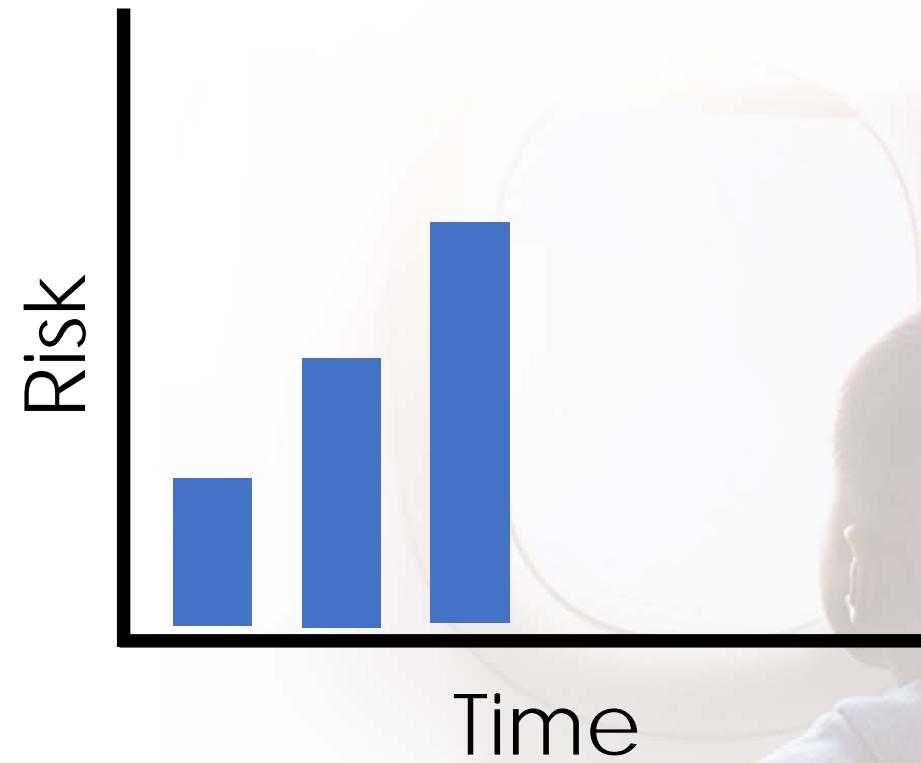
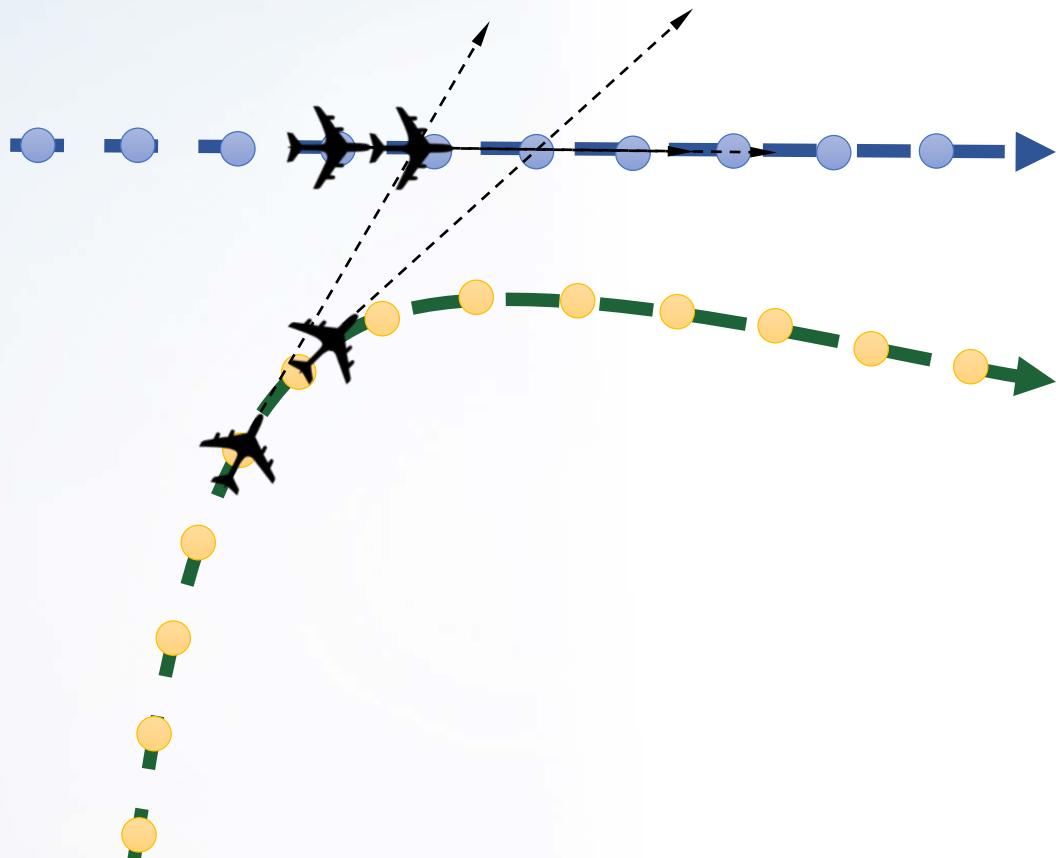


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