

IATA Turbulence Aware

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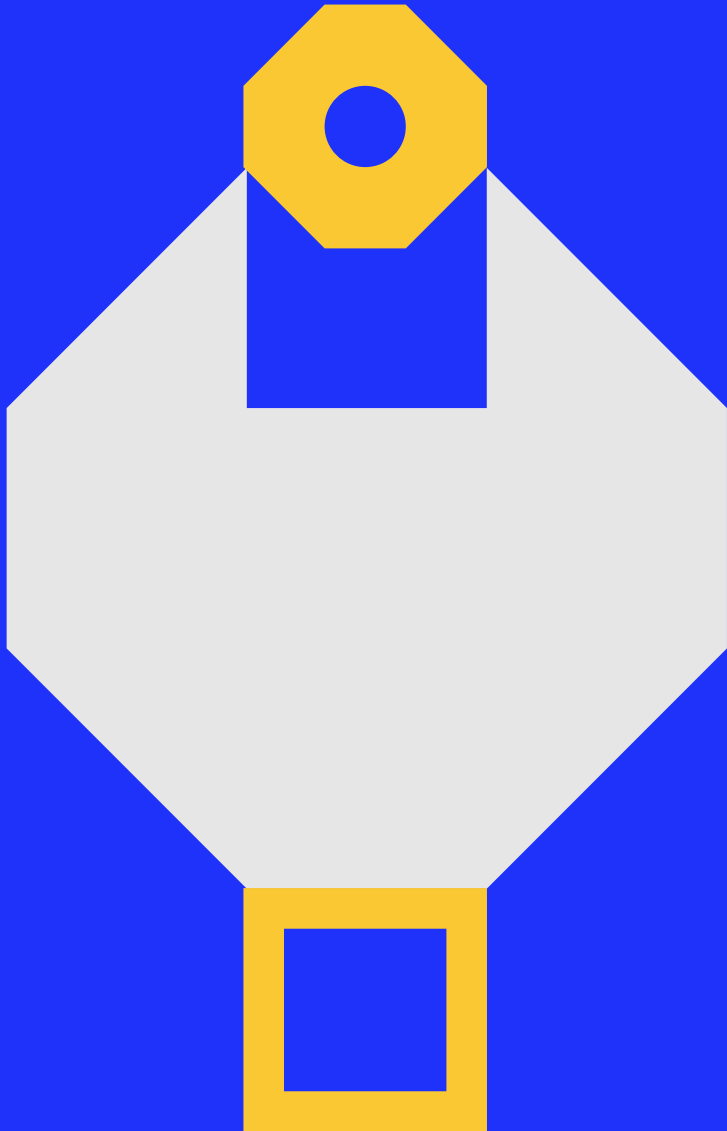


Turbulence is

The leading cause of injuries to cabin crew and passengers in non-fatal accidents (FAA)

Costing the aviation industry hundreds of Millions of dollars every year, including brand damage





Existing tools for managing turbulence have limitations

- **Subjective** Pilot Reports
- Forecasts that may be **inaccurate** and **hours old**
- Weather radar is used for turbulence avoidance related to thunderstorms but **cannot detect clear air turbulence**

Industry shift to data-driven turbulence management

Recent technical advancements now enable aircraft to accurately calculate the turbulence state of the atmosphere in flight

What is real-time turbulence data?

Eddy Dissipation Rate (EDR)

- ICAO Annex 3 metric for turbulence
- Measuring the state of the atmosphere around the aircraft in flight
- Aircraft independent absolute value
- Simple software installation based on NCAR v2 open source algorithm
- No hardware required to calculate EDR





Eddy Dissipation Rate (EDR)

- Existing sensor data (TAS, AOA, etc.) is run through an algorithm to calculate turbulence values
- These values are then compiled into a report that also includes a time stamp, aircraft position and altitude
- Automated real-time turbulence reports are sent to the ground using aircraft communication systems



How can your airline implement EDR reporting capability?

- Customization of existing ACMS/AHM in-house or via OEM/Avionics solution providers
- EFB application via AID
- Onboard wi-fi server
- **IATA Turbulence Reporting Guidelines for detailed information**



Guidelines Overview

File #1: Background and Technical Perspectives

- Executive Summary
- Introduction
- Technical: EDR Calculation Methods
- Technical: Airline Implementation of EDR
- Appendices

File #2: Operational Perspective

- Operational: Sharing and Using Turbulence Data
- How to share EDR with other airlines and use this information in your operation to reduce the impact of turbulence
- Appendices

File #3: Financial Perspective & Conclusion

- Financial: Building a Business Case
- Help give you tools to prepare a business case and justify an investment in EDR implementation
- Acknowledgements & Conclusion.

