

AIRSPACE AND AIRFIELD MODELLING

Fast Time Simulation



Think

WHO ARE THINK?

Think Research is an Air Traffic Management and Airports consultancy based in Bournemouth, UK.

We are a data-centric consultancy – all our advice is evidence-based and validated using appropriate analytical techniques.

Modelling and Simulation are capabilities at the core of our services:

- We use Real and Fast Time Simulation (RTS and FTS) to test ideas, generate evidence of system performance, gain user feedback and train the operators.
- Our approach to modelling and simulation is based on concept maturity - we can help you develop a simulation strategy according to your objectives, budget, resource and timescales.
- Our strategy can cover rapid, low cost models for less mature ideas or concepts, up to large scale trials for pre-operational concepts and systems.
- Our experience covers all the traditional techniques such as modelling, gaming, prototyping, RTS, FTS, human-in-the-loop, shadow mode trials, flight trials and operational trials.

This presentation explains how we can help you assess airspace and airfield solutions and changes using Fast Time Simulation.



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Elizabet is an ATM Consultant who has experience in Fast Time Simulation modelling using AirTOP (developed by Transoft Solutions), remote towers and airspace modernisation. She joined us after completing her MSc degree in Air Transport Management at Loughborough University, where she was exploring Remote Towers impact on controllers as her research project.



IN THIS PRESENTATION...

UNDERSTANDING FAST TIME
SIMULATION



Deep diving into the Fast Time Simulation service and understanding how Think can deliver cost-effective, quick and high quality solutions.

BENEFITS OF FAST TIME SIMULATION



Capturing the benefits of using Fast Time Simulation modelling and assessment.

MODELLING TOOL



Getting you familiar with AirTOP FTS software we use for airspace and airfield modelling.

DATA OUTPUTS



Introducing the types of data, reports and outputs we can generate using AirTOP.

OUR EXPERTISE



Our expertise and experience with airspace and airfield modelling.

UNDERSTANDING FAST TIME SIMULATION



Airports and airspace are complex environments where infrastructural, structural and operational changes are almost always difficult to implement, require substantial time and large investments.

Fast Time Simulation (FTS) modelling gives an efficient and cost-effective way of evaluation which can help inform key business decisions at an early stage. It is a flexible method of assessing operational aspects and can be used in strategic or pre-tactical environments.

AT THINK, WE USE FTS TO...

Generate evidence of system and operational performance

Mature, evaluate and optimise solutions, ideas and concepts

Rapidly explore and assess system and operational changes

FTS can be applied in many ways including capacity evaluations, scheduling, assessing impact of planned changes, ATM procedures, airspace design, and many more. These activities are too valuable to leave to chance and Think understand the uses, benefits, considerations and methods better than any other consultancy.

BENEFITS OF FAST TIME SIMULATION



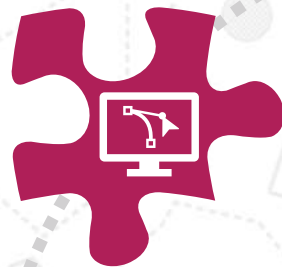
FORECASTING

FTS produces forecast outcomes with moderate levels of accuracy



VISUALISATION

Modelling allows to better understand and visualise the operation



DEVELOPMENT IMPACT

Modelling in FTS makes it easy to understand the impact of planned/unplanned changes



COST-EFFECTIVENESS

FTS is a cost-effective and efficient solution for evaluation of projects at an early stage



IDENTIFYING RISKS

Using FTS gives the ability to spot potential risks and problematic areas



MODELLING TOOL

AirTOP is a data-centric, gate-to-gate fast time air traffic complexity modelling, simulation and assessment software developed by Airtopsoft, now part of Transoft. We use AirTOP for scenarios testing using aircraft performance data and reporting by making use of data reports and interactive 2D maps and 3D views.

The models developed using the software are designed to give an accurate representation of real life operations. Simulations run at accelerated speed and generates large volumes of output data which are analysed to form meaningful conclusions.

Our Think FTS experts are trained and experienced at using AirTOP as our primary airspace and airfield modelling tool.

