

# Hazard Library

## MediaWiki for Safety and Hazard Analysis

Presented to: IATA Safety Data Symposium

By: Jacob Streeter, Safety Data and  
Analysis Team Chair

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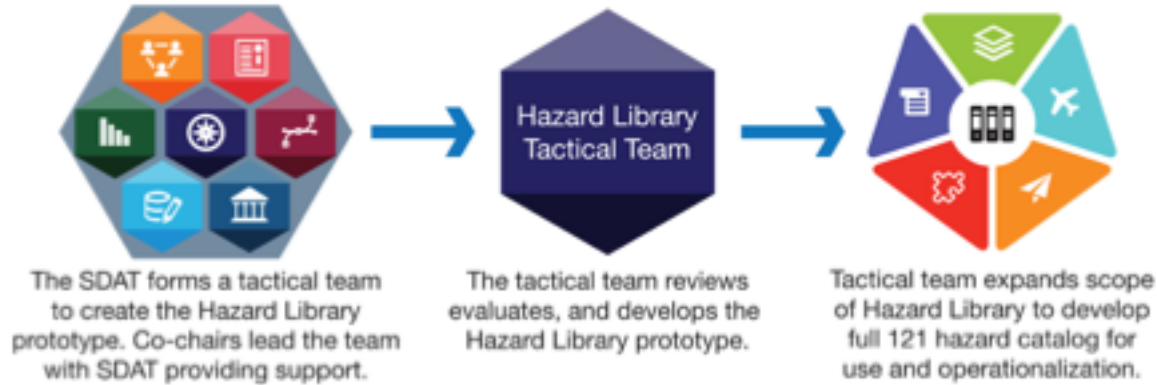
**Federal Aviation  
Administration**

# Safety Data and Analysis Team (SDAT)

- **SDAT provides agency-level direction for, and management of, all safety data throughout the FAA**
- **Through SDAT, FAA analysts:**
  - Identify data requirements and standards
  - Improve data collection methods
  - Work together on projects requiring cross-organizational expertise



# Collaboration Model



- **A product of the FAA's Safety Data and Analysis Team (SDAT)**
  - Because of SDAT, the Hazard Library has input from all safety offices
  - SDAT and the Hazard Library move the FAA towards a unified aviation safety data and analysis system

