ICAO MID

CCO-CDO Workshop

ICAO MID Workshop on the Continuous Climb Operations (CCO) / Continuous Descent Operations (CDO) Implementation

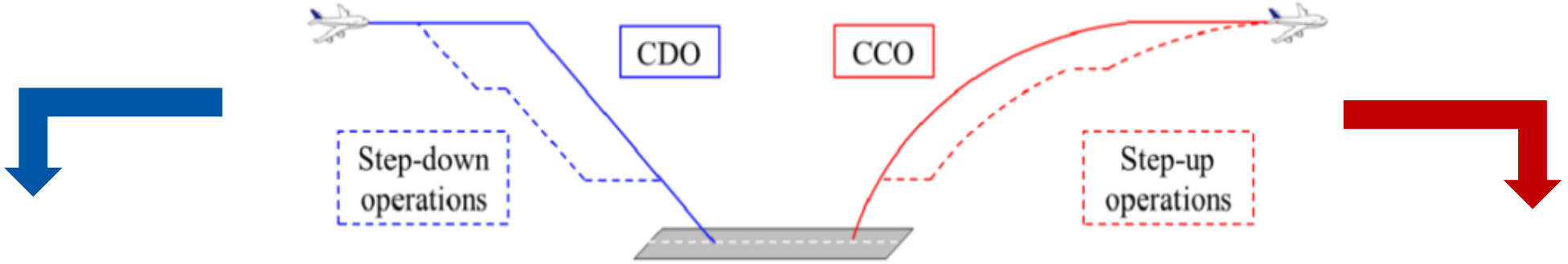
Abu Dhabi, UAE 13 – 14 June 2022

FTS supporting CCO-CDO local implementation plans

Rovshan Sultanov, Manager of Airspace Design and Development -dans

CCO-CDO

CCOs and CDOs are aircraft operating techniques enabled by airspace design, instrument procedure design and facilitated by air traffic control.



CDO

employ minimum engine thrust, ideally in a low drag configuration, prior to the final approach fix/ final approach point.

CCO

employ optimum climb engine thrust and climb speeds until reaching their cruising levels.

CCO-CDO Constraints for the implementation*

- Aircraft FMS capability
- Airline Policy / Crew training
- ATCO training
- ATC WL, predictability, DTG Info
- Capacity (network & local)
- Letters of Agreement
- Airspace/Procedure Design
- Parallel Runway Procedures
- Climb vs. Descent Optimization
- Military Airspace
- Geographical Constraints
- Safety
- Weather
- Human

*European CCO / CDO Action Plan

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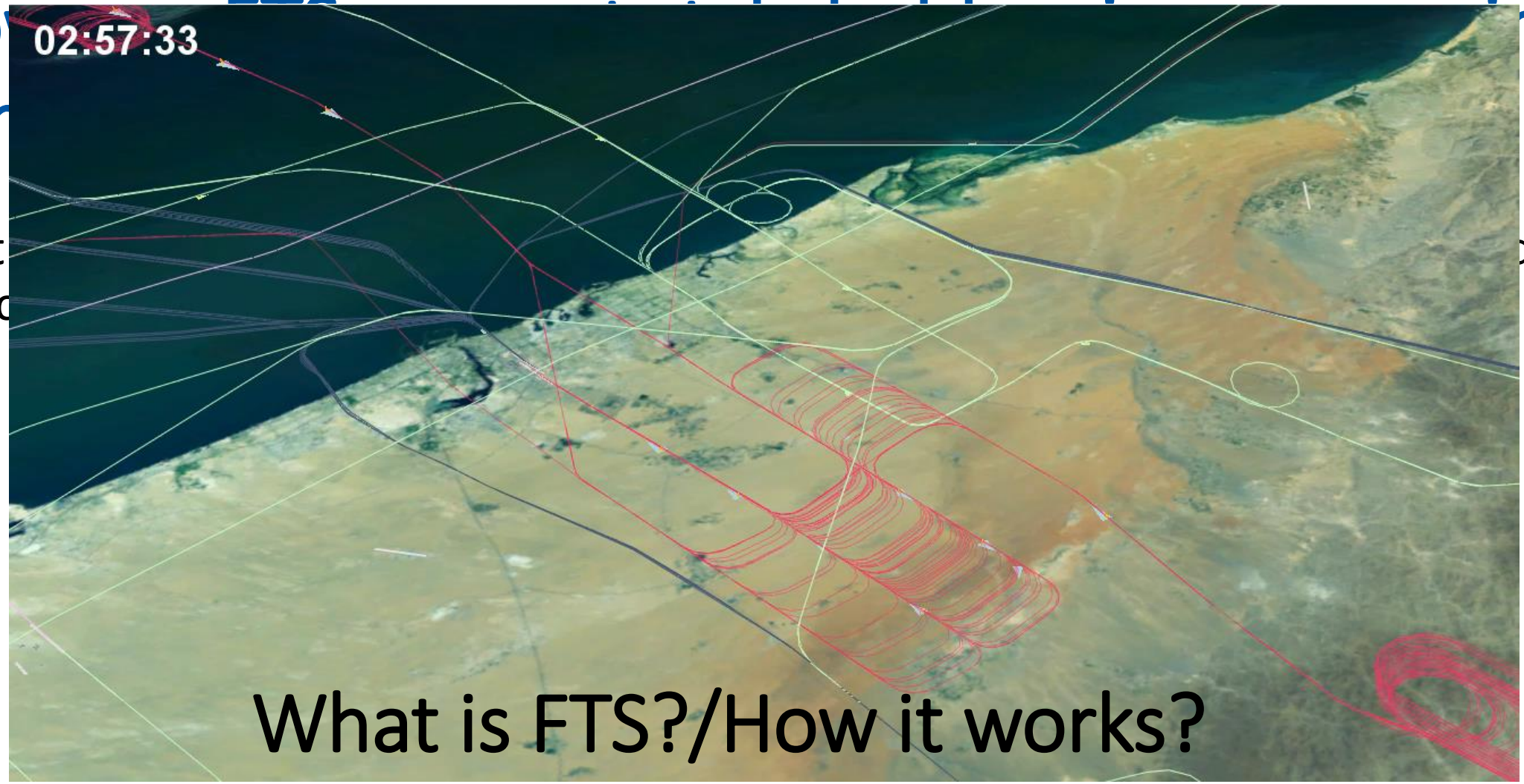


What is FTS model: virtual and reliable models of ATM systems, airports and airspace.

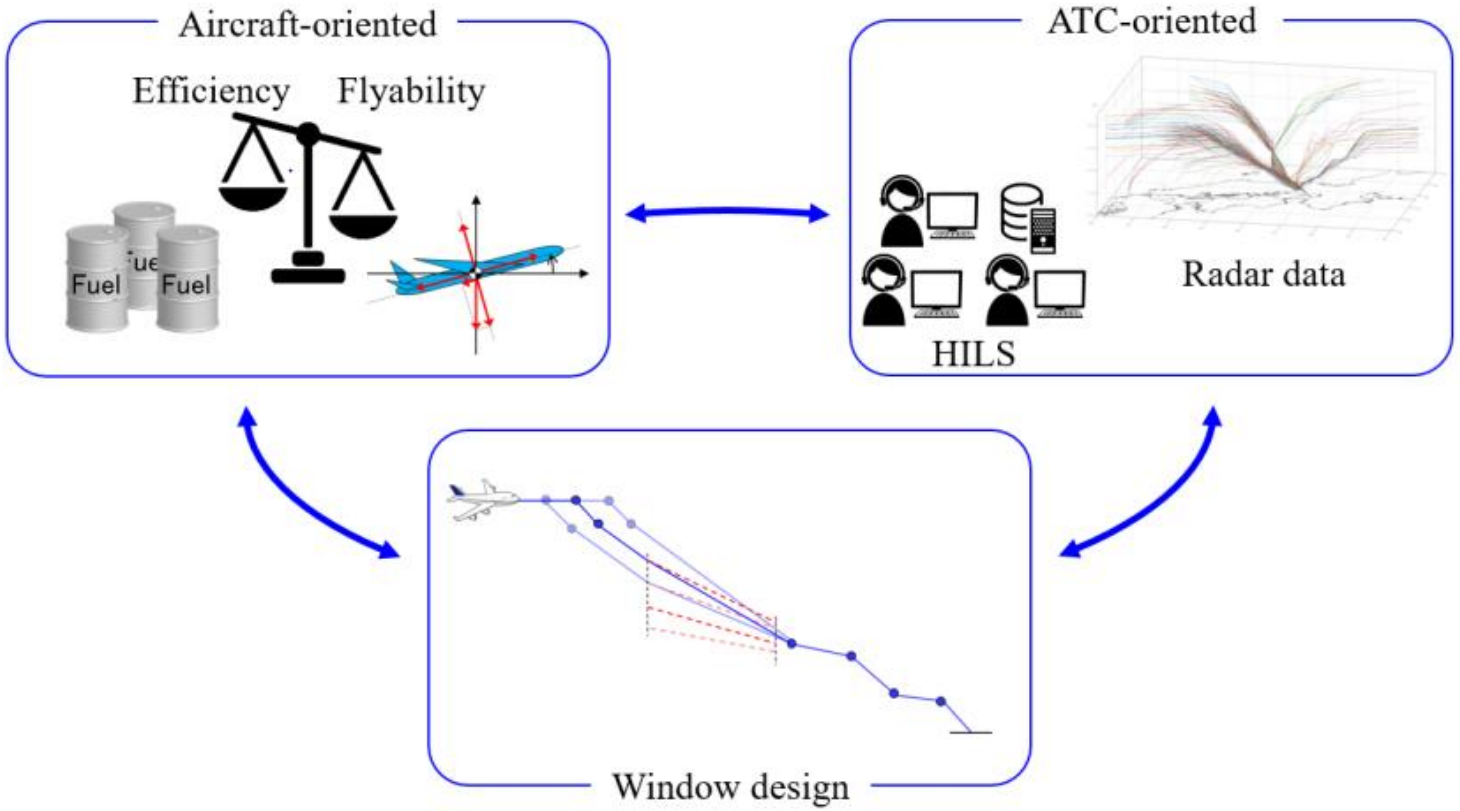
When to use: to support daily operations and R&D activities, to support decision-makers to get inside insights for airport and airspace issues and/or to assess different options

Why to use: Cost saving tool, requiring limited resources, quick what-if options available

To be noted:

- Models are highly dependent on the data used to drive them
- FTS exercises: multiple runs with randomized variations of a scenario
- Numerical/graphical output. Careful analysis and interpretation

CCO-CDO Constraints for the implementation*



Reference: Simulation Techniques For Arrival Procedure Design In Continuous Descent Operation

Daichi Toratani Navinda Kithmal Wickramasinghe Hiroko Hirabayashi Air Traffic Management Department Electronic Navigation Research Institute (ENRI) 7-42-23 Jindaijihigashimachi Chofu, Tokyo 182-0012, JAPAN

*European CCO / CDO Action Plan

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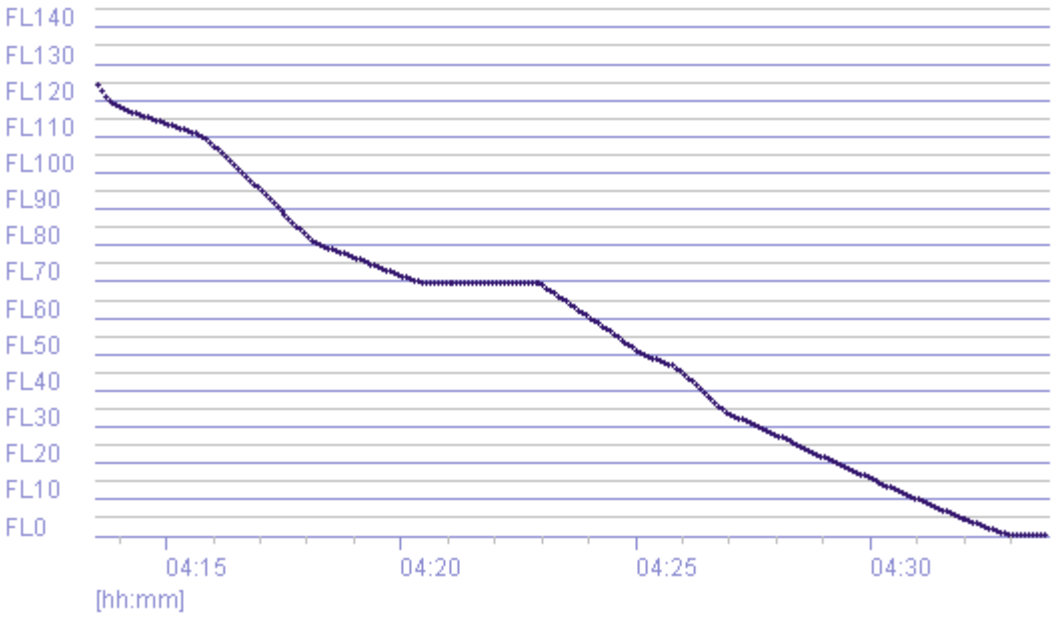
Constraints addressed using FTS

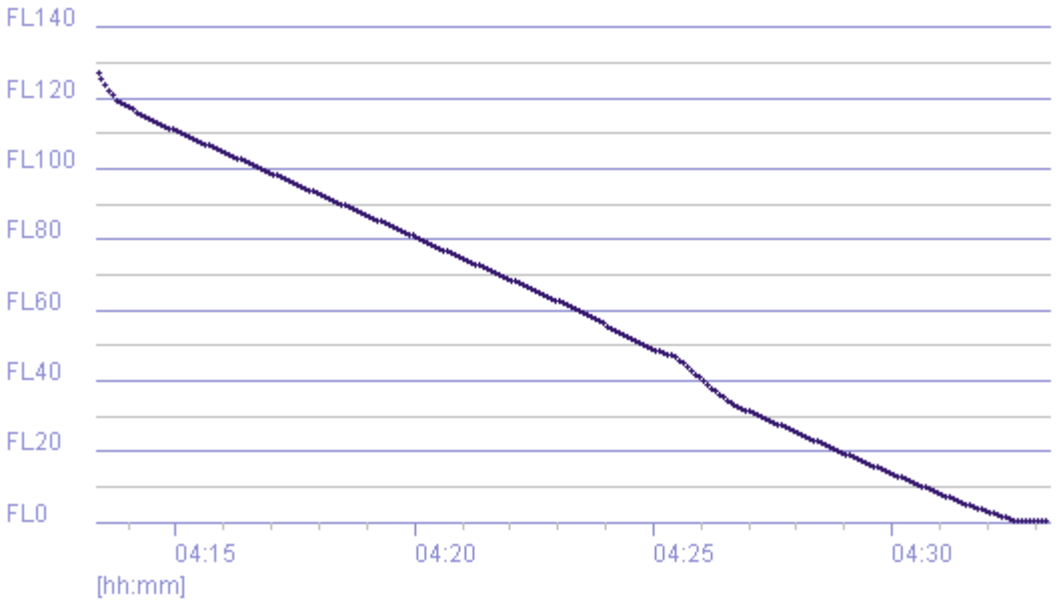
- ✓Identifying constrains for CDO/CCO implementation (ATC procedures? PANS OPS requirements? Airspace constrain)
- ✓Calculate the possible range of the CDO/CCO trajectory
- ✓Define altitude windows for CDO/CCO using by modelling different type of Aircraft
- ✓Define time window when CDO/CCO can be implemented
- ✓Comparing ATC workload in CDO/CCO and conventional procedures
- ✓Comparing Conflicts in CDO/CCO and conventional procedures
- ✓Compare fuel consumption in CDO/CCO and conventional procedures
- ✓Assessing impact on airspace and airport operation

FTS study- Example ARRIVALS

Baseline Scenario – Current Procedure - Sim

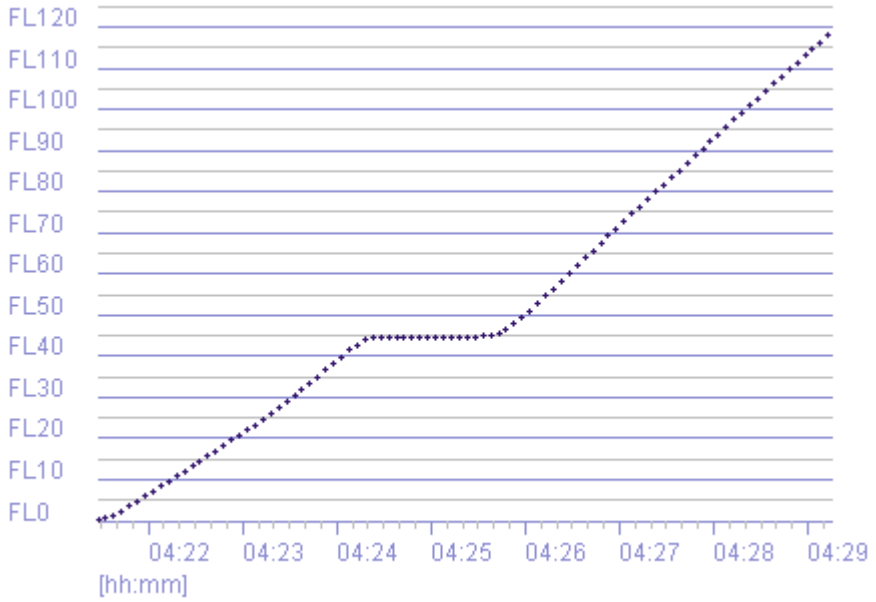


Scenario – CDO - Sim

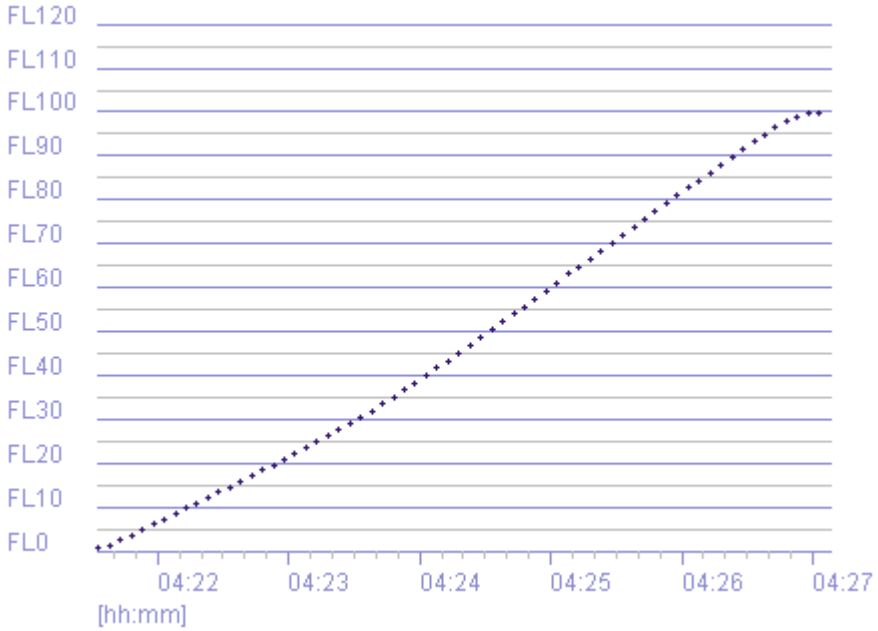


FTS study- Example DEPARTURES

Baseline Scenario – Current Procedure - Sim

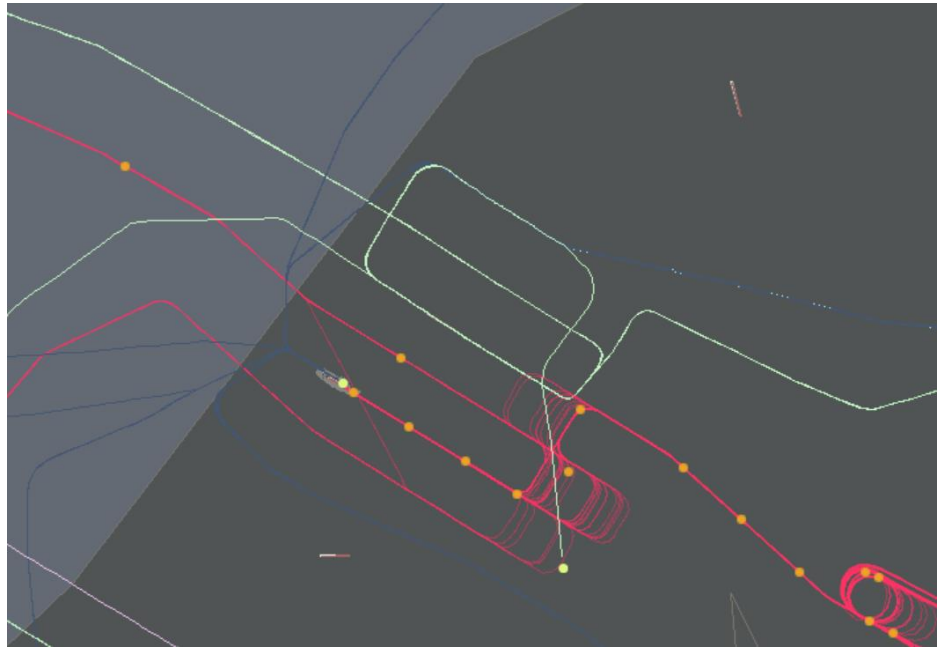


Scenario – CCO - Sim



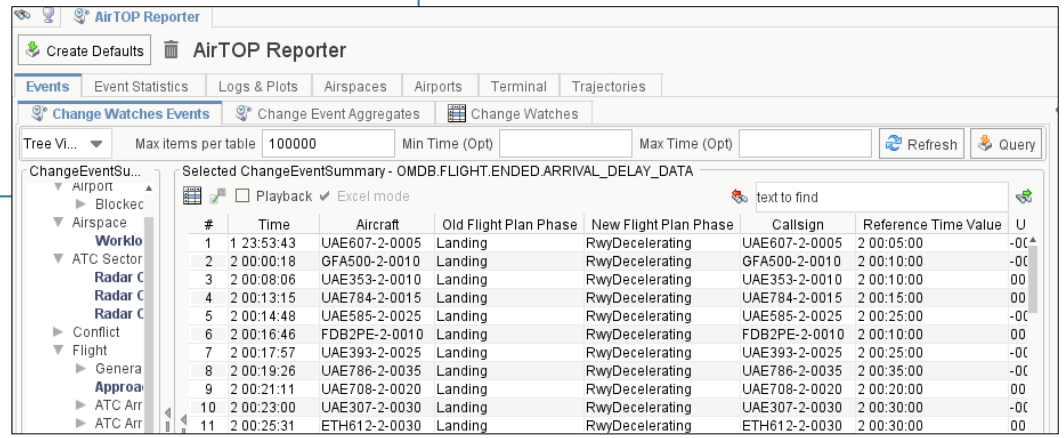
FTS study- Example

"Fly" scenarios (runs)

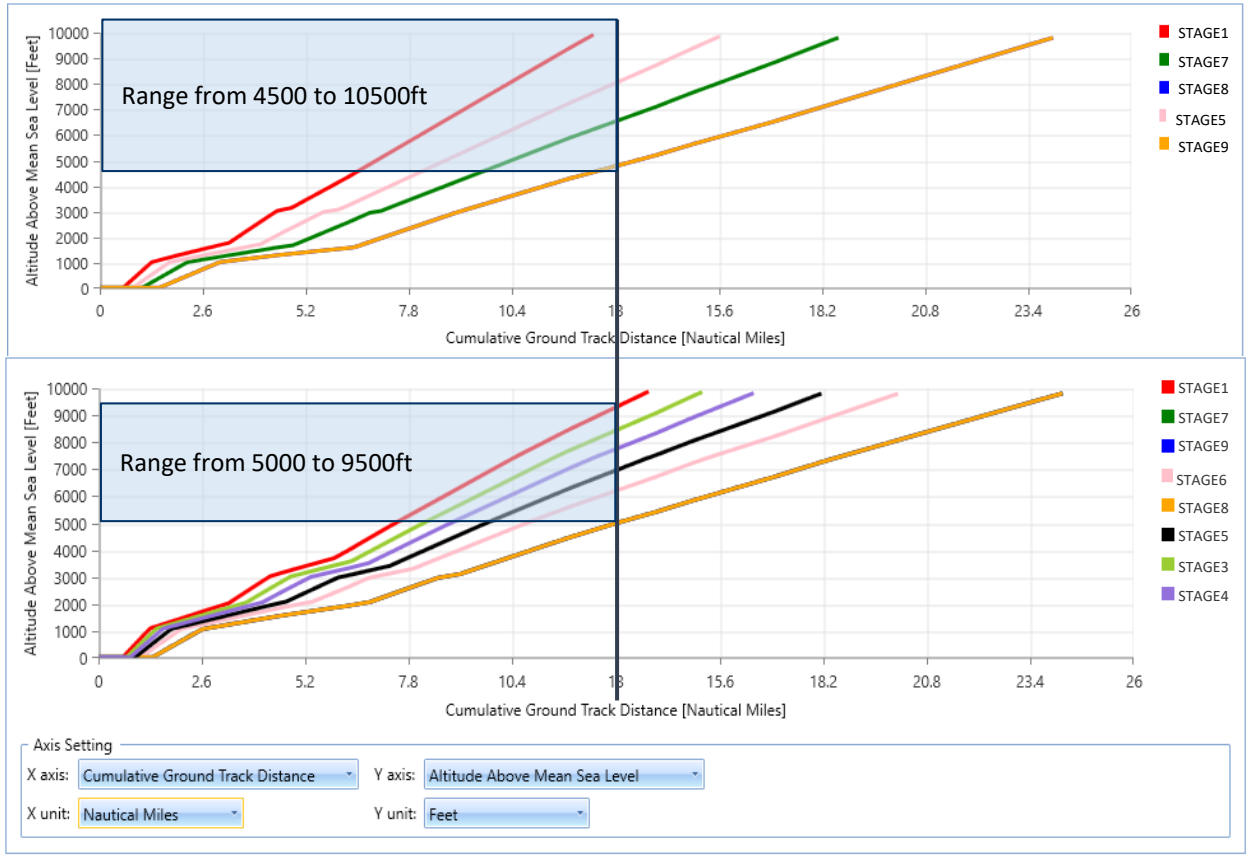


Analyze & compare results

- Radar Controller Workload
- Sector entry/exit
- Distance flown
- Fuel burnt
- Delays
- Conflicts
- Etc.



CCO flight performance



- **Airbus A380-800** with engine GP7270 via **ANVIX**

- **Boeing 777-300** with engine GE90-115B via **ANVIX**

THANK YOU