File #4: Frequently Asked Questions:

Includes answers to both General & Technical questions.

File #5: Detailed Technical Information for NCAR2 EDR Implementation

- Work Flows for NCAR2 EDR Implementations
- Required NCAR2 EDR Software and Documentation
- On Board, NCAR2 EDR Algorithm Software
- Software for Testing & Tuning NCAR2 EDR Representativeness



Practical use of EDR data: Flight Planning

Knowledge about the ride condition

Decisions made about route and altitude selection to avoid injuries, optimize fuel efficiency, maximize passenger comfort and provide the best inflight service



Practical use of EDR data: In-Flight

- Real-time information about the location, altitude and intensity of turbulence and also smooth air
- Ability to change altitude to avoid turbulence
- Secure the cabin and coordinate service



Benefits of data driven turbulence mitigation

- Improved safety outcomes
- Efficient fuel planning and reduced discretionary uplift
- Inflight flight level optimization
- Saving on engineering inspection requirements
- Enhanced customer experience and brand image



Business Case - Value Proposition

- Obtain access to global real time turbulence database
- Implement turbulence reporting capabilities with open source software
- Keep exclusivity of your Airline's data
- Integrate data into platforms your Airline is already using operationally
- Enhance operational costs for fuel efficiency
- Improve overall safety by avoiding turbulence
- Decrease crew and passenger injuries
- Improve the accuracy of turbulence data at different altitudes
- Decrease costs associated with turbulence events

Airlines requested IATA to be a global EDR data consolidator

Existing
turbulence
data is often
not shared

Fragmented
data pools
limit
benefits

Airlines need
to see beyond
their own data
to mitigate
turbulence

Importance of
global data
coverage

- Data is collected from airlines, business aviation or third party ground servers in real-time
- Data is consolidated, quality controlled and de-identified
- Data processing through the platform is max 30 sec
- Airlines can use their own flight planning and in-flight tools to display the data, or use IATA Turbulence Aware viewer in-flight via Wi-Fi

IATA Turbulence Aware

A global platform for sharing automated EDR turbulence reports in real time



How can I use Turbulence Aware data in my operation?

- Use your own flight planning and in-flight tools to display the data provided by the platform
- Use third party flight planning and in-flight tools to integrate the data
- Use Turbulence Aware Viewer (web-based) tool in Operations Control Center or in-flight via Wi-Fi



Overview

25 airlines currently in the **Operational Trial** with many others in the process of joining

