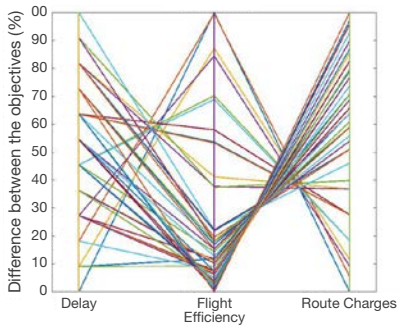
OptiFrame for Decision Support

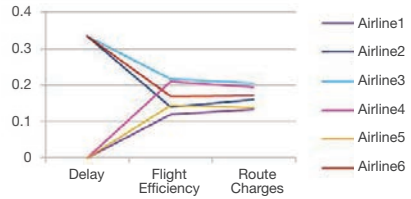
OptiFrame provides the capability to analyse alternative solutions at different levels of aggregation. At a system level, it visualizes the trade-off associated with some or all of the efficient solutions. At network level OptiFrame calculates total delay, flight efficiency, and route charges for all Airspace Users (AUs).

Network level results



At the airspace users (AUs) level, OptiFrame provides for each selected (efficient) solution the values of the identified KPIs per AU.

Airspace user results



At the individual flight level, OptiFrame allows us to visualize the 4D trajectory as well as the values of the identified KPIs.

Trajectory level results

Lancaster University

www.lancaster.ac.uk

CFR

Consorzio Futuro in Ricerca
www.cieffeerre.it

EUROCONTROL

eurocontrol.int

nlr

The Netherlands Aerospace Centre
www.nlr.org

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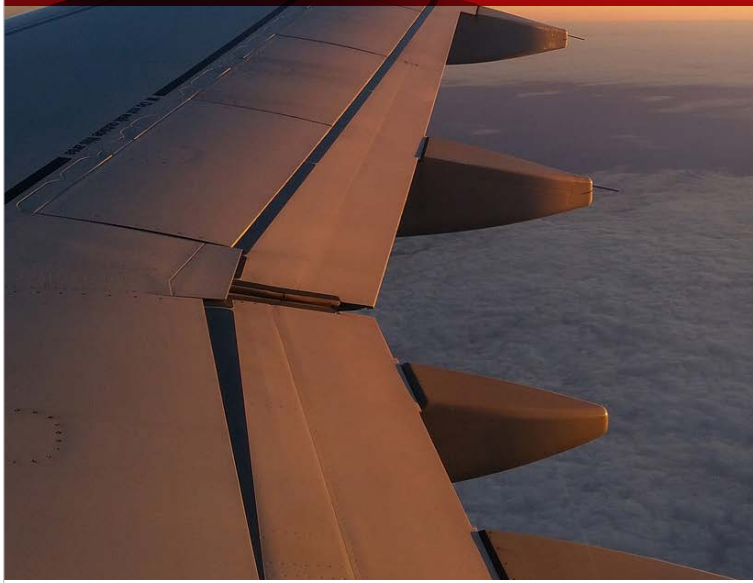
Alternatively, you can visit our website:
wp.lancs.ac.uk/optiframe

OptiFrame

An optimisation framework for trajectory based operations



SESAR JOINT UNDERTAKING

The OptiFrame Project

In 2035, the forecasted annual air traffic volume in the European Civil Aviation Conference (ECAC) area will be 14.4 million flights which will carry 1.4 billion passengers (according to the European ATM Master Plan). These values represent an increase of more than 50% in the number of flights and of 100% in the number of passengers compared to 2012. In response to this tremendous increase, the European ATM Master Plan has been developed with a clear vision to deliver a high performance ATM system that will ensure the sustainability and competitiveness of aviation in Europe.

The Trajectory Based Operations (TBO) concept has been identified as one of the cornerstones of the future ATM system. OptiFrame is a two-year Exploratory Research project funded by SESAR JU, aiming to develop mathematical models and optimization algorithms in order to configure and assess the performance of the Trajectory Based Operations (TBO) concept. The OptiFrame project's aims were to:

- Assess the viability of the concept
- Identify major issues related to its implementation by considering barriers, constraints, and stakeholders' expectations
- Investigate to what extent the objectives of flexibility and predictability of the ATM system can be achieved

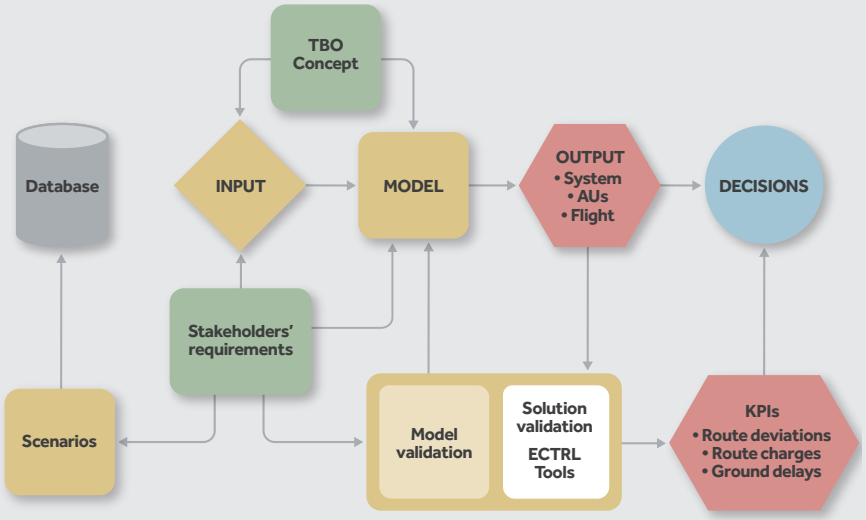
2012	2035
9.5 million flights	**14.4** million flights
0.7 billion passengers	**1.4** billion passengers

Source ATM MasterPlan

Methodology

The OptiFrame methodology involves three integrated modules; identification of stakeholders expectations and requirements; model development; and model validation.

The model requires input data describing the structure and the operational characteristics of the ATM network for alternative user defined scenarios, and the ideal 4D trajectories for the individual flights of all Airspace Users (AUs). The central feature of the OptiFrame model development process is the incorporation of the preferences and priorities of the ATM stakeholders.



Stakeholders' Preferences

- Time deviation (departure delay)
- Horizontal deviation
- Flight level deviation

Stakeholders' Priorities

The OptiFrame model incorporates three prioritization mechanisms proposed by SESAR's User Driven Prioritization Process (UDPP, Step 2).

- Fleet Delay Re-ordering
- Selective Flight Protection
- Arrival Departure Margins

The OptiFrame Model

OptiFrame developed a multi-objective optimization model that provides the capability to examine the trade-off between flight departure delays, flight efficiency, and flight route charges.