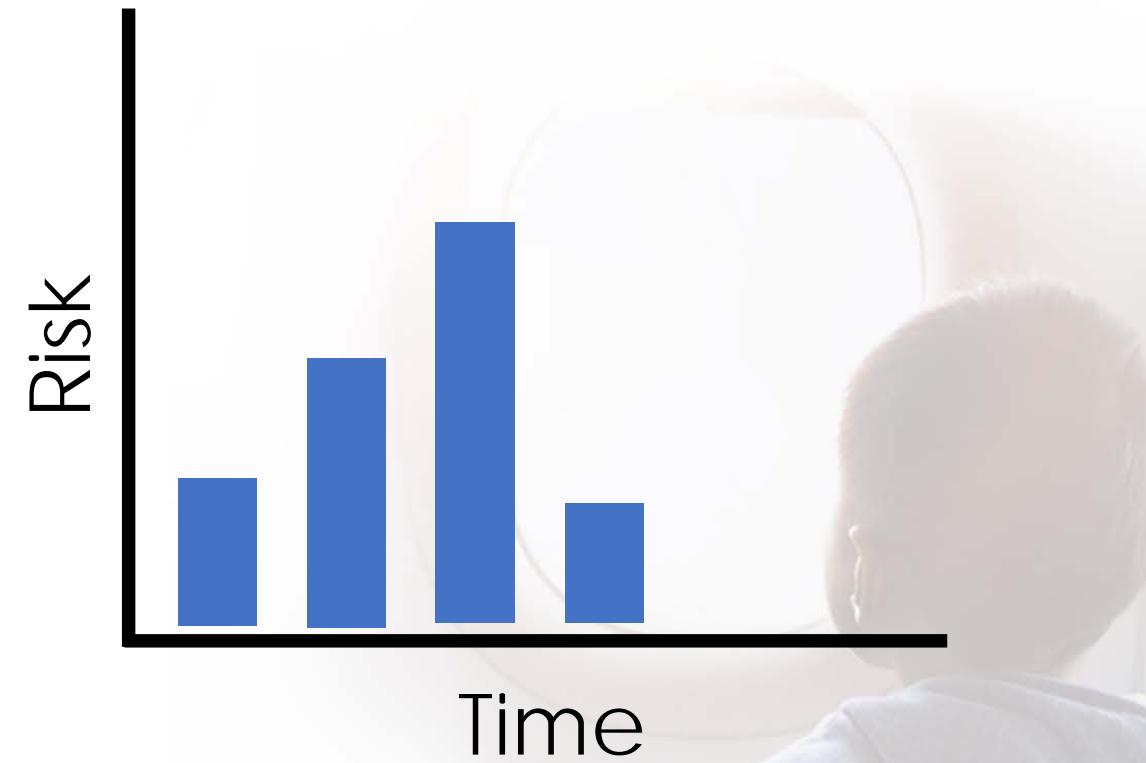
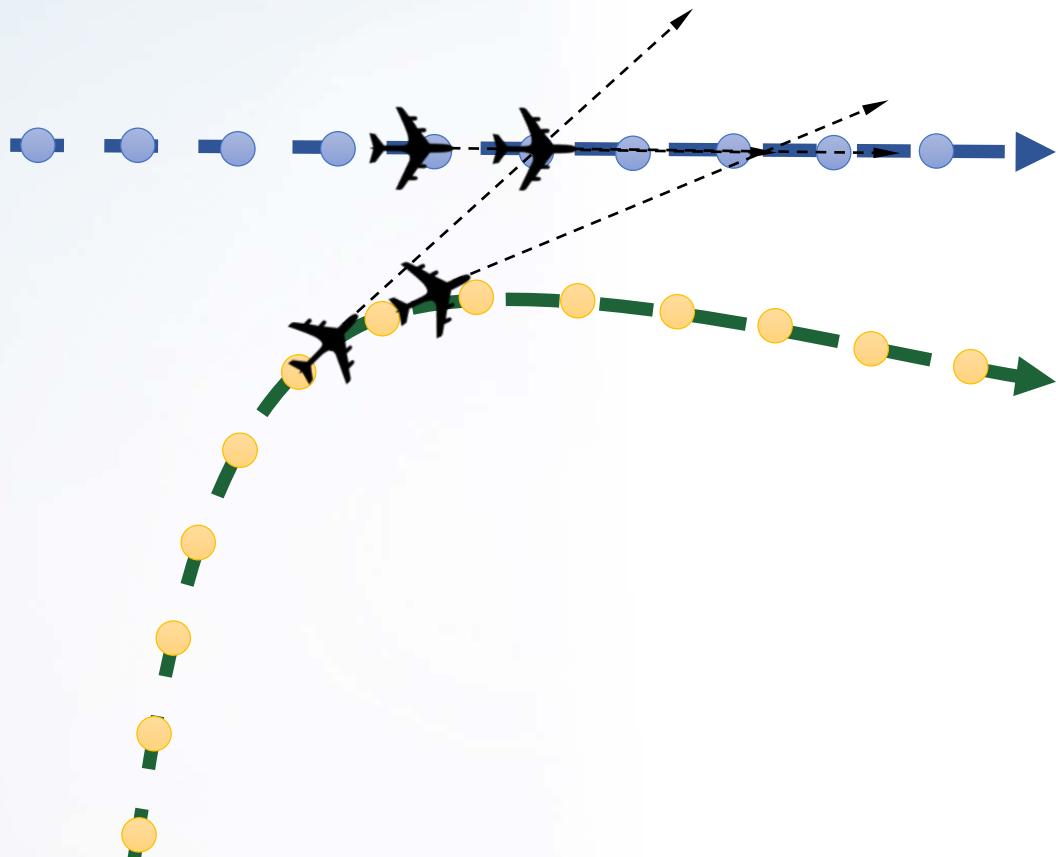