10 airlines are **feeding** live data to the Platform

10 service providers integrating data

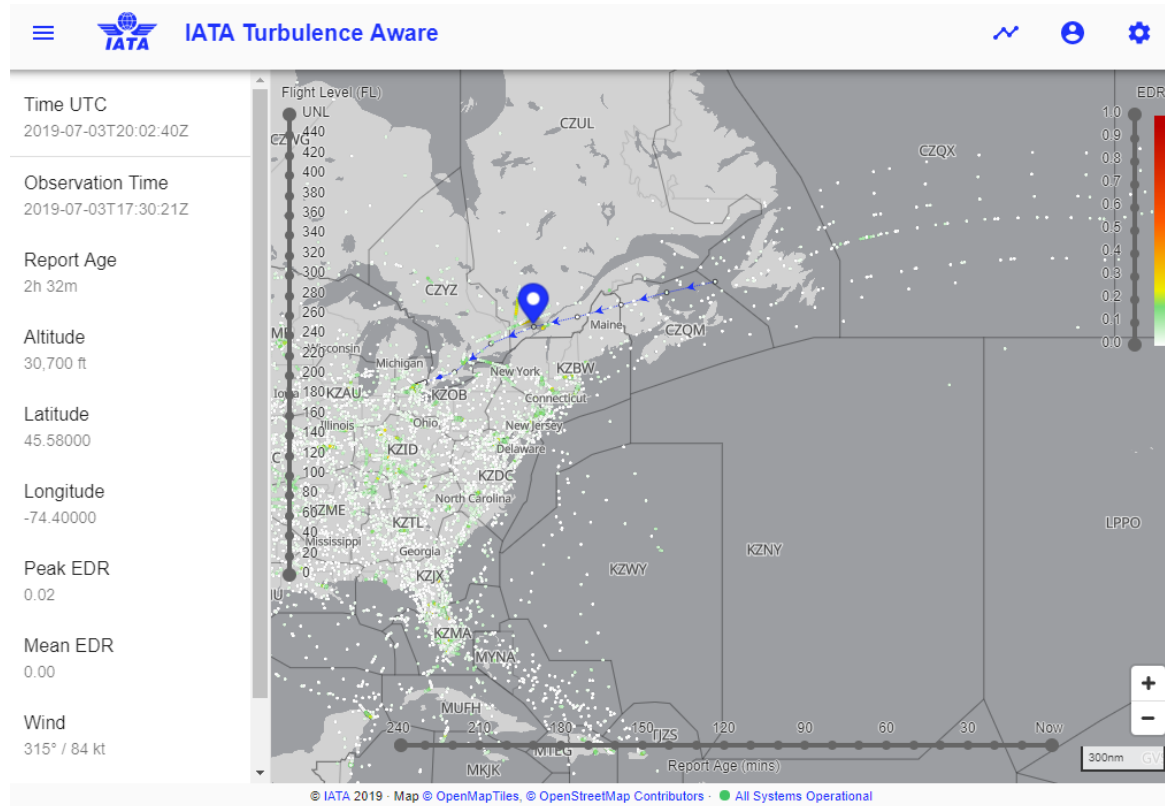
110k+ turbulence reports received daily

The IATA Turbulence Aware Team is making a continuous effort to **promote EDR reporting**



MET Viewer

- Our tool to visualize the turbulence reports
- The viewer includes basic flight planning functionalities and map overlays



- Color coded turbulence reports presented on a map
- White dots represent areas of no turbulence and colored dots represent different intensity of turbulence as per the scale on the right
- Flight Level filter on the left can be used to assess the intensity of turbulence at different flight levels
- Time slider at the bottom allows users to see turbulence reports between now and up to four hours prior
- Detailed report available for each data point, including time, altitude, aircraft position, mean and peak turbulence values as well as wind and temperature data

