

The Next Generation WAFS Delivery System (2022)

The aviation industry is changing rapidly, with increasing traffic and capacity demands on airports and airspace, plus a need to limit the environmental impact of air travel. There is a growing need for accurate and detailed meteorological data to meet these developing demands, as well as to support air traffic management strategies to mitigate against and avoid hazardous weather conditions. The United Kingdom Met Office and the United States National Atmospheric and Oceanic Administration, as World Area Forecast Centres (WAFC) London and Washington, have been developing plans for the next generation of World Area Forecast System (WAFS) data sets.

Improved data coupled with the transition away from a six hourly push data paradigm to a more tailored service-enabled "data on demand" approach will allow new approaches which support improvements to flight planning and flight following - providing additional value for airlines.

What have we got planned?

- **An increase in the horizontal resolution of the gridded data sets from 1.25° to 0.25°**
 - This means one data point approx. every 1.75 minutes of flight time (compared to every 9 minutes now).
 - More detailed wind and temperature data will allow fuel efficiency gains, whilst detailed hazard fields will allow new approaches to optimising flight plans and hazard avoidance.
- **New and improved aviation hazard algorithms**
 - Turbulence severity, which will provide forecasts in terms of EDR (Eddy Dissipation Rate) using the GTG (Graphical Turbulence Guidance) algorithm developed by NCAR.

WAFS Turbulence Severity (GTG) 0.25° FL300

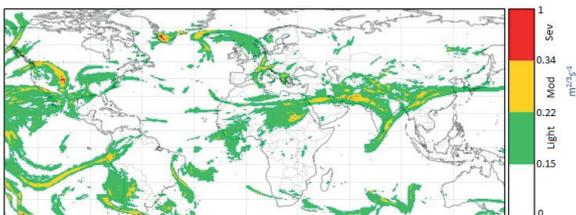


Figure 1: WAFS Turbulence Severity

- Icing severity uses more atmospheric parameters and will give a categorical assessment of icing.

WAFS Icing Severity 0.25° FL240

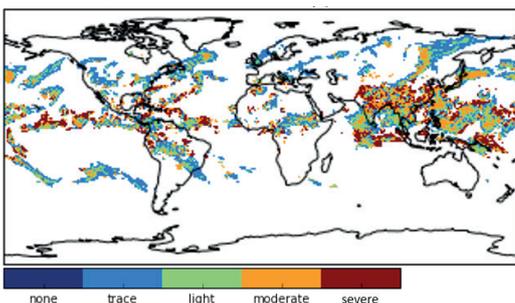


Figure 2: WAFS Icing Severity

- Probabilistic data sets will start to be produced from 2024 onwards.

- **Gridded data sets will be produced for 1000ft vertical intervals**

Parameter	1000ft data range	
	Lowest level	Highest level
Wind, temperature, geopotential height	FL050	FL600
Humidity	FL050	FL180
Turbulence severity	FL100	FL450
Icing	FL060	FL300

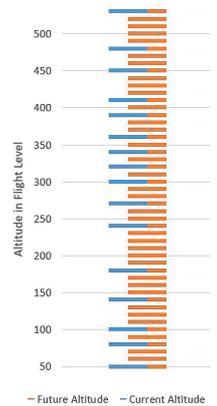


Figure 3: Future WAFC Gridded data vertical resolution

- **Gridded data sets will be provided for additional time steps:**

Time steps	Parameter
T+18 to T+24 Hourly intervals	All
T+27 to T+48 3 hourly intervals	All
T+54 to T+120 6 hourly intervals	Wind, temperature, geopotential height, jetstream only.

Figure 4: Future WAFC Gridded data time steps

- **WAFC SIGWX data sets will be produced for 3 hourly intervals between T+6 and T+48**

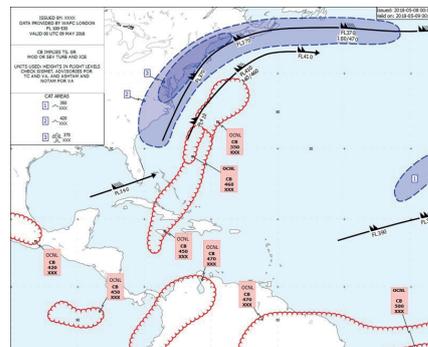


Figure 5: WAFC SIGWX Data

Note: Some additional changes to WAFC SIGWX production will be necessary, such as merging the existing high and medium level SIGWX into a single level encompassing FL100-FL600, adjustments to the way some parameters are depicted, and retirement of the medium level png charts.

