

# 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 on a number of 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?

Information from radar observations in vertical columns helps give valuable detail on the nature and structure of storms, enabling effective decision-making 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)

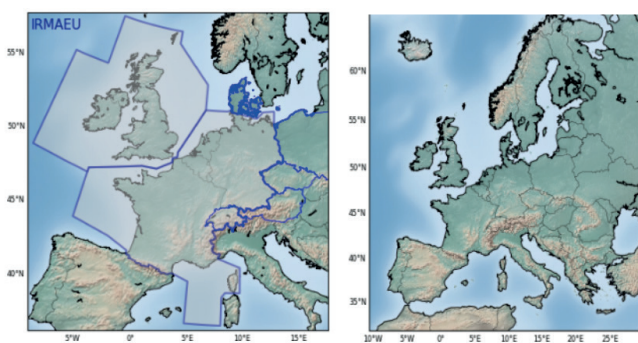


Figure 1: Coverage of radar products

	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

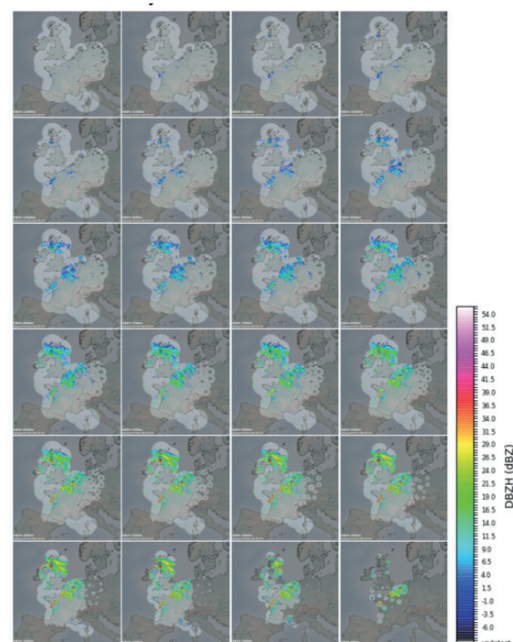


Figure 2: 24 levels of radar data

### 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

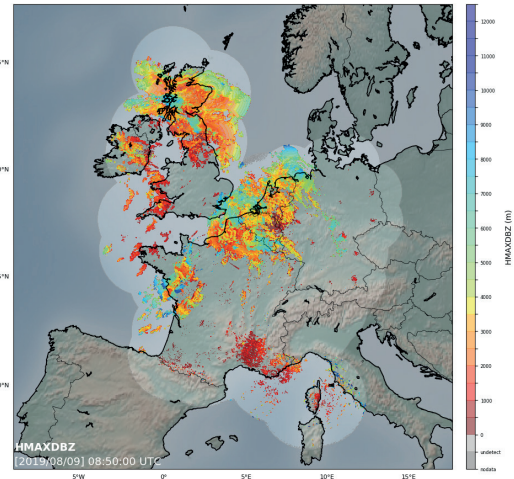


Figure 3: Max reflectivity

## 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

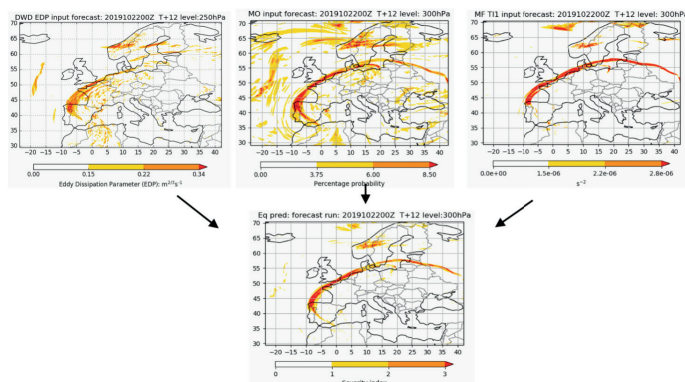


Figure 4 - Example of each of the individual forecast models and how they are harmonised to give a single output across Europe

## 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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 Met Office

 Deutscher Wetterdienst  
Wetter und Klima aus einer Hand



## 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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