

SINAPS

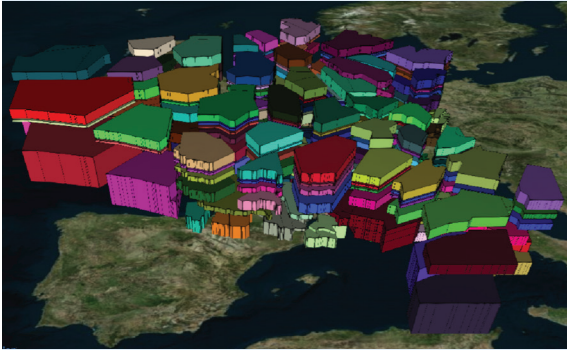
Capacity and resources optimization

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A SET OF INNOVATIVE ATFCM SERVICES TO SUPPORT DECISION MAKING FOR THE DYNAMIC CONFIGURATION OF EN-ROUTE SECTORS

SINAPS provides a set of innovative services addressing Dynamic Airspace Configuration (DAC) for Flow Management Position (FMP) and Supervisors in Area Control Centers (ACCs). This tool integrates multiple operational parameters and offers various advanced operational solutions to deploy the optimal configuration of sectors, and thus to optimize capacity with available resources.





European airspace is divided in several elementary blocks of airspace: it allows modularity and flexibility in building the different airspace configurations to meet expected and effective traffic flows. In the case of France, its airspace is composed of 168 elementary sectors.

In tactical phase, Supervisors and FMPs analyze, on a continuous basis, traffic demand and available capacity from the analysis of the operational ACC data (resources, technical availability, unexpected events...), and the environment data (weather, military activity). With their expertise, they manually determine the most adequate sector configurations. Without automation, identifying the sequence of adequate ACC sector configurations according to traffic flows and associated workload is time consuming. And only solutions from predefined catalogues are routinely used, limiting the possibilities.



SINAPS, THE OPERATIONAL CONCEPT

SINAPS (SWIM Integrated Network management and extended ATC Planning Services), using innovative technics, offers **dynamicity, optimization and time-saving in capacity management and ACC sector configuration**. In order to maximize the benefits of airspace modularity while optimizing resources, automated functions have been developed to support Supervisors' and FMPs' decision making: SINAPS provides airspace solutions optimized in case of high workload and unforeseen events which could require quick decisions for airspace re-organization. SINAPS provides additional means in the ATFCM toolkit using dynamic sector configurations to facilitate Users Preferred Routings.



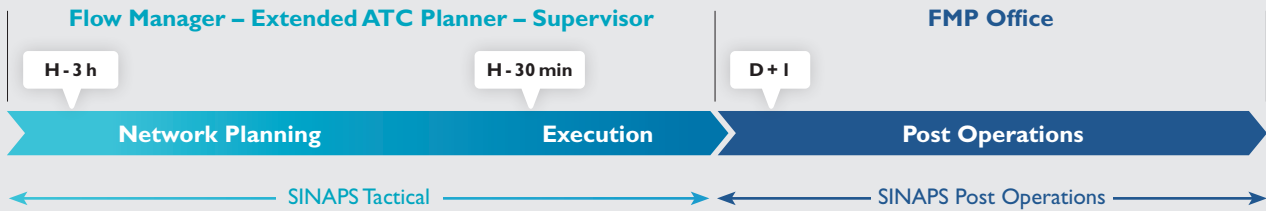
DIGITALIZATION AND ARTIFICIAL INTELLIGENCE

SINAPS is developed by DSNA and its partner ONERA in the framework of the SESAR project "Advanced Airspace Management" led by EUROCONTROL. The tool is based on webservices (Network Manager B2B, SINAPS server, 4Me ATFCM data server) to enable easy accessibility and integration in different operational environments.

SINAPS uses the latest innovations:

- **Data Mining**
- **Machine Learning**
- **Configuration Optimizer based on real-time multi-objective optimization**
- **SWIM web services architecture**
- **Human factors in design**
- **"Exploratory mode" capability**

OPERATIONAL WORKFLOW



Support Supervisors and FMPs by optimizing ACC sector configuration

No more predefined catalogue of ACC configurations, only a list of elementary and collapsed sectors to be combined adequately by the Configuration Optimizer and to build the ACC configuration.

Investigate new options to face traffic evolution

With the “exploratory mode”, the Configuration Optimizer processes all geographically feasible merging of sectors, and identifies the most promising ones with regard to evolving traffic distribution.

SINAPS HMI

The screenshot displays the SINAPS HMI interface, showing various charts and data tables. The interface includes a menu bar (File, View, Tests) and a status bar (28/07 09:18). The main area is divided into several sections:

- Alerts on excessive workload:** A chart showing workload over time with a highlighted peak.
- Nb of CWP's available/required:** A table showing personnel and CWP status.
- Possibility to trigger new calculations with less/more CWP's or different constraints:** A table showing solutions generated with data from 18:25.
- Towards access to “what if” ATFCM measures to combine DAC and ATFCM solutions:** A table showing solutions for various flight paths.
- Solutions provided by the Optimizer are computed to ensure a valid and feasible transition path from the current ACC configuration:** A table showing solutions for various flight paths.

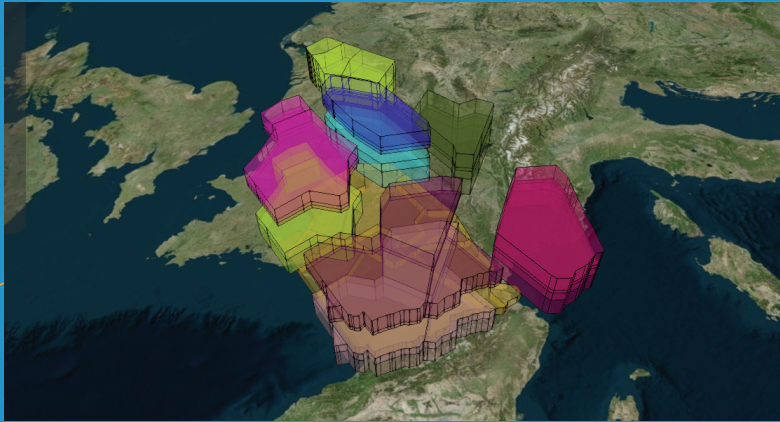
Occupancy/workload charts related to the selected solution dynamically updated – access to flight lists...

TRIALS IN BORDEAUX ACC

Bordeaux ACC airspace is composed of 38 elementary sectors, to be dynamically and efficiently collapsed, on up to 21 Controller Working Positions (CWP).

More than 20 Supervisors / FMPs were involved in the September 2018 trial in the ACC operations room. Each evaluation team had a 3 hour slot.

Then, simulations were conducted during several peak traffic periods to compare results with and without SINAPS, and to investigate new solutions offered by the exploratory mode using the full range of geographical possibilities.



A positive feedback from both FMPs and Supervisors on different aspects: **usability, efficiency, time saving, workload, support in decision making.**

"We appreciated that coordination between FMPs and Supervisors was facilitated."

"It was easy and quick to get and assess several possible airspace solutions."

"Interesting new solutions were offered by the tool."

"It was easy and quick to identify where the remaining problems were and to concentrate on them."

"Yes, SINAPS saves time and effort!"

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