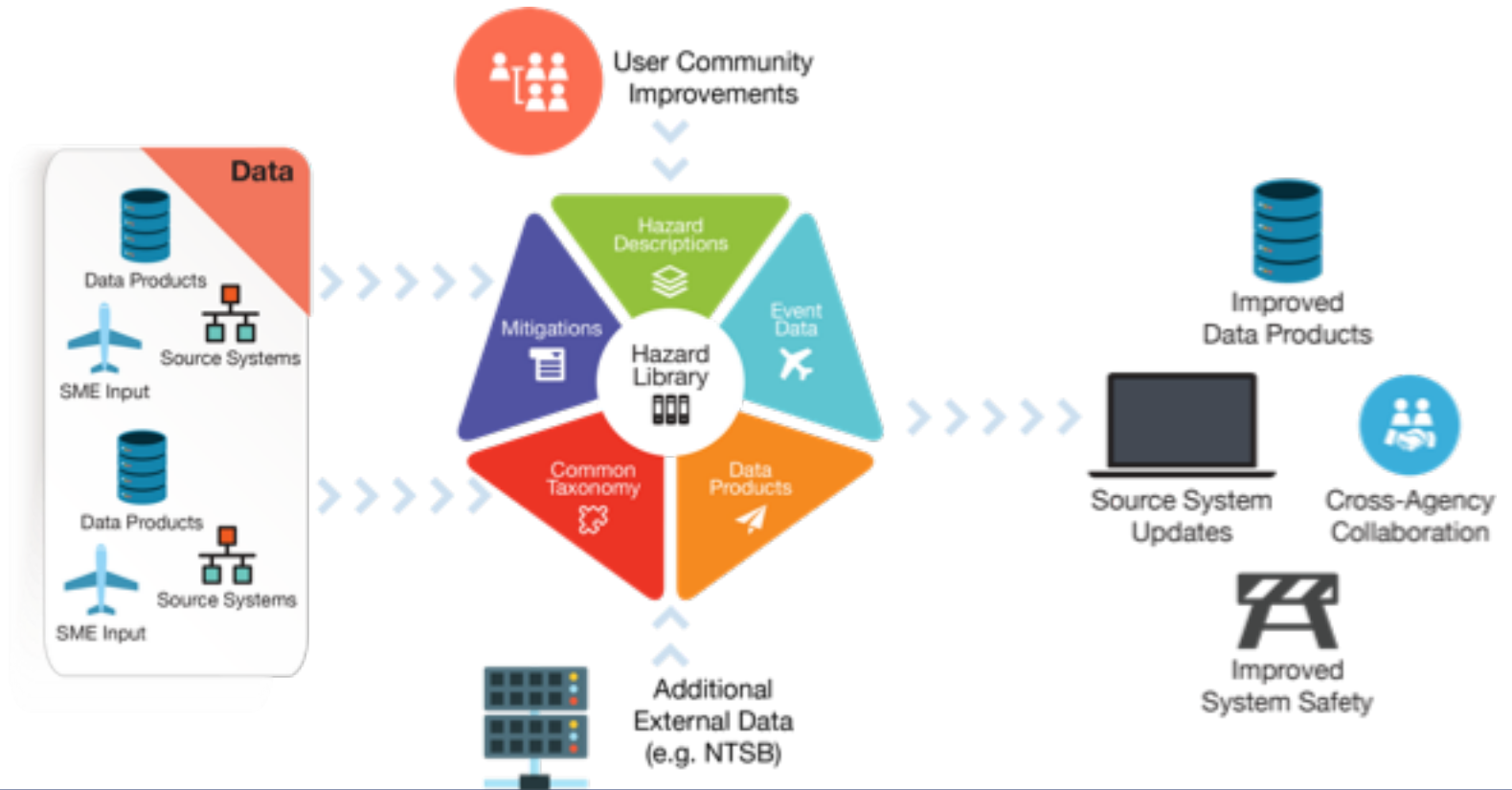
# Hazard Library Concept

- A centralized reference for hazard information using MediaWiki
- A platform ensuring FAA employees have access to all available hazard data





# Work Process



# Prototype Demonstration



- Main page
- Recent changes
- Random page
- Help
- Create
- New hazard
- New accident/incident
- New data product
- Tools
- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link
- Page information
- Page values
- Browse properties

[Testuser](#) [Talk](#) [Preferences](#) [Watchlist](#) [Contributions](#) [Log out](#)

[Main page](#) [Discussion](#)

[Read](#) [Edit](#) [View history](#) [More](#)

Search Hazard Library - MediaWiki Instance

## Main Page



[Browse by Event](#)



[Browse by Hazard](#)

### Hazard Library Introduction

The hazard library is a searchable list of classified hazards allowing for tracking and analysis of changes to system safety. The hazard library links hazards collected from across the FAA, including models such as the Integrated Safety Assessment Model (ISAM). In addition, data from the National Transportation Safety Board Aviation Accident/Incident Database (NTSB), and data products/research completed on hazards throughout the aviation safety system included. The FAA Draft Hazard Taxonomy is currently being used as a means of organization. This iteration of the library is a notional prototype and is subject to change. Currently, this prototype is focused on wrong surface landings, as specified by the Hazard Library Tactical Team's initial charter.

### Data Products [\[edit\]](#)

#### I

- Identification Techniques to Reduce Confusion Between Taxiways and Adjacent Runways

#### S

- SAFO 08001

#### S cont.

- Safety Assessment for Wrong Surface Landings (SCT)

#### W

- Wrong Surface Analysis Group (AJI-1240)

#### W cont.

- Wrong Surface Landings SRM Document (ATO FY17 Top 5)
- Wrong Surface Landings: Literature Review

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# Benefits of the Hazard Library

Easy access to the following:



Unique Hazards



Probabilities of Occurrence



Probable Mitigations



Accident/Incident Queries



Data Products



**Influences and informs other safety models, safety groups, and data systems**



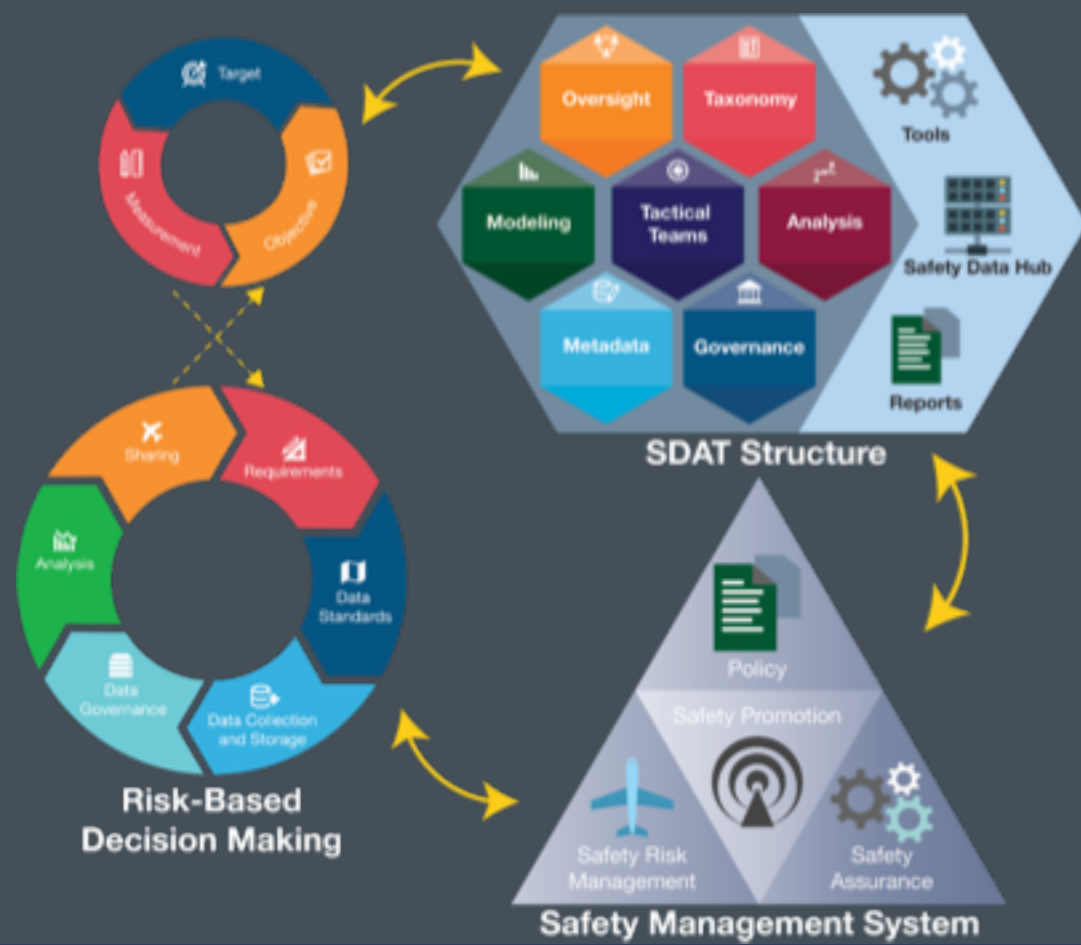
**Reduces rework, improves efficiencies and encourages collaboration**

# A Data Driven, Risk-Based Approach

The Hazard Library, SDAT, SMS, and risk-based decision making work together to improve safety.

## Questions?

Jacob.Streeter@faa.gov



# Improving Runway Safety through Data Driven Decision Making

IATA Aviation Data Symposium, Berlin 2018

Robert Graham



David Pérez



# Challenges

<b>Political</b>	regulation	citizen rights	state
<b>Social</b>	union	citizen protection	privacy
<b>Economic</b>	value	intellectual	monopolistic
<b>Technical</b>	standards	structure/size	multiple sources
<b>Legal</b>	intellectual	protection	multiple owners
<b>Security</b>	cyber	threat	theft
<b>Punitive</b>	exclusion	punishment	denial

## Ignorance

we have more data than we know what to do with?

we have data?



