START
"a Stable and resilient ATM by integrating Robust airline operations into the network"

Concept Note

- Funded by the European Commission
- Call: H2020-SESAR-2019-2
- SESAR-ER4-15-2019: Increased Levels of Automation for the ATM Network
- 1st May 2020 – 31 Oct. 2022
- GA number: 893204

Media

- **Project's** website: www.START-ATM.com
- **Twitter: @START_ATM**
- Linked-in Group

Project Summary

One of the key enablers of Trajectory Based Operations (TBO) is the automated updating of trajectories in reaction to developing uncertainties. However, a high frequency of updates and modifications leads to degraded system stability. The overall goal of START (a Stable and resilienT ATM by integrAting Robust airline operations into the neTwork) is to develop, implement, and validate optimisation algorithms for robust airline operations that result in stable and resilient ATM performance even in disturbed scenarios. START's goal shall be reached by a suitable combination of methods from applied mathematics, i.e.: mathematical optimisation, optimisation under uncertainty, Artificial Intelligence (AI) and data science, as well as algorithm design. Furthermore, insight into the uncertainties relevant in TBO systems will be gained through simulations. The main focus of the project is the optimization of conventional traffic situations while considering disruptive weather events such as thunderstorms.

Project Specific Goals:

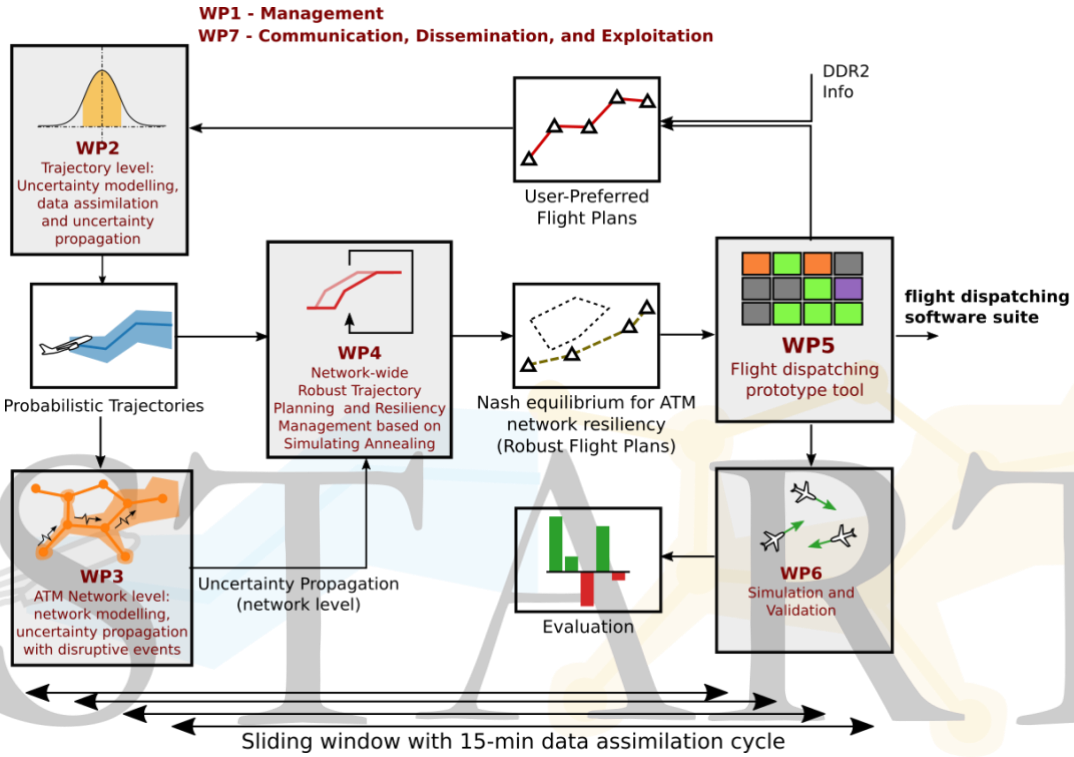
- To model uncertainties at the micro (trajectory) level, assimilate observations (via ADSB/Radar) every 15 min and propagate trajectory uncertainties using assimilated models and a stochastic trajectory predictor.
- To model uncertainties at the macro (ATM network) level, assimilate observations (satellite data for storm, and network status) every 15 min., and propagate ATM network uncertainties using the assimilated models.
- To develop an Artificial Intelligence (AI) algorithm capable of generating a set of pan-European (i.e., considering the whole traffic over Europe) robust trajectories that make the European ATM system resilient when facing these relevant validate ties.
- To implement those algorithms as an advanced fight dispatching demo functionality for airspace users to obtain robust trajectories.
- To validate these concepts through system-wide simulation procedures in order to evaluate their stability.

Hypotheses

The following two hypotheses are to be verified:

- H1: The calculation of the robust trajectories that make the European ATM system resilient when facing disruptive events (e.g., thunderstorms) and relevant uncertainties can bring **improvements on the airline side**.
- H2: The calculation of the robust trajectories that make the European ATM system resilient when facing disruptive events (e.g., thunderstorms) and relevant uncertainties can bring **improvements on the Network side**.

Concept and Methodology



Consortium

Participant No		Participant organisation name	Country
1 - BRTE	BOEING	Boeing Research and Technology Germany (BRTE)	Germany
2 - DLR	DLR	German Aerospace Center (DLR)	Germany
3- ENAC	ENAC	Ecole Nationale de l'Aviation Civile (ENAC)	France
4- FK	FLIGHTKEYS	FlightKeys (FK)	Austria
5- ITU		Istambul Teknik Universitesi (ITU)	Turkey
6 – UC3M (Coordinator)	Universidad Carlos III de Madrid	**Universidad Carlos III de Madrid (UC3M)**	**Spain**
7 - UPC	UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH	Universitat Politecnica de Catalunya (UPC)	Spain