As part of the AirTOP tool, we specialise in the following features:

EN-ROUTE AND ATC

- Flow Management and AMAN
- ATCO workload modelling and assessment

AIRPORT TMA

- Holdings, SIDs/STARs
- Runway sequencing and dependencies

AIRPORT AIRSIDE

- Aircraft manoeuvring
- Airfield servicing vehicles movement



CONCEPT MATURITY

Low

New concepts

- New airport
- New runway
- New airspace design

Planned changes

- New apron/taxiway
- Airspace re-structuring
- Assessing ATCO workload

Solutions comparison

- TMA and taxiing routes
- Procedures definition
- ATCO handover positions

Capacity establishment

- En-route capacity
- Airfield capacity
- Runway throughput

Identification of showstoppers

- “Hot spots” and congestion areas
- AROT/DROT estimations
- Procedural inefficiencies

Implementation and assessment of operational changes

- En-route and TMA operations
- Airfield operations
- ATC operations

High



AirTOP is a flexible tool that allows cost-efficient and rapid visualisation, testing and evaluation of concepts in different maturity stages.

We have identified six maturity stages of concept development along with examples to better explain the type of changes each maturity stage may involve that could be modelled and assessed using AirTOP.

DATA OUTPUTS



AirTOP outputs vast volumes of raw data which require technical and operational knowledge to interpret. Here are some of the results you can expect depending on project requirements:

- Gate, runway and airborne delays;
- Stand and taxiway utilisation;
- “Hot spots” and congestion areas identification;
- Controller workload;
- Runway and sector throughput and capacity;
- Track miles flown;
- Trajectory profiles;
- Traffic density plots;
- Fuel burn estimations;
- 2D/3D simulation playback.



At Think, we pride ourselves in being the modern consultancy who will deliver results that are simple, honest, transparent and valuable. We combine the raw data with our qualitative, technical and operational ATM and Airports expertise to provide the whole package.



As an end product, we ensure our clients receive analysed and evaluated information and meaningful conclusions to support the project objectives.

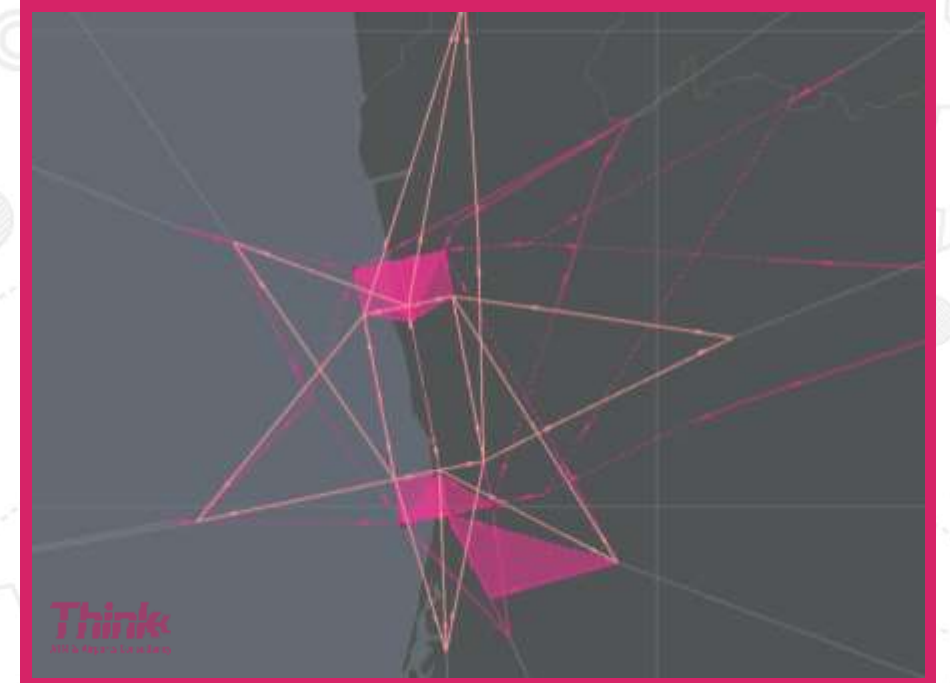
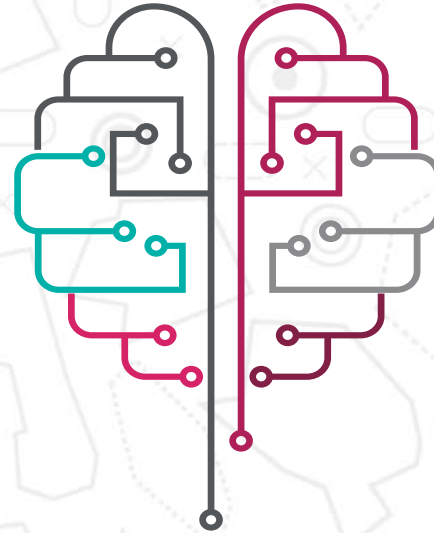
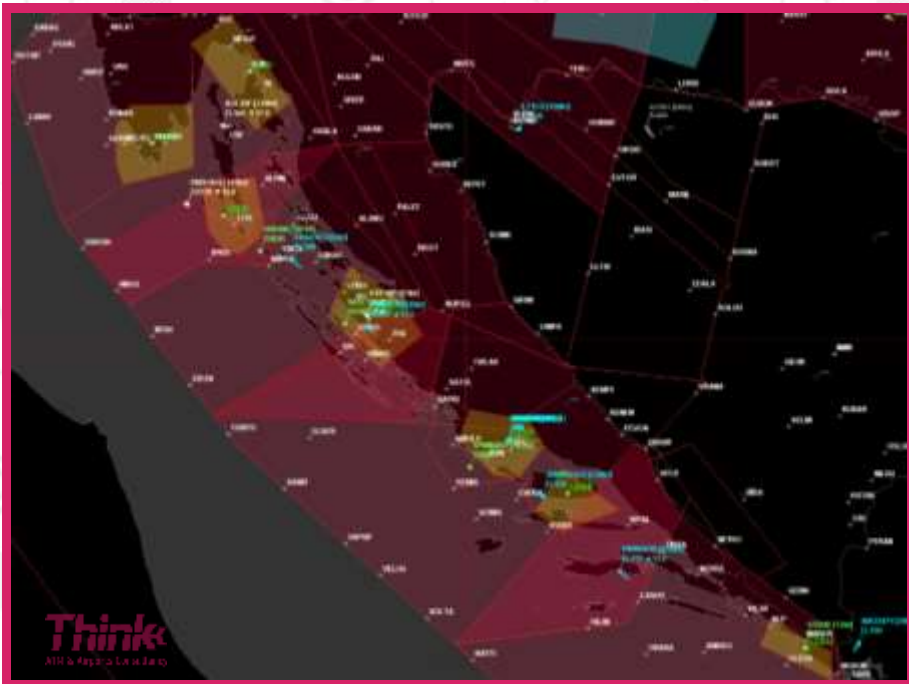


