

# Met Office **SESAR** projects

Weather has been accountable for over 20% of Air Traffic Flow Management (ATFM) delays across Europe in recent years; and adverse weather will continue to place increasing stress on Air Traffic Management (ATM). Therefore, there is an increasing need to mitigate against the impact of adverse weather, by providing a highly accurate, resilient and consistent view of weather hazards to enable smarter decision making.

The Met Office has been working alongside partners as part of an Innovation and Networks Executive Agency (INEA) funded SESAR deployment projects to deliver services that will bring benefits across the ATM system.

## European Composite of Convection Project

### Why is this project taking place?

Radar observations in a vertical columns help give valuable detail on the nature and structure of storms, enabling effective decisions for the aviation community. The development uses a new algorithm to speed up the processing. This enables high spatial and temporal resolution 3D weather radar products to be available in real time over a large geographical area.

### What will the Met Office deliver?

The Met Office will deliver radar mosaic datasets for two regions:

- 3D high resolution radar across FABEC and FABUK-Ireland domains (EU-IRMA)
- 3D lower resolution radar across wider European domain (EU-OPERA)

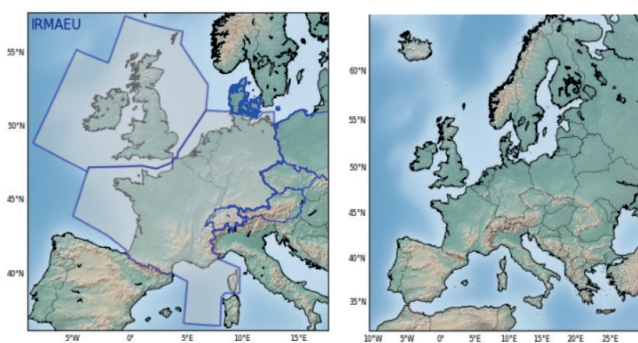


Figure 1: Coverage of radar products

	EU-IRMA product	EU-OPERA product
Horizontal Resolution	1km x 1km	2km x 2km
Vertical Resolution	500m (500m to 12km)	500m (500m to 12km)
Update cycle	5 minutes	15 minutes
Output format	Grib2	Grib2

### What will be the outputs?

A range of parameters will be available from the datasets to enable users to identify depth and intensity of convective storms; assess their development and the potential for hail.

#### 3D parameter

- A Horizontal reflectivity (3D) – 24 levels of radar data will be produced

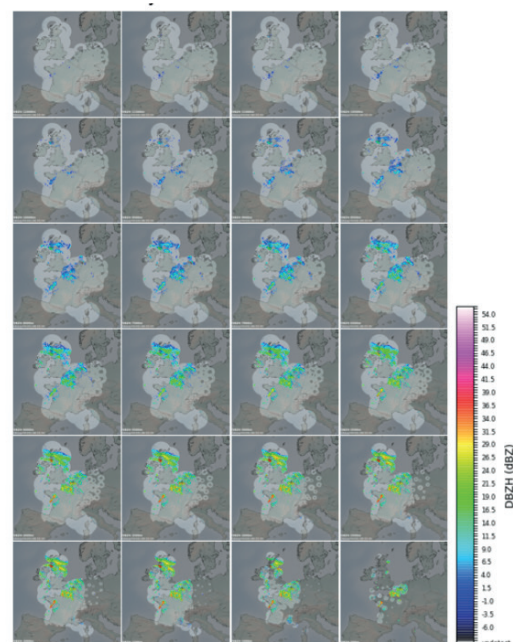


Figure 2: 24 levels of radar data

### Benefits

Greater situational awareness through enhanced provision of radar data leading to:

- Enhanced safety through more pro-active and less tactical weather avoidance
- Greater efficiency in routing aircraft, less fuel burn
- Earlier capacity and constraint management, enhancing predictability and reducing delays
- More cost effective operations



### 2D parameters:

These outputs are derived from the 3D datasets:

- Maximum reflectivity (TOPVIEW and SIDEVIEW)
- Altitude of maximum reflectivity
- Echo Tops (TOP18 and TOP45)
- Vertically Integrated Liquid