# Confidence

## **Safe** and **secure**

A **data protection** agreement that brings confidentiality and privacy

De-sensitised / **de-identification** of your data

Verifiable restricted **access** to known partners

Clear, agreed and **auditable** use of the data

Identified approval **milestones** for you to check and agree to proceed

# What is DataBeacon?



[www.databeacon.aero](http://www.databeacon.aero)

# Some of the requirements



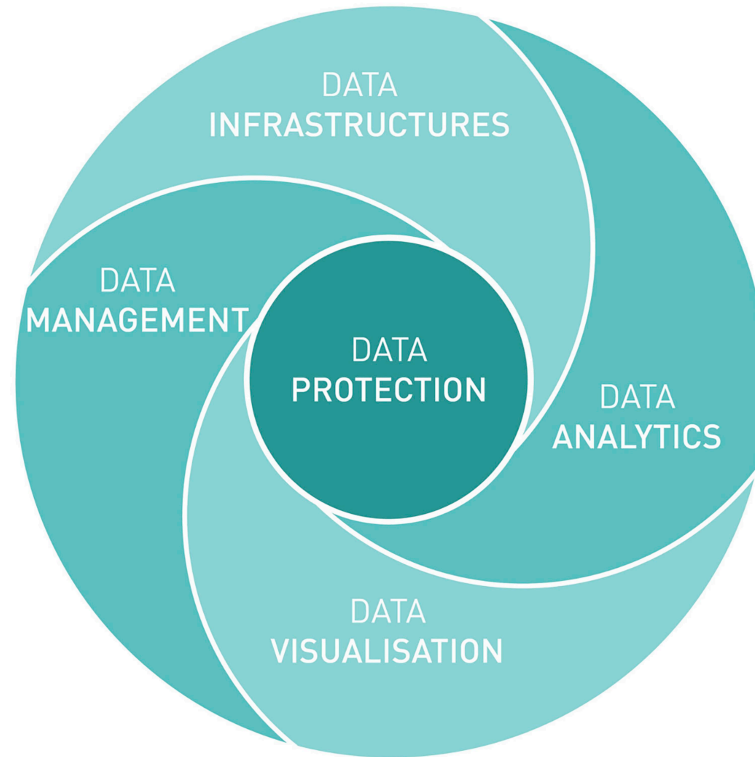
**Privacy** by design

**Data engineering** - Security, Scalability, Flexibility

Integrated **technology** platform & **governance** model