OUR EXPERTISE – AIRSPACE



AIRPORT TMA MODELLING

We have worked on numerous projects in the past with focus on airspace, in particular TMA modelling, traffic separation and minimising airborne delays.



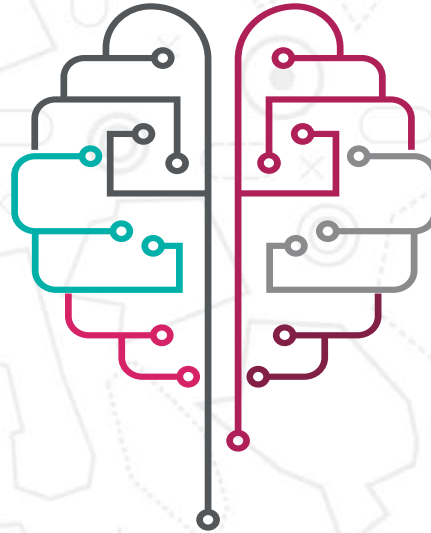
Our custom-made models were used to generate data for analysis and propose solutions for planned airspace re-design, improvement of operational practices, assessing infrastructure ability to handle varying traffic levels, estimating en-route and TMA delay, and identifying potential congestion areas.

OUR EXPERTISE – AIRFIELD



AIRFIELD CAPACITY MODELLING

Our FTS team have also supported several airfield-related projects looking at different areas including runway and taxiway development, runway throughput and aircraft and service vehicle routings.



As part of the projects, we have tested different scenarios to better understand runway and stand capacity, identify “hot spots”, estimate ground and runway delays, define optimum taxiway routings, assess airfield infrastructural developments impact on operations, and calculate ATCO workload levels in different handover positions.



Trajectory Based
Operations



Remote and Digital
Tower



Wake and Time
Based Separation



Airport CDM



Performance Based
Navigation



Flexible Use of
Airspace



Unmanned Aerial
Systems



Runway
Optimisation



Virtual Centre



Enterprise and Airspace
Architecture



Airspace Change



ATCO Team
Organisation & Training