

Meteorological Uncertainty Management for Flow Management Positions (FMP-Met)



Weather is difficult to predict even with the help of the latest in forecasting technology, but an accurate weather outlook is crucial for air traffic management (ATM). In this context, the **framework** for this project was the integration of MET forecast uncertainty information into the decision-making process for Flow Management Positions (FMP), an operational position that monitors the level of traffic in airspace sectors and coordinates flow measures when an excess of demand over capacity is detected. Thus, FMP-Met dealt with the provision of probabilistic traffic and capacity reduction forecasts under convective weather for a forecasting horizon of 8 hours (tactical traffic flow management).

The key **research challenge** was the analysis of a traffic flow management problem with an extended time horizon, in which the levels of uncertainty are important and, therefore, a probabilistic approach was required. In this analysis different probabilistic weather forecast products were used, with different lead times and coverage areas (the best products available at each time and location).

The **overall objective** was to provide the FMP with an intuitive and interpretable probabilistic assessment of the impact of convective weather on the traffic, up to 8 hours in advance, to allow better-informed decision making. The main **outcome** of the project was the development of a probabilistic methodology to forecast traffic congestion and traffic complexity to be used in conjunction with the tools currently employed by FMPs.

The FMP-Met concept to integrate weather uncertainty information into FMP tools was assessed positively by expert FMPs.

The **expected benefits** are the following:

- Support to take anticipated, appropriate, and timely tactical flow measures.
- Possibility of conducting what-if analyses, to have a preliminary evaluation of the impact of measures to be taken.
- Enhancement of ATM efficiency, which will ultimately reduce flight delays and improve passenger journeys.

The **next steps** in this research should lead to the development of a prototype tool, in close collaboration with FMPs, implementing the FMP-Met concept.

Website — <https://fmp-met.com>