



AireonINSIGHTS™ Turbulence

Global, real-time turbulence intelligence
for proactive operational safety



AireonINSIGHTS Turbulence is a global, real-time monitoring service of turbulence events around the world. By combining Aireon's space-based ADS-B data with the National Center for Atmospheric Research (NCAR) turbulence algorithm, the world's global fleet of ADS-B equipped aircraft become a distributed network of turbulence sensors — providing consistent visibility into where turbulence occurs and how severe it is, including over oceanic and remote airspace.

AireonINSIGHTS Turbulence delivers a world-first capability by transforming the global commercial aircraft fleet into a distributed sensing network for real-time atmospheric monitoring. By combining Aireon's unrivaled space-based ADS-B infrastructure with the National Center for Atmospheric Research (NCAR) algorithm, the service provides high-fidelity, global visibility into turbulence events as they occur. This solution addresses a rising risk to the aviation

industry by extending consistent, precision data across remote and oceanic regions where traditional sources are often limited or unavailable.

With sub-second latency, ADS-B data from active flights is processed through the NCAR Algorithm, outputting the peak eddy dissipation rate (EDR) experienced per minute of flight, producing a standardised turbulence measure that is normalized

Key benefits of AireonINSIGHTS Turbulence

Enhanced awareness

supporting safer, more informed
operational decisions

Operational efficiency

enabling route optimization
reducing delays and disruption

Full ADS-B visibility

monitoring all equipped aircraft
without added hardware or software

Actionable trend insights

identifying where turbulence may
be developing

Seamless integration

delivering standardized data easily
embedded into aviation systems

across aircraft types. This normalization supports consistent interpretation of turbulence intensity regardless of whether different aircraft may experience the same conditions differently, enabling a common operational and analytical baseline for turbulence awareness.

AireonINSIGHTS Turbulence is represented as event-based data: an event is the continuous period of detected turbulence that may last from seconds to hours, while each report is a one-minute increment that captures the peak EDR and associated parameters for

that minute. Multiple reports can be linked to describe the duration and evolution of a single event over time. Aireon Turbulence measurements can be categorized in accordance with global ICAO standards: Light when EDR is greater than 0.1 and less than 0.2; Moderate when EDR is 0.2 or higher and less than 0.45; Severe when EDR is 0.45 or higher and less than 0.7; and Extreme when EDR is 0.7 or higher.

In addition addition to peak EDR, each Turbulence report includes key magnitude and location parameters such as time at peak

EDR, latitude, longitude, and altitude, along with supporting aircraft and flight identifiers and operational fields including ICAO address, callsign, aircraft type, selected altitude, track angle, groundspeed, and vertical rate. The service is delivered as a real-time, global data feed designed for straightforward integration into existing systems and tools, and historical turbulence data is available in CSV format for analytics as one-off datasets or as recurring daily deliveries. AireonINSIGHTS Turbulence operates as a global monitoring service without geographic filtering to ensure complete worldwide coverage.

Use cases

With real-time, globally consistent turbulence data, AireonINSIGHTS Turbulence enables a diverse set of use cases spanning operational decision-making, system integration, forecasting, and scientific research.

	Airlines & Operators	System Integrators	OEMs	MET Service Providers	Research & Academia
In-flight turbulence alerting	▶	▶			
Route optimization	▶	▶			
Post-flight analysis	▶	▶	▶		▶
Turbulence forecasting	▶	▶		▶	
Passenger safety reporting	▶				▶
Climate & atmospheric research				▶	▶
NWP model validation		▶		▶	▶
Insurance & risk modelling	▶		▶		▶

▶ Primary use ▶ Secondary use