**Designed** for AI applications

# What is an AI platform?



# Aviation Data



Description

Structure and size

Data Items description

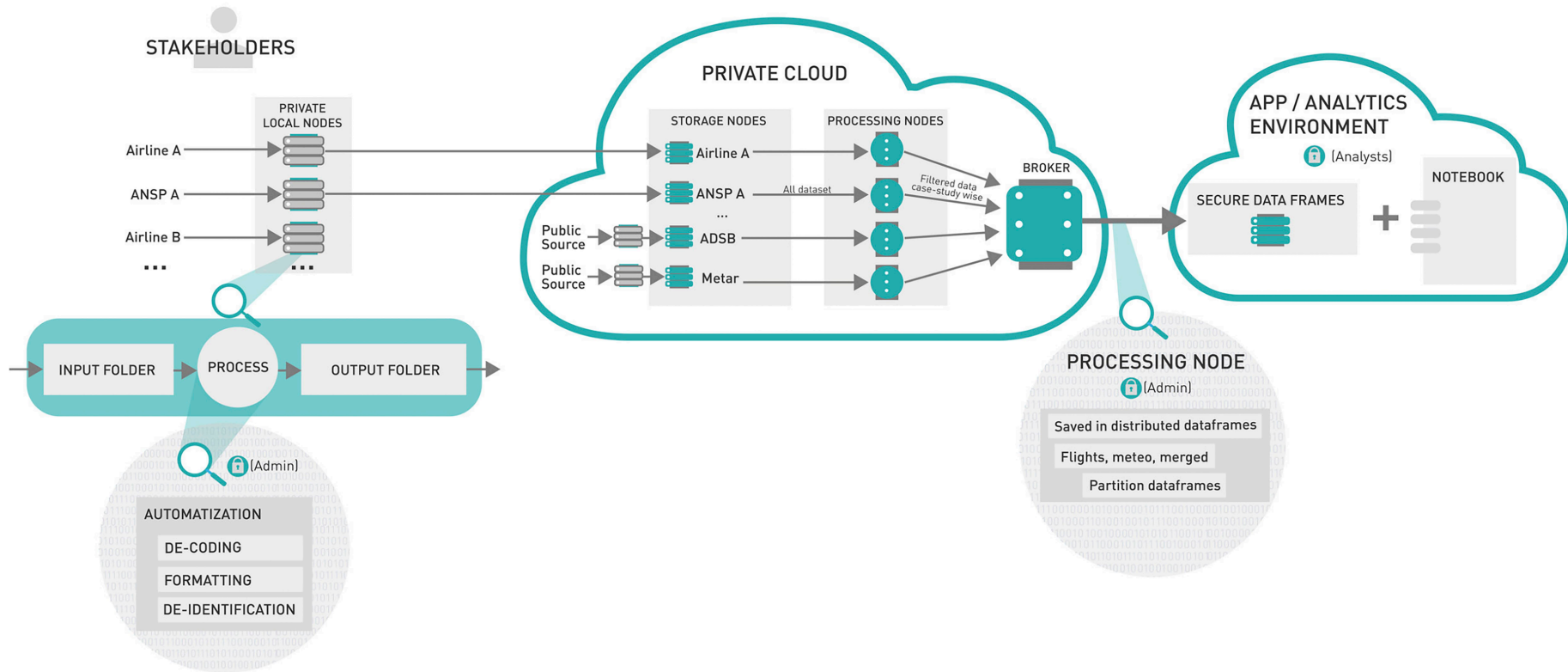
Range of available data

Acquisition

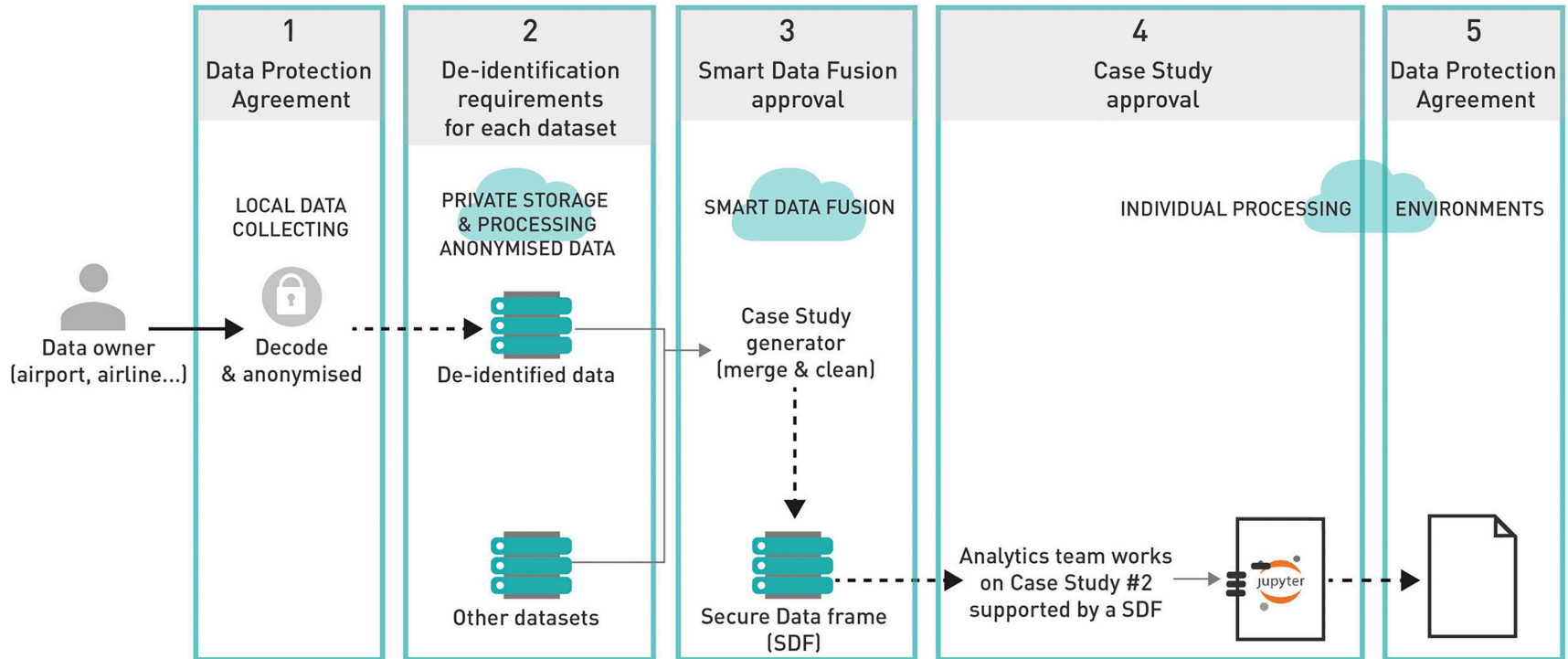
Technical limitations

# Privacy by design

## Secure Data Fusion and application sandboxing



# Integrated technology platform & governance model







Jupyter notebooks

Secure multi-party computation

Distributed storage & processing

auto-scaling

real-time broker

feature engineering

Apache Kafka

descriptive analytics

crypto de-id

