



# Airport and Airspace Fast-Time Simulation Software

## Terminal-to-Terminal Fast-Time Modeling and Simulation

AirTOP®, the leading airport and airspace simulation software, is a comprehensive suite of tools to model, simulate, and visualize airport and air traffic operations—in fast-time. Created by experts who understand the challenges of managing airports and airspace, AirTOP lets you study the implications of infrastructural or operational changes before investing in costly and time-consuming construction projects or altering procedures. Confidently make decisions that translate into safe, efficient, and cost-effective operations.

Use AirTOP to measure terminal, airside or airspace capacity, pinpoint delays, determine the impact of revised flight schedules, simulate new operational procedures, assess air traffic controller workload, and more. Using integrated, multifaceted functions, assess individual aspects of all airport and airspace operations or run complete gate-to-gate, or terminal-to-terminal analyses.

Trusted by consultants, airports, air navigation agencies, research institutes, and regulatory bodies around the world, AirTOP employs rule-based modeling (you provide the inputs based on your unique situation) to create simulations of multi-agent scenarios and events. AirTOP provides fast-time results—running hours of procedures in mere minutes—so you can quickly and effectively assess outcomes of different scenarios.

AirTOP is a modular platform, offering the flexibility to license modules to suit your project requirements. The modules, Airside Aircraft, Airside Vehicle, and Terminal, allow the simulation of aircraft or support vehicles on the ground, or passenger movements within the terminal, while Runway Capacity Analyzer helps you assess runway capacity. Evaluating and managing airspace operations from airport to airport is achieved with the TMA/TRACON, En Route, and Flow Management modules.

The fully-integrated AirTOP WIZer ACC module brings the benefits of fast-time simulation to real-time operations.

## Benefits



### Customize data for better decision-making

AirTOP data is highly customizable and can be extracted and visualized using hundreds of built-in reports, or exported as spreadsheets or SQL databases for presentation to stakeholders. Create videos of simulations to portray the impacts of different scenarios to decision-makers. The project management tool allows users to define scenario variants while avoiding data duplication.



### Visualize the problem – and the solution – in 2D and 3D

Seeing a problem often makes it easier to identify solutions. To test different scenarios and measure impacts, AirTOP accurately simulates all user-defined airport and airspace operations, as well as rules, multi-agent tasks, and behaviors. A single graphical user interface provides easy scenario editing, as well as viewing of simulations in 2D and 3D. AirTOP features an easy-to-use integrated map-based application containing GIS capabilities, to allow a flexible background display of scanned maps, aeronautical charts or vector data, weather data, satellite images, and elevation data.



### Purchase only the modules you need

AirTOP modules integrate with one another on a common platform to offer a scalable feature set. An airport project may begin with the Airside Aircraft module, and as operations grow in size or complexity, additional modules such as Airside Vehicle or TMA/TRACON can be added to extend the software's capabilities.



