OPTIFRAME : Project Overview

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LANCASTER UNIVERSITY
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Consortium
Main objective

Application of principles of mathematical modelling and optimization to configure and assess the performance of the Trajectory Based Operations (TBO) concept.

- Viability of the concept
- Major issues (e.g., barriers, constraints, stakeholders’ expectations, etc.)
- Whether and to what extend the objectives of flexibility of airspace users and predictability of the ATM system can be achieved
Project outcome

Development of a framework to address the identified objectives and provide guidance to decision makers on the potential and conditions of deployment of the TBO concept.

This framework, consisting of mathematical models, solution algorithms and conditions of applicability, can be used:

1. as a “simulator” to fully understand the benefits and limitations of the TBO approach;
2. to investigate trade-offs between different competing objectives relevant to the TBO concept;
3. as an engine for the preliminary identification, on a daily basis, of promising ATM interventions regarding the ECAC-wide area.
Innovative aspects of the proposed approach

1. It explicitly takes into account the route preferences and flight criteria and priorities of the airspace users.

2. Holistic view of the ATM system (by considering all ATM system components for the entire ECAC area).

... but barriers, enablers and potential benefits from the TBO concept implementation should be analysed.
Research questions

How stakeholders’ priorities and preferences can be incorporated into mathematical models?
What are the scalability issues associated with the development and implementation of these models and algorithms?
Project activities (WPs)

WP1 Project Management [ULANC]
WP2 State-of-the-art and Stakeholder Expectations [CFR]
WP3 Data Management [CFR]
WP4 Modelling of TBO [ULANC]
WP5 Development and Implementation of Solution Algorithms (exact and heuristic) [ULANC]
WP6 Validation of the OptiFrame approach in normal and disturbance cases [NLR]
WP7 Implications for Decision Makers and Dissemination of results [EUROCONTROL]
WP8 Ethics requirements [ULANC]
Management structure

SESAR JU

PROJECT COORDINATOR
Lancaster University

STEERING COMMITTEE

ADVISORY COMMITTEE OF STAKEHOLDERS

WP2
STATE-OF-THE-ART AND STAKEHOLDER EXPECTATIONS
CFR

WP3
DATA MANAGEMENT
CFR

WP4
MODELLING TRAJECTORY-BASED OPTIMISATION (TBO)
ULANC

WP5
DEVELOPMENT AND IMPLEMENTATION OF SOLUTION ALGORITHMS
ULANC

WP6
VALIDATION AND SENSITIVITY OF TBO TO PERTURBATIONS
NLR

WP7
IMPLICATIONS FOR DECISION-MAKERS AND DISSEMINATION
ECTRL
Interrelation of project activities

- WP1 Project Management
- WP2 State-of-the-art and Stakeholder Expectations
- WP3 Data Management
- WP4 Modelling TBO
- WP5 Development & Impl. of Algorithms
- WP6 Validation of OptiFrame Approach
- WP7 Implications for Decision Makers and Dissemination
## Project schedule

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Workshop related tasks

WP 4: Modelling of TBO
Task 4.1: Optimization modelling of ATM system.
Task 4.2: Modelling of stakeholder preferences and priorities.
Task 4.3: Preliminary model assessment and modelling refinements.

WP6: Validation of the OptiFrame approach in normal and disturbance cases
Task 6.1: Identification of disturbances and operational scenarios of TBO.
Task 6.2: Qualitative assessment of OptiFrame models in normal and disturbance cases.
Task 6.3: Assessment of the OptiFrame computational framework in normal and disturbance cases.
Expected project impact

Project impact will be assessed in relation to ICAO’s KPIs

- Capacity
- Access & equity
- Cost effectiveness
- Efficiency (environment)
- Flexibility
- Predictability
Expected impact on SESAR target concepts

Moving from airspace sectors to 4D Trajectory Management
Traffic Synchronisation
Network Collaborative Management and Dynamic Capacity Balancing
Airport Integration and Throughput
Thank you very much for your attention!

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