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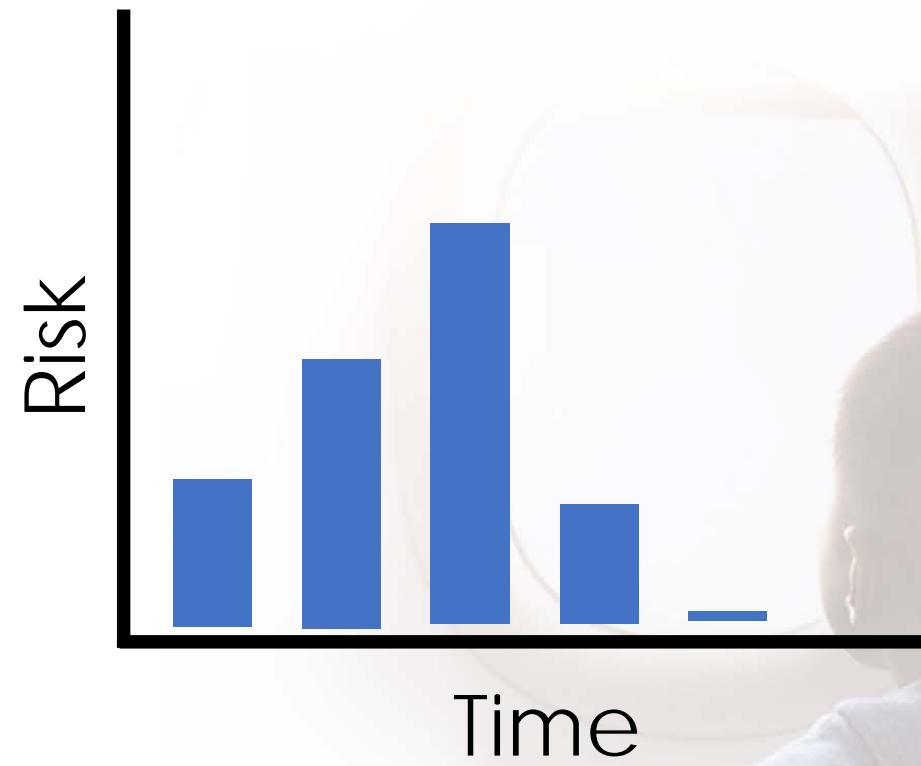
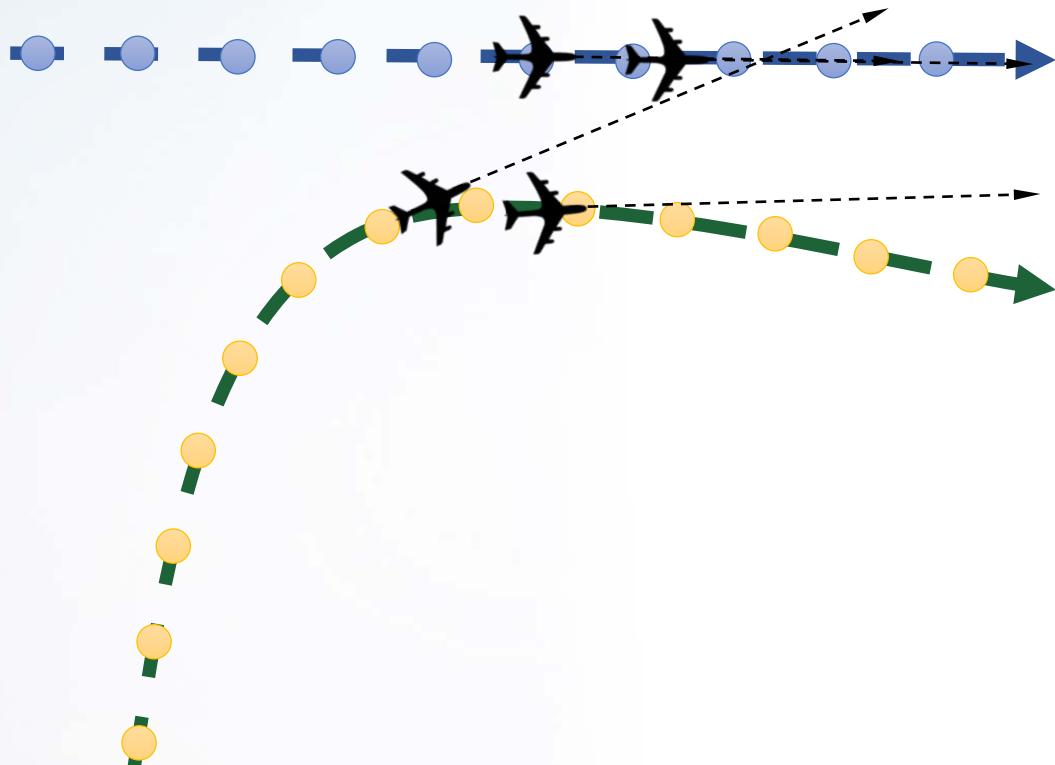
