



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

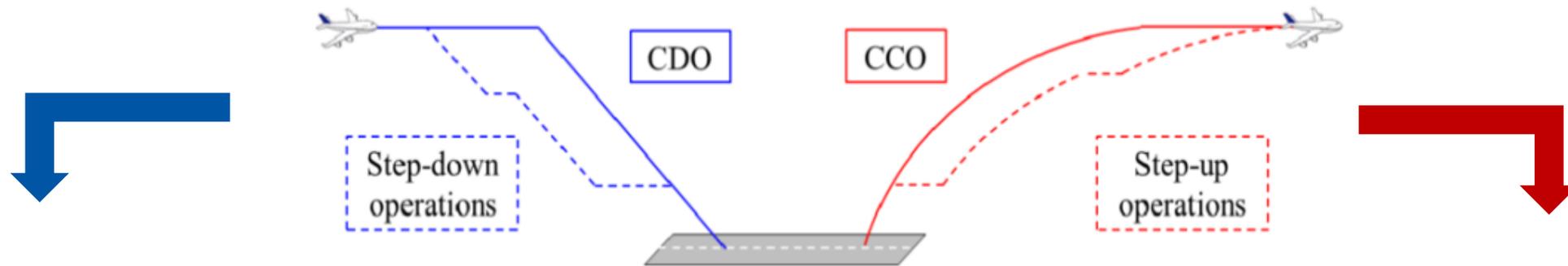
FTS supporting CCO-CDO local implementation