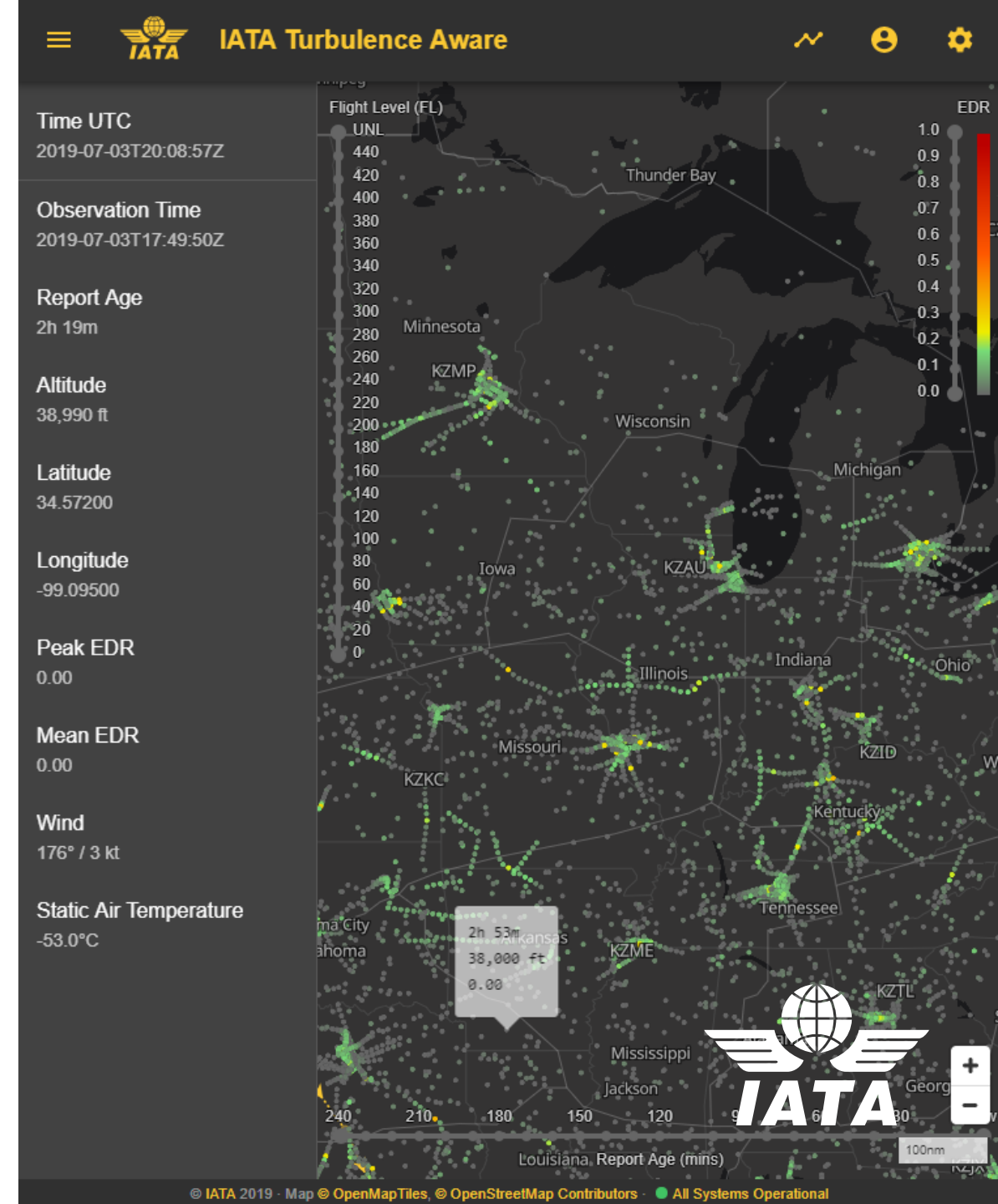
MET Viewer

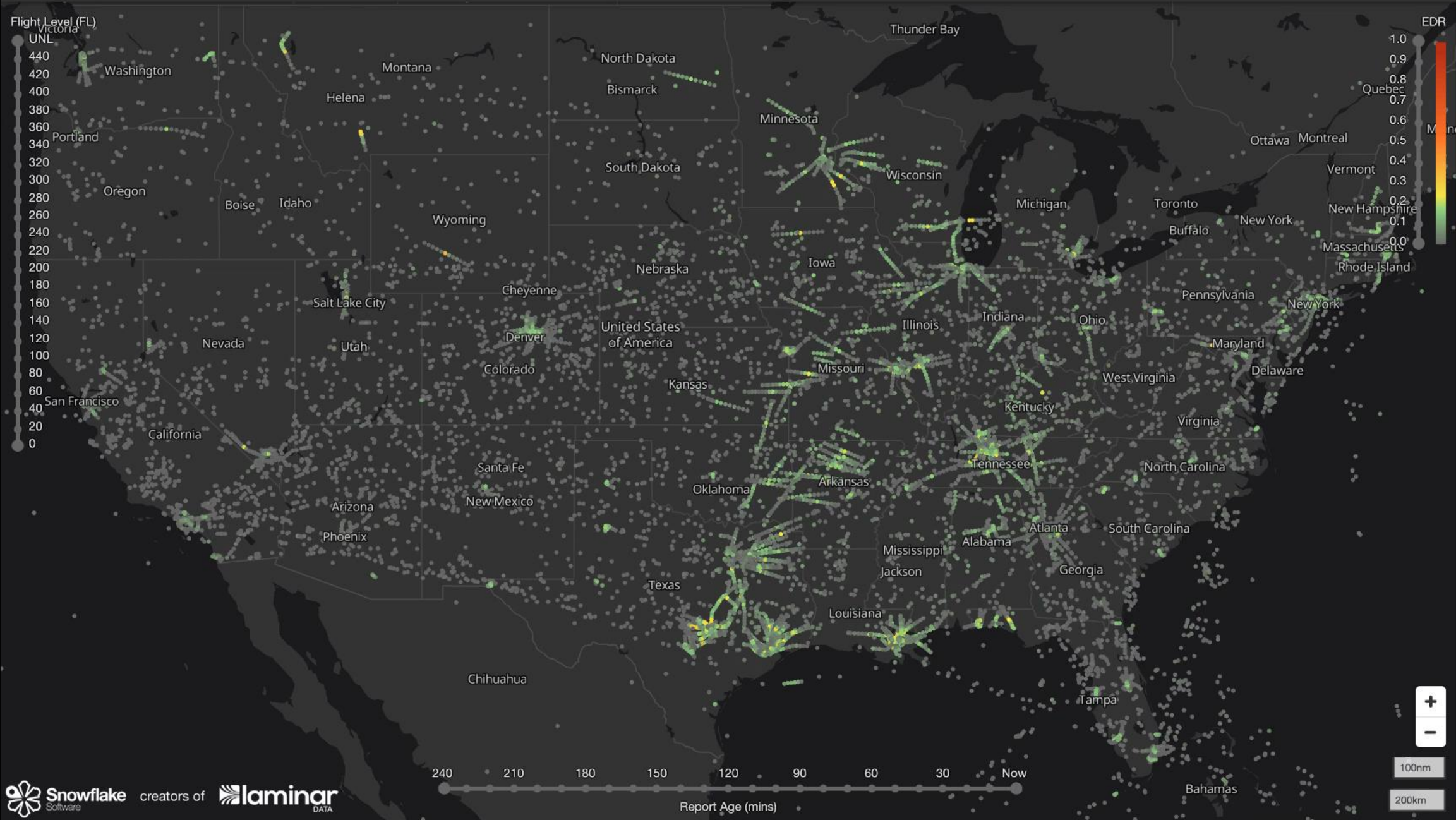
Functionalities

The MET Viewer includes many functionalities that are updated on a rolling basis until the end of 2019 given the feedback from our end users.

These functionalities include

- Dark Mode
- Adding a Flight Plans