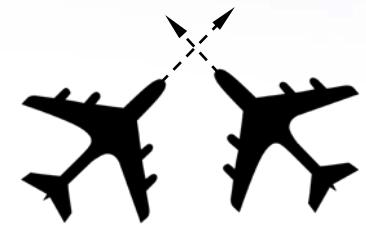


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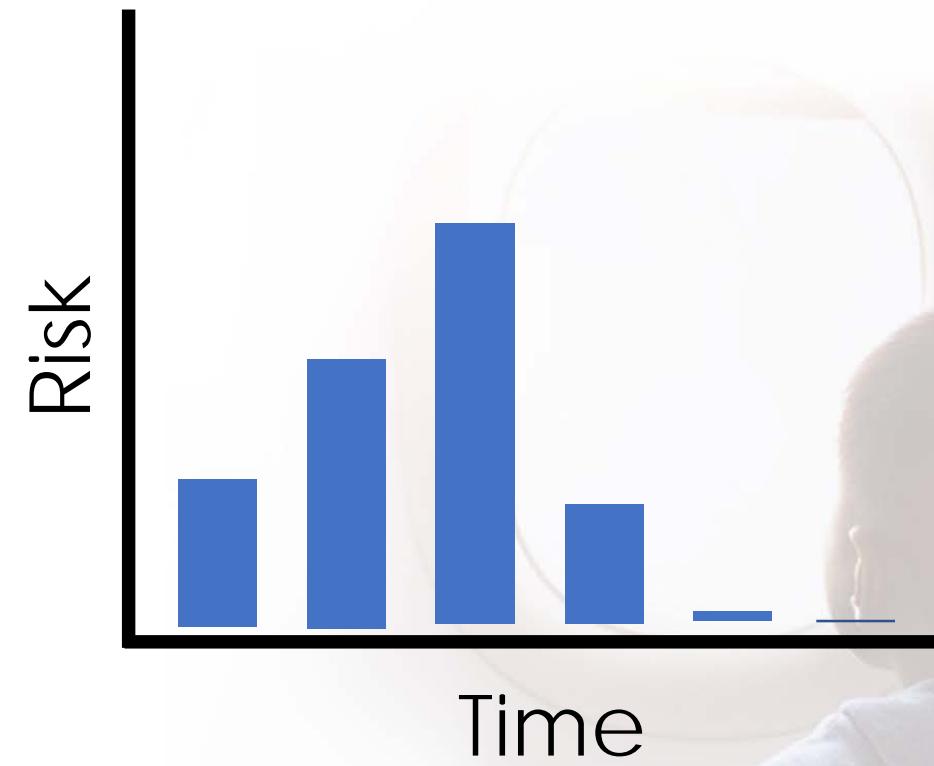
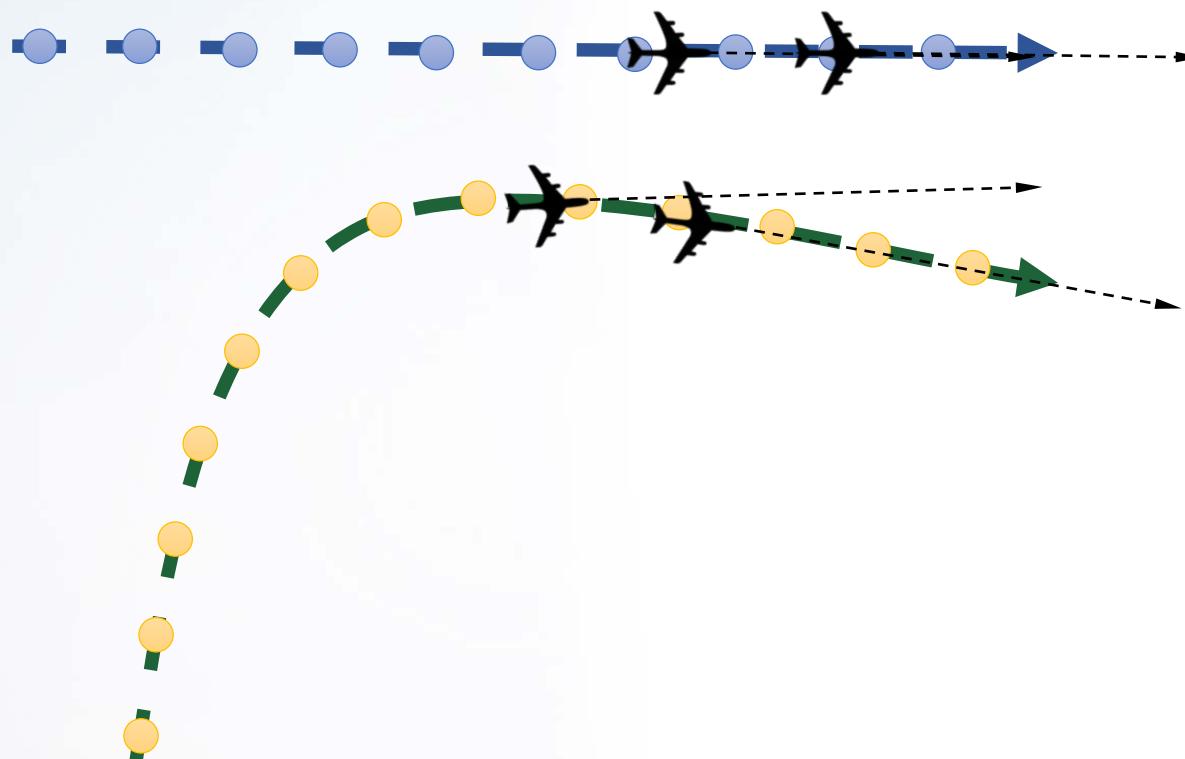
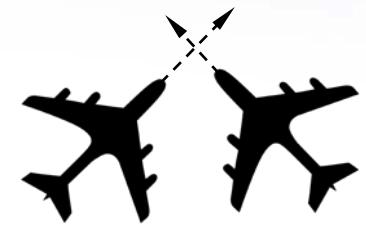