predictive analytics

Apache Spark

DevOps env

de-coding, parsing, cleaning

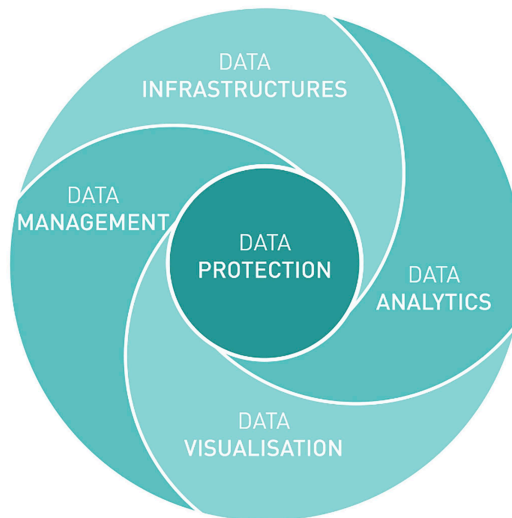
sandboxed apps

Secure Data Fusion (SDF)

GitLab

true-blind benchmarking

integrated dashboards



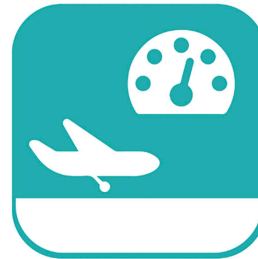
# Collaborative apps



Airprox



Separation with terrain



SafeRunway



Level bust



Hard landing



Wake vortex separation



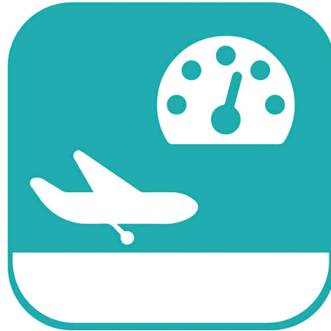
Congestion monitoring



Unstable approach

# SafeRunway

Manage runway occupancy to safely increase runway throughput  
Providing additional access to constrained resource – the runway