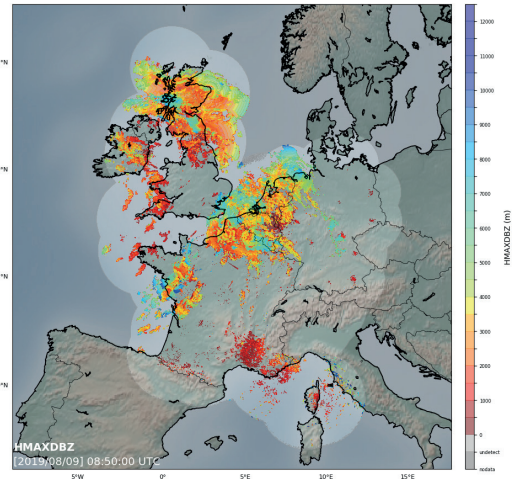


Figure 3: Max reflectivity

## European Harmonised Adverse Weather Hazards Project

### Why is this project taking place?

The overall aim is to produce a common view of meteorological hazards across the European aviation domain by combining forecasts from different National Met Services.

### What is the project going to deliver?

The following products will be developed:

- Turbulence (Met Office)
- Icing (DWD)
- Convection Nowcast (Météo-France)
- Convection Potential (Météo-France)
- Winter Weather (FMI)

### What will the Met Office deliver?

- New Harmonised turbulence across Europe
- Harmonising forecast data from Met Office, MeteoFrance and DWD to produce an enhanced forecast. Use of equal weightings methodology
- Available as gridded (Grib2) and vector datasets

### Benefits

Access to the same consistent met information will give users a common representation of weather across Europe. This in turn will deliver benefits in airspace management including:

- Enhanced airspace capacity decisions and flow management through collaborative decision making based on a single view of met across Europe
- Improved flight efficiency (time and fuel) through enhanced pre planning information
- Safety in flight through common safety related decision making

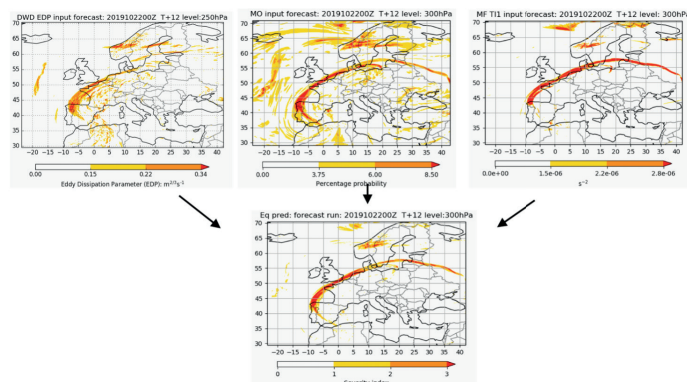


Figure 4 - Example of each of the individual forecast models and how they are harmonised to give a single output across Europe

## European Harmonised Turbulence

Output Units	Turbulence intensity scale (0,1,2,3 for nil, light, moderate, severe)
Coverage domain	29.5°N- 70.5°N; 23.5°W – 62.5°E
Horizontal resolution	0.0625° x 0.0625°
Vertical resolution	9 Flight levels approximately FL230 to FL450
Issue frequency	Four times daily, every 6 hours.
Timesteps within forecast	Hourly to T+24hr, then 3 hourly to T+48hr
Output format	GRIB2 (Gridded data), XML (Vector data)

### How can I access these new datasets and what will they be like?

- Services will be searchable through the SWIM (System-Wide Information Management) registry
- ICAO SWIM compliant, following SWIM Yellow profile, to enable interoperability with other aviation systems
- Cloud hosted to enable the system to scale according to the demands placed upon it
- Accessed using an API via http endpoints
- Full domain and predefined spatial sub-sets available for areas of specific interest



## Thank you to all contributors and our funding partners



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## Find out more:

[metoffice.gov.uk/SESARprojects](https://metoffice.gov.uk/SESARprojects)

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[sesarju.eu](https://sesarju.eu)

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