# How does ARIA Calculate Risk?



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# Principles of a Risk-based Approach to Event Identification



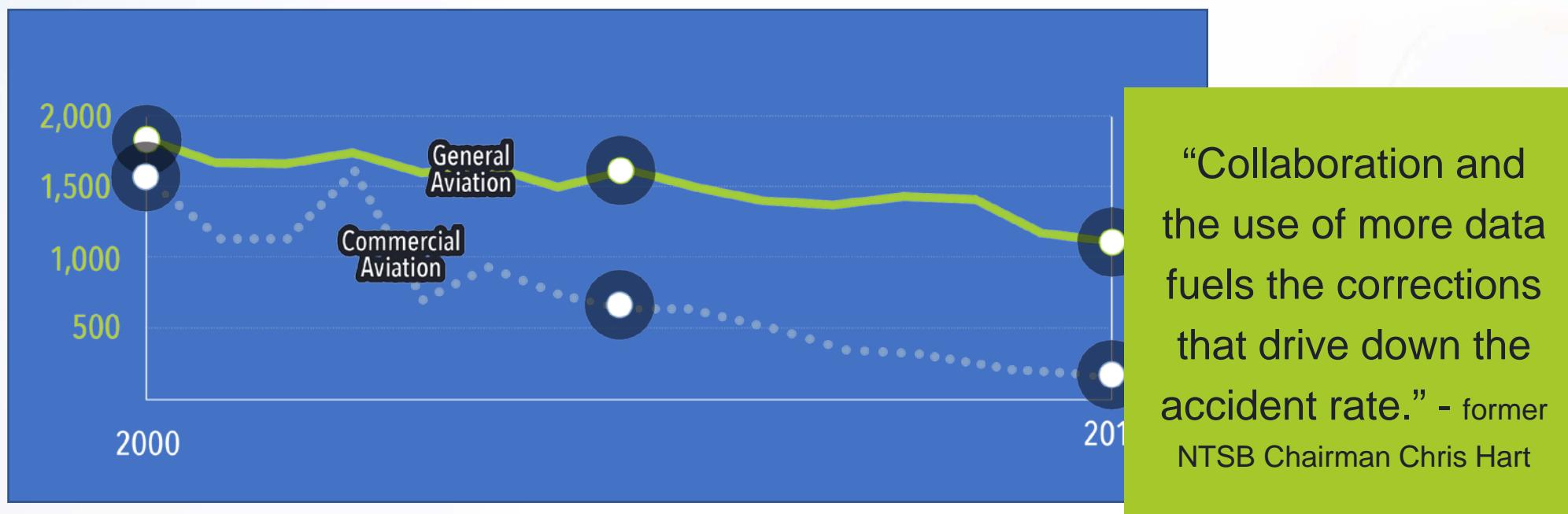
# Next Steps

- 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



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

A photograph showing the silhouettes of two people in an office environment. One person is seated at a desk, facing a computer monitor, while the other stands across the desk, gesturing with their hands as if in conversation. The scene is backlit, creating a high-contrast silhouette effect.

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