Impact on SADIS and WIFS

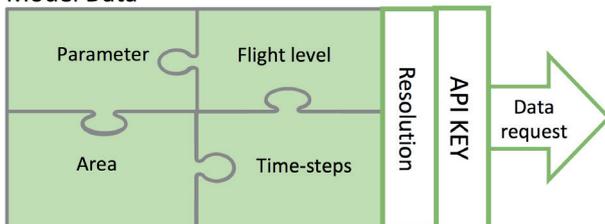
As you might imagine, these changes will result in a large increase in the volume of data that we produce. Disseminating this data over the existing SADIS ftp system operated by the United Kingdom, and WIFS system operated by the United States would lead to high latency and long download times.

So we are developing how the next generation WAFS data will be accessed. We plan to move away from the existing “download everything” approach to a future in which users download much smaller, specific chunks of information that is more relevant and better suited for their needs.

What will the next generation WAFS data delivery system be like?

- ICAO SWIM (System-Wide Information Management) compliant, to enable interoperability with other aviation systems such as airspace management and flight following software.
- SWIM services designed to support specific and relevant requests for data – so that users can download exactly what they need when they need it.
- It will meet the objectives set out in ICAO’s Global Air Navigation Plan and the associated Aviation System Block Upgrade framework.
- Cloud hosted to enable the system to scale according to the demands placed upon it.
- Accessed using an API. (Application Programming Interface)
- Will offer the ability to “subscribe” to receive routine/ fixed data sets as well as allow users to make one off requests (e.g. for a specific flight trajectory).

Model Data



OPMET Data

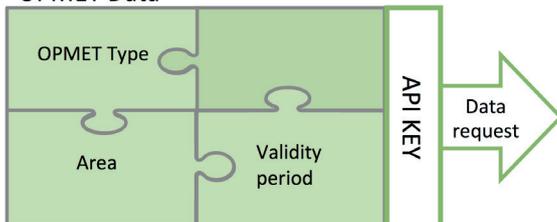
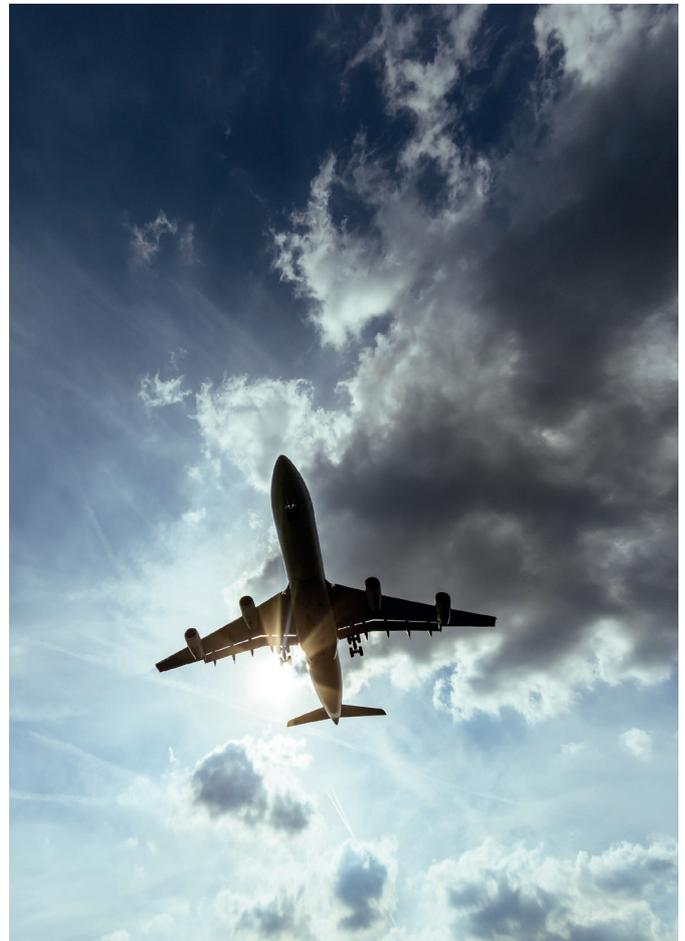


Figure 6: Illustration of the customisable parameters that we expect to offer as part of an API data request.



Benefits of WAFS data

An independent study commissioned by the Met Office shows that if used to its full potential, WAFS high resolution weather data will deliver significant benefits to the aviation industry:

- £792 million saved globally per year by 2025
- £1239 saved globally by 2030

Through

- Reduced fuel burn
- Lower emissions (15-20% of total saving)
- Reducing injury

Savings can be optimised if the WAFS data is used to improve strategic re-routing, and to improve calculations of the optimum route (wind and temperature).

Do you want to find out more?

Key information on these changes can be found on: www.metoffice.gov.uk/WAFS2022

Or e-mail: SADISmanager@metoffice.gov.uk or ncep.awcweb@noaa.gov