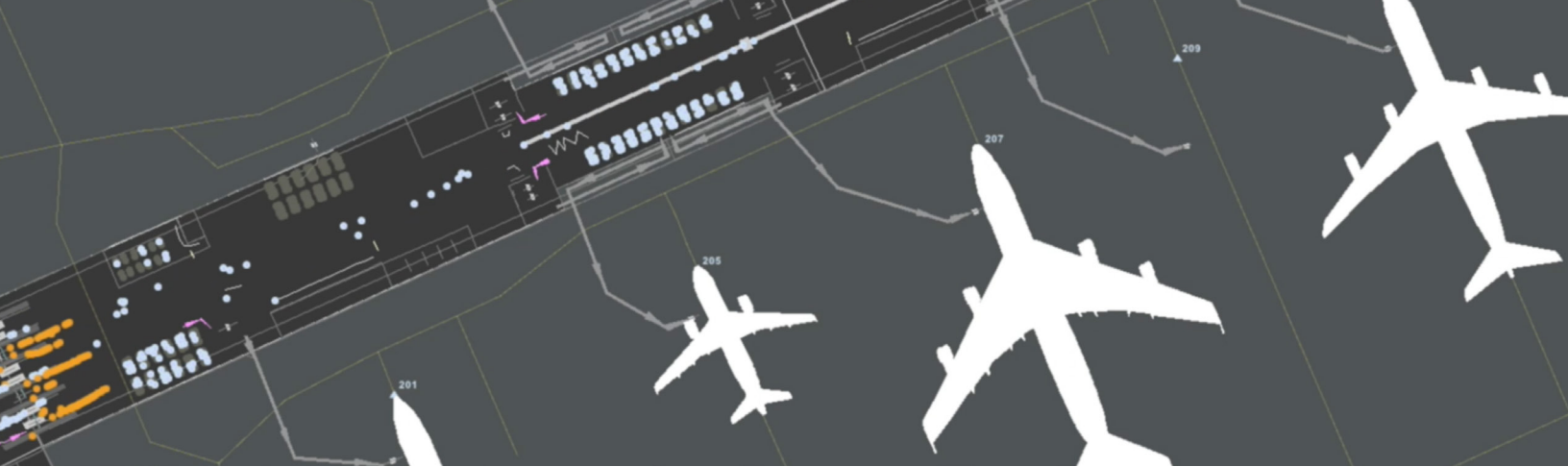
### Make better, more-informed decisions

Complicated decisions involving multiple moving parts require more than a simple spreadsheet. When considering making changes to airport or airspace operations or infrastructure, AirTOP assists with informed decision making. Accurately model any airport or airspace operation, and run fast-time simulations of complex scenarios to test options and examine all the 'what-ifs.'



### Get the most out of airport and airspace operations and capacity

At an airport, delays of minutes and the associated knock-on effects can translate into impacts on the bottom line. AirTOP's broad spectrum of tools allows users to assess how scenarios impact various aspects of airport operations, and how decisions play out in terms of costs and efficiency.



## Modules

### AirTOP Terminal

Before considering implementing a new terminal layout or revising operational systems or processes, use AirTOP Terminal to weigh options, assess design choices, and evaluate constraints. Airport designers, planners, operators, and airlines use AirTOP Terminal to:

- View 2D and 3D models of passengers, visitors, and baggage throughout the terminal
- Simulate terminal processes including check-in, passport control, security, baggage claim, and retail areas, while dynamically calculating resource requirements\*
- Assess the impact of infrastructure modifications, including associated construction, area closures, and re-routing of passengers
- Evaluate how different design choices facilitate or impact improved terminal operations

*\*This feature includes software developed by [choco-solver.org](http://choco-solver.org).*

### AirTOP Airside Aircraft

Redefining aircraft taxi routes, closing infrastructure for maintenance purposes, or changing runway modes of operations can result in operational bottlenecks that cause delays and affect the bottom line. AirTOP Airside Aircraft allows you to visualize potential choke points and test alternative scenarios to assess and improve airport capacity.

Using the integrated 2D and 3D graphical user interface, you can create, simulate, and compare detailed airside layouts, along with performance indicators such as fuel-burn, taxi-time, or runway queues. Often used by airport authorities, operators and aviation consultants, AirTOP can model rule-based scenarios including:

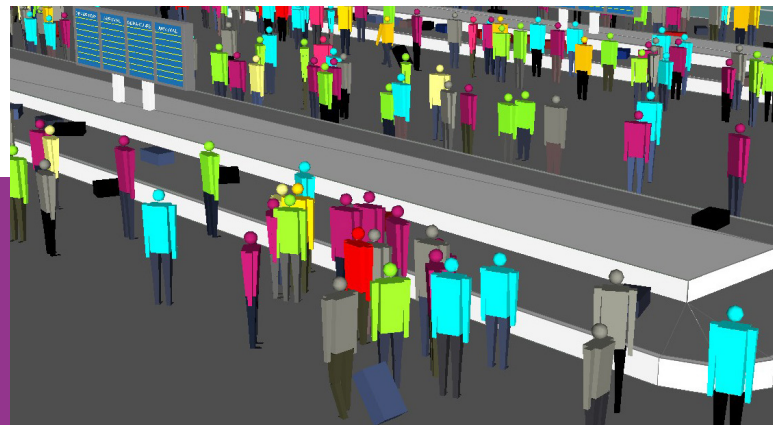
- Stand/gate allocation
- Taxi flow control and push/pull procedures, including taxibot/eTaxi concepts
- Runway entry and exit selection
- Single and multiple runway sequencing and dynamic runway direction changes
- Turnaround management
- De-icing procedures
- Ground metering and departure management (DMAN)