- Boundary overlays
- Report trajectory
- EDR Severity





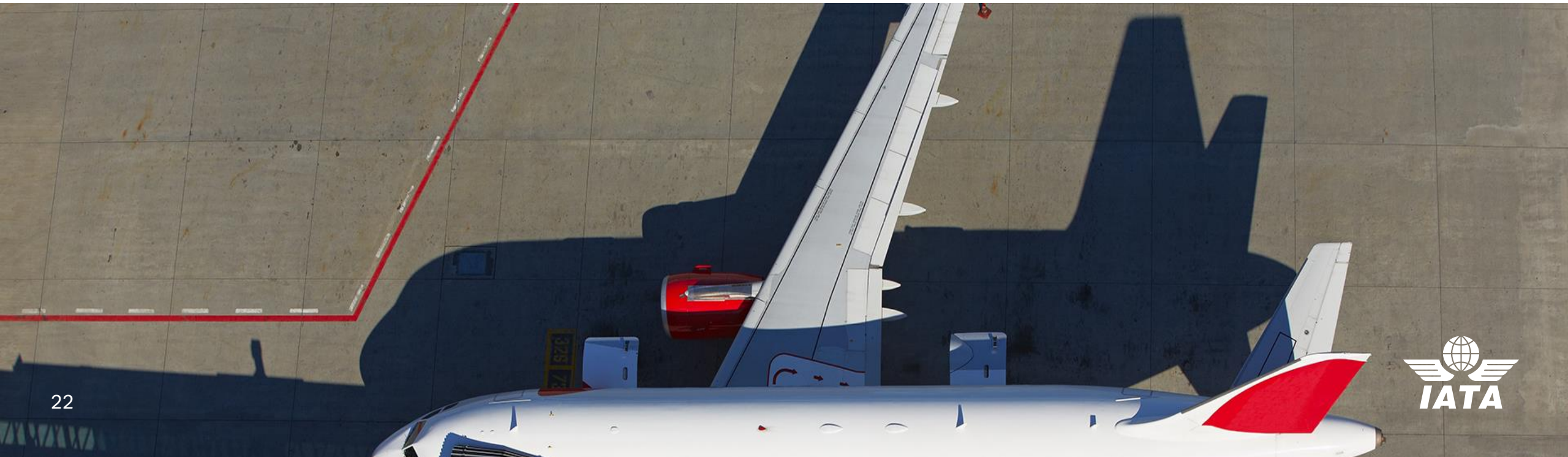
MET Viewer Demo

Turbulence Aware Viewer

Platform Implementation Timeframe

Feb 2019 - Dec 2019: Free Operational trial available to Airlines for evaluation and feedback

Jan 2020: Full Operational launch



Thank You