SafeRunway

# What are we talking about?



Geography

Runway Configuration

Aircraft Type

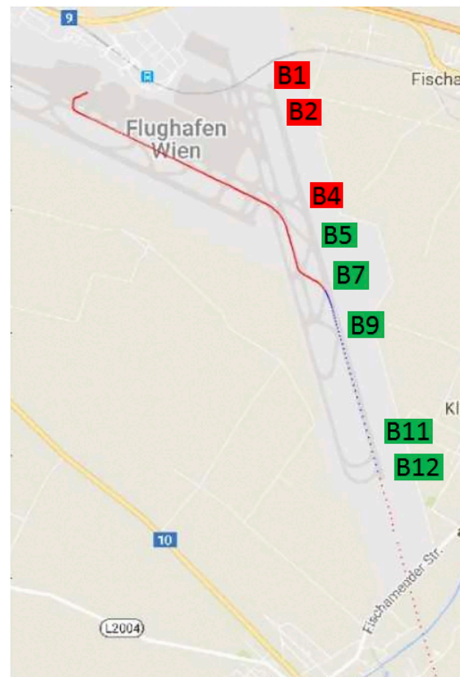
Company Policy

Pilot and controller

Weather

Day

Data



# Large historical dataset



What happened?  
What's happening?  
Descriptive analysis

Deep **understanding** of contributing factors



What will happen?  
Predictive analysis

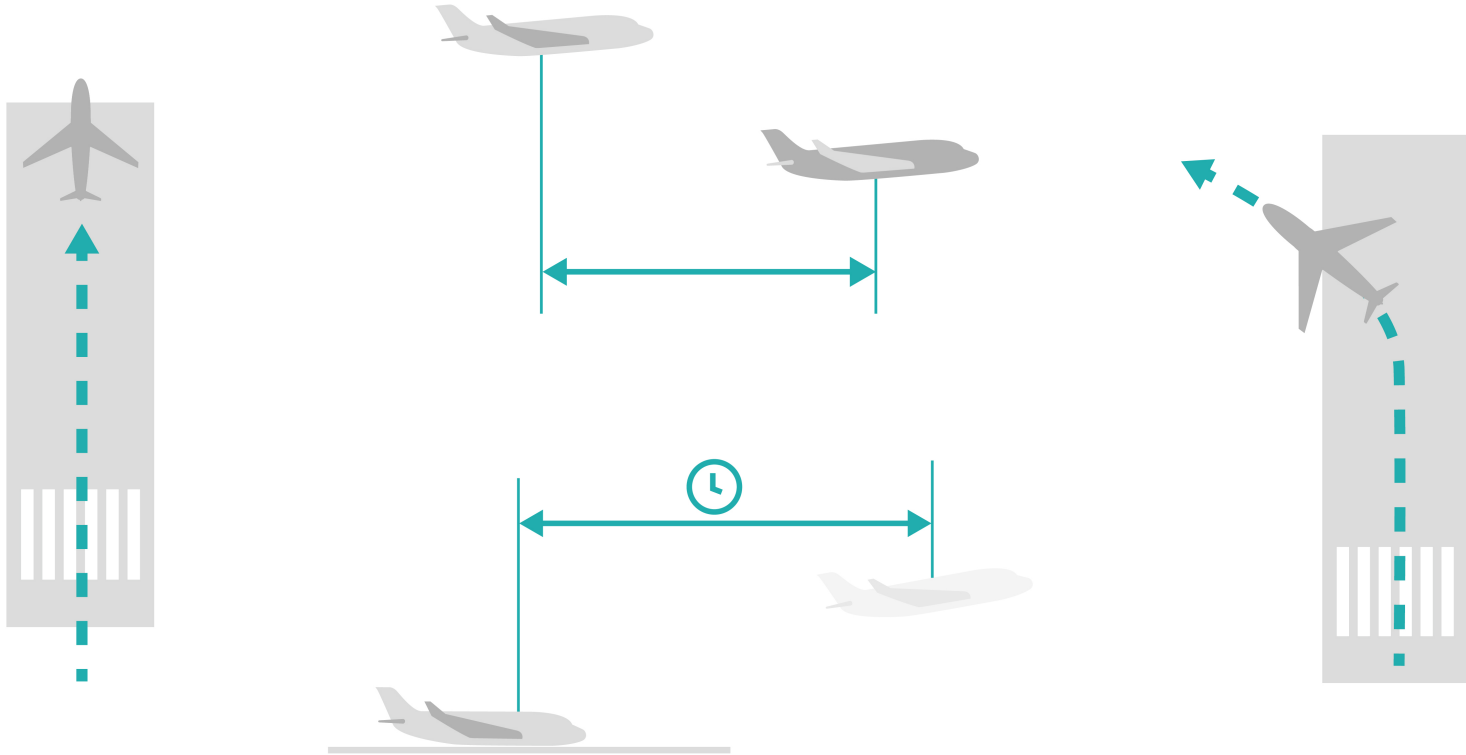
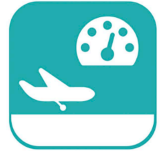
Automatic and precise **prediction** of traffic behaviour impacting runway performance

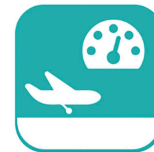


What should we do?  
Solution analysis

Effective **mitigation**

# Real Time Data Driven Predictions





# The SafeRunway app is a predictive AI engine to safely drive runway throughput



Safe reduction of separation

Full use new wake minima

Optimised time based separation

Reduction in go-around

Additional throughput



# An ecosystem of partners collaborating together



Overcoming the data challenges

Building confidence to do business

A secure common data platform in place



[www.databeacon.aero](http://www.databeacon.aero)

- Secure ownership and control
- Increased data quality
- Smart Data Fusion
- Solving the "cold start problem"

**Let's talk about partnerships and applications**

# Thank you!

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KNOWLEDGE DISCOVERY FOR AVIATION