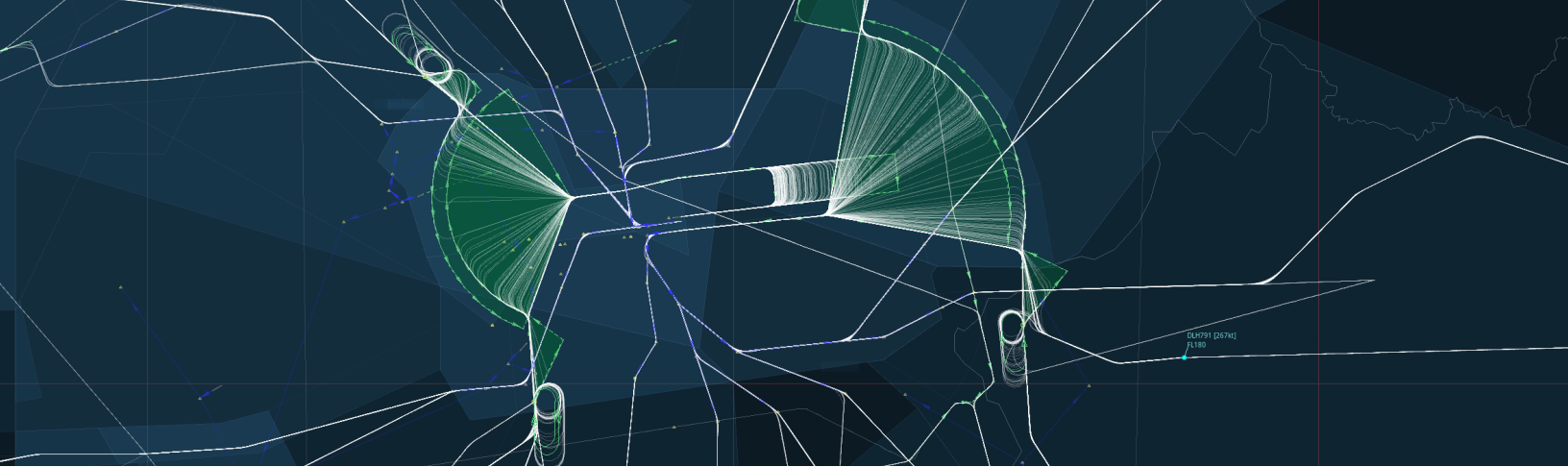
### AirTOP Airside Vehicle

Compare the safety and performance of alternate airport layouts, understand delays, evaluate vehicle fleet size, or demonstrate the effects of ground support equipment (GSE) on capacity, and level of service, when you simulate ground-support vehicle movements with AirTOP Airside Vehicle. With customizable vehicle performances (speeds, fuel consumption, emissions, etc.), use AirTOP Airside Vehicle to determine:

- Service equipment allocation to aircraft
- Optimal service road networks, including intersections with taxiways or taxi lanes
- Service road closure management
- Allocation of vehicle parking positions (temporary or long-term)
- Pick-up or drop-off locations for passengers, baggage, or catering
- Dynamic placement of refueling stations

**Simulate, Validate, Test and Optimize Airport and Air Traffic Operations**





## AirTOP Runway Capacity Analyzer

Whether considering the construction of a new runway, assessing current runway performance, or determining the potential for adding flights to existing runways, AirTOP Runway Capacity Analyzer helps you identify the best options to:

- Determine optimized traffic sequence
- Evaluate the runway system throughput and delay under various conditions
- Test future traffic demand in terms of runway capacity shortfall or excess
- Study the impacts of factors like fleet mix, required aircraft separation, runway layout and mode of operation, location and use of entries and exits, level of service and preferential treatment of certain flights
- Evaluate traffic sequences by running Monte Carlo analyses to incorporate the effects of uncertainty from input parameters to throughput estimates

## AirTOP TMA/TRACON

AirTOP's TMA/TRACON module helps airports understand their airspace capacity issues and delay factors, along with the required maneuvers to safely maximize capacity. It supports all key airport approach and departure procedures, while realistically simulating all aircraft movements in the airport's airspace and required departure/approach controller tasks. Use AirTOP to:

- Model aircraft movements in condensed airspace
- Assess the performance of air traffic control procedures and controller workload
- Evaluate the runway system's sequencing options
- Simulate aircraft speed and separation maneuvers, including vectoring and holding

## AirTOP En Route

AirTOP En Route is geared towards agencies and airports to simulate the complexity and capacity of upper airspace, and model necessary separation procedures. It provides realistic en route simulations and supports all key en route structures and controller tasks, as well as static or dynamic restrictions related to them, to:

- Model air traffic and control procedures and assess controller workload
- Create easy-to-use, high-fidelity airspace and air traffic models for use in capacity studies, re-sectorization projects, reorganization of routes, implementation of free-route or reduced vertical separation minima (RVSM) airspaces
- Measure capacity, delays, and economic or environmental performance

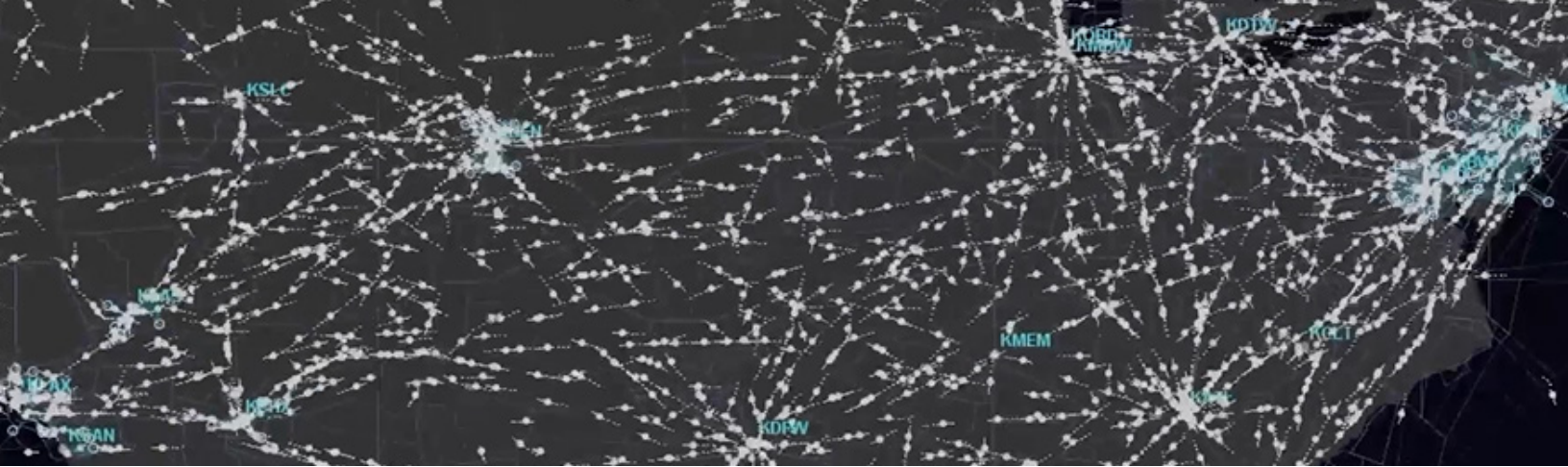
## AirTOP Flow Management

AirTOP Flow Management combines the capacities of AirTOP TMA/TRACON to model the airspace in the close vicinity of airports and those of AirTOP En Route to simulate airport-to-airport traffic. Used by those with complex airspaces, it facilitates 4D Trajectory Based Operations, a key component of the US Next Generation Air Transportation System (NextGen) and Europe's Single European Sky ATM Research (SESAR) and supports:

- Planned 4D trajectory synchronization and negotiation
- Airspace planned entry load and occupancy monitoring
- Flow management and demand capacity balancing (DCB)
- Time-based (TTA/CTA/RTA) or distance-based point-in-space metering

The capacity of AirTOP Flow Management to quickly process and analyze huge data samples and the ability

# Rule-Based Airport and Airspace Fast-Time Simulation



to present tailored performance indicators, makes it the state-of-the-art air traffic flow and capacity management (ATFCM) model. It is the ideal choice for research projects, the strategic system-wide analysis of flow and capacity, or for developing scenarios of standard solutions and playbooks.

AirTOP Flow Management is used by EUROCONTROL and the FAA for large-scale modeling of traffic covering entire continents or oceans.

### **AirTOP WIZer ACC**

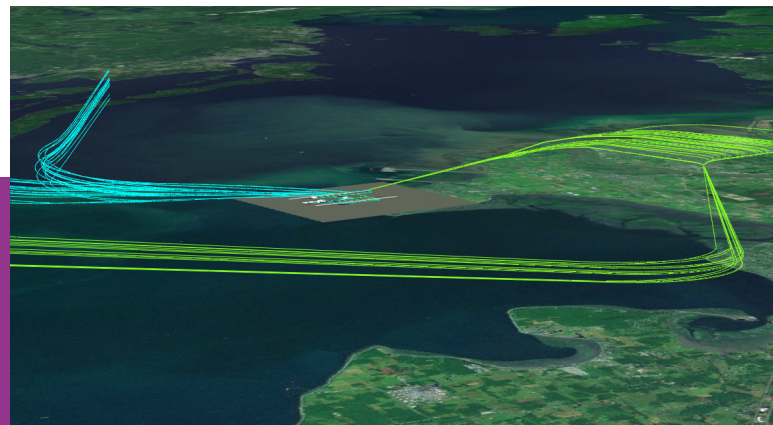
AirTOP WIZer ACC brings the power of fast-time simulations to real-time operations. Acquiring real-world information, such as data on traffic, aircraft locations, weather, and more, this powerful connectivity tool, securely integrates with airport and air traffic control systems to provide detailed, up-to-the-minute forecasts of air traffic demand, traffic complexity, and controller workload.

Forecast data is displayed to the user in a graphical interface (charts, tables, 2D and 3D views, etc.) to highlight when demand is forecasted to exceed capacity. These forecasts support ACC supervisors and flow managers to make real-time forecast and what-if analysis decisions.

WIZer ACC can:

- Deliver warnings when the entry count, occupancy, or workload/complexity of a sector is forecasted to exceed some user-defined threshold
- Provide air traffic flow and capacity management (ATFCM) options to either reduce demand or increase capacity, and display the results of executing such measures on the updated forecast, allowing the user to perform an interactive what-if analysis of the available options
- Model the full operational environment of any ACC or group of ACCs and provide complexity and controller workload measurements for all sector types (En Route sectors, TMA, etc.), or for tower controllers

For more detailed information on how AirTOP WIZer ACC can assist you with up-to-the-minute forecasts of air traffic demand, traffic complexity, and controller workload, contact Transoft Solutions.



## Platform Requirements

Java 17 64-bit

## Languages Available

English

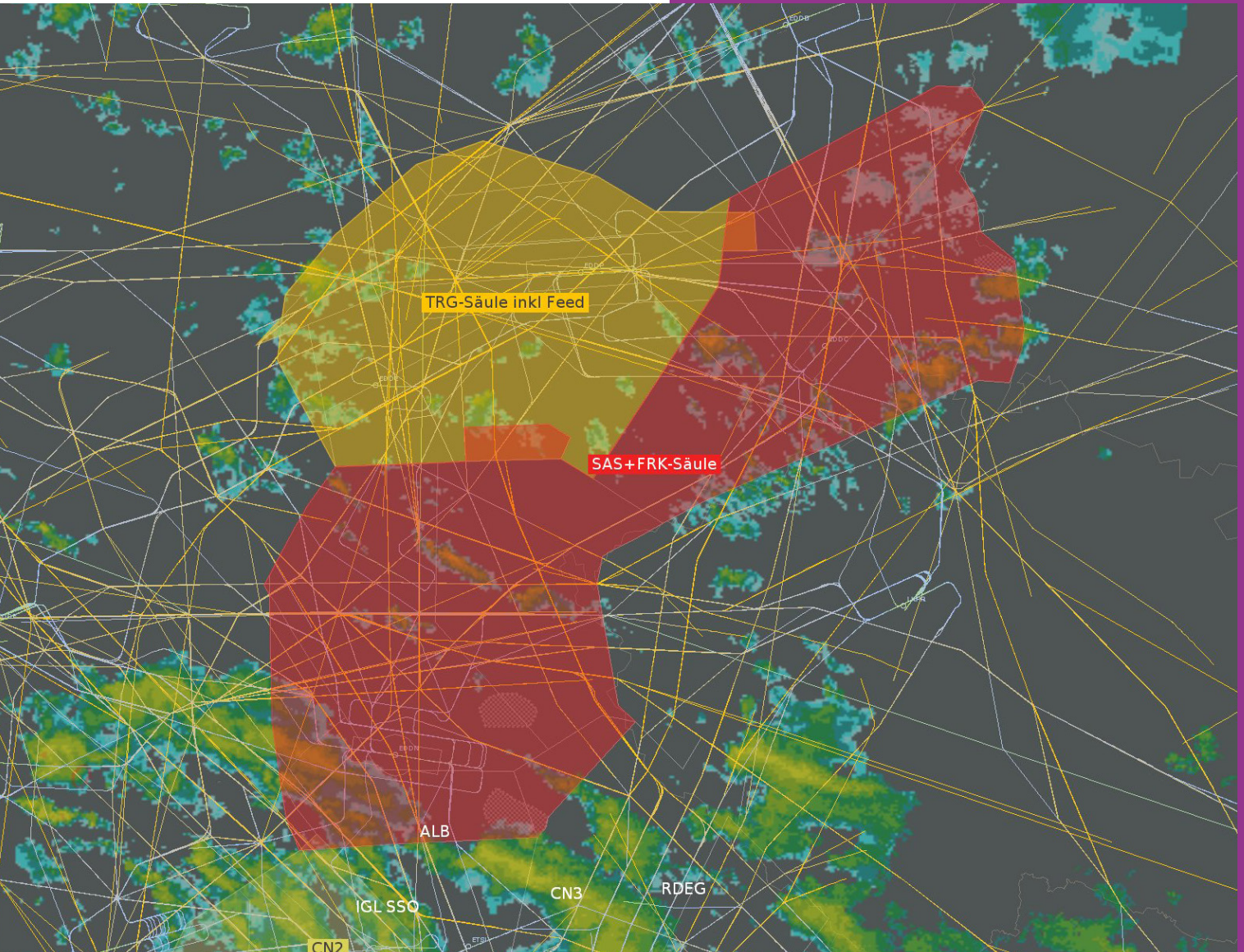
## System Requirements

Full support for 64-bit operating systems

Windows® 8.1 – 11

MacOS® X 10 or later

Linux kernel 2.6 or later (e.g. Ubuntu, Fedora, RHEL)



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