

# Meteorological Uncertainty Management for Flow Management Positions



## Introduction

### Flow Management Position (FMP)

- Assists in choosing the best Air Traffic Control (ATC) sector configuration at the right time.
- Monitors the traffic in ATC sectors, and adjusts the capacity in view of adverse weather (among other causes).
- Coordinates possible Air Traffic Flow and Capacity Management (ATFCM) measures.

### Meteorological Uncertainty Management

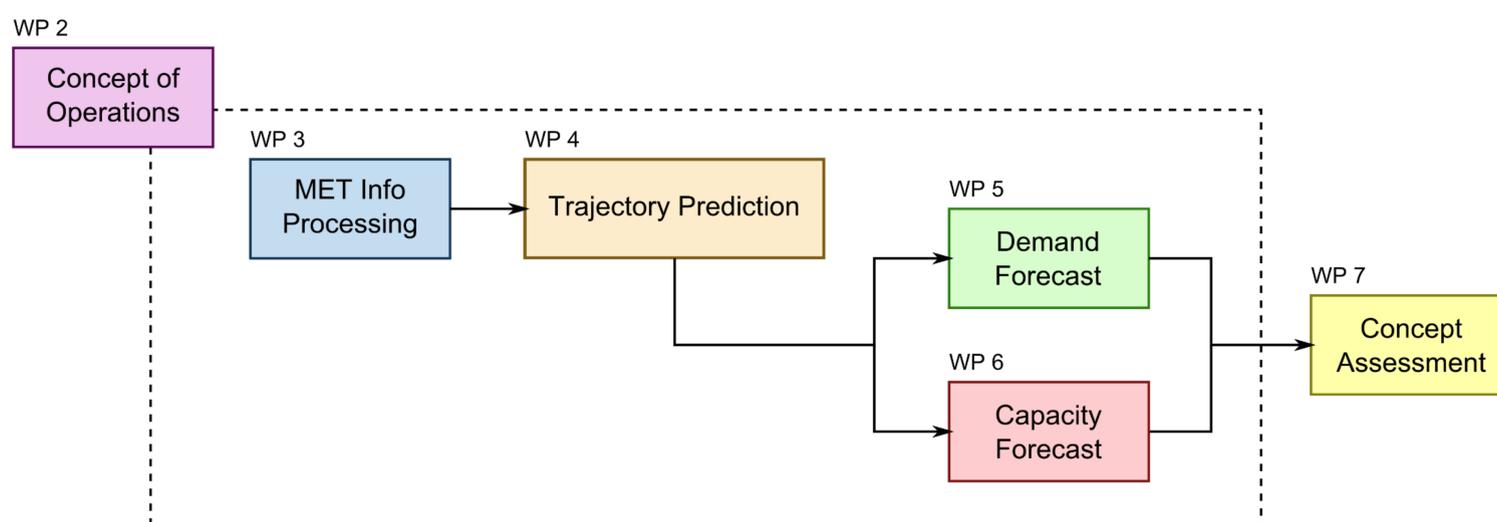
- Weather is difficult to predict but an accurate weather outlook is crucial for ATM.
- Meteorological (MET) forecast uncertainty should be included in the decision-making processes.
- Ensemble Weather Forecasting enables to quantify MET uncertainty.

## Project Objectives and Structure

The **overall objective** is to provide the FMP with an intuitive and interpretable **probabilistic assessment of the impact of convective weather on the operations**, coming from the combination of the probabilistic demand, complexity, and capacity reduction, to allow better-informed decision making.

### Specific objectives

- Tailor multi-scale, multi-source convective weather information for FMP application.
- Predict probabilistic aircraft trajectories using multi-scale convective weather information.
- Forecast multi-sector demand and complexity under convective weather.
- Translate convective weather forecasts into predictions of reduced airspace capacity.
- Produce guidelines for the use of probabilistic forecasts for FMP application.



## Impact and Relevance for ATM

The **expected impact** of this project is the **enhancement of ATM efficiency** by improving decision making in traffic flow management under convective weather (**better-informed decision making**).

The provision of a trustworthy forecast of the future sector demand and a reliable estimation of the impact of the convective weather in the sector capacity will **support the FMP in taking anticipated, appropriate, and timely tactical ATFCM measures** (such as sector configuration management, rerouting, or slot allocation), which as a consequence will lead to a **reduction of delays**.

As a **quantitative indicator** of the expected impact, savings of **24M€ per year** could be achieved for the European air traffic system, if a 5% reduction of weather-dependent delays is attained.

### Specific results expected

- Early warning of capacity reduction (caused by convective weather).
- Prediction of en-route sector congestion due to convective weather (likelihood of demand exceeding capacity).
- Suggestion of opening scheme (sectorization least affected by convective weather).



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