Hazard Library

MediaWiki for Safety and Hazard Analysis

Presented to: IATA Safety Data Symposium

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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

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 national 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

- Identification Techniques to Reduce Confusion Between Taxiways and Adjacent Runways
- Safety Assessment for Wrong Surface Landings (SCT)
- Wrong Surface Landings SRM Document (ATO FY17 Top 5)
- Wrong Surface Landings: Literature Review
- SAFO 08001
- Wrong Analysis Group (AJI-1240)

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Prototype Demonstration
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?

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Improving Runway Safety through Data Driven Decision Making

IATA Aviation Data Symposium, Berlin 2018

Robert Graham

David Pérez

EUROCONTROL
TADOREA
SafeClouds.eu
EU
data beacon
Challenges

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

STAKEHOLDERS
- Airline A
- ANSP A
- Airline B

PRIVATE CLOUD
- STORAGE NODES
  - Airline A
  - ANSP A
  - All dataset
- PROCESSING NODES
  -ADS
  - Metar
  - Public Source

APP / ANALYTICS ENVIRONMENT
- 3 (Analysts)
- Secure Data Frames
- Notebook
- (Admin)

INPUT FOLDER → PROCESS → OUTPUT FOLDER

AUTOMATIZATION
- DE-CODING
- FORMATTING
- DE-IDENTIFICATION

PROCESSING NODE
- (Admin)
  - Saved in distributed dataframes
    - Flights, meteo, merged
    - Partition dataframes

Introduction > DataBeacon > SafeRunway > Conclusions
Integrated technology platform & governance model

1. Data Protection Agreement
   - LOCAL DATA COLLECTING
   - Decoded & anonymised

2. De-identification requirements for each dataset
   - PRIVATE STORAGE & PROCESSING ANONYMISED DATA
   - De-identified data
   - Other datasets

3. Smart Data Fusion approval
   - SMART DATA FUSION
   - Case Study generator (merge & clean)
   - Secure Data frame (SDF)

4. Case Study approval
   - INDIVIDUAL PROCESSING
   - Analytics team works on Case Study #2 supported by a SDF

5. Data Protection Agreement
   - ENVIRONMENTS

Data owner (airport, airline...)
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
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

What will happen? Predictive analysis

What should we do? Solution analysis

Deep understanding of contributing factors

Automatic and precise prediction of traffic behaviour impacting runway performance

Effective mitigation

Introduction > DataBeacon > SafeRunway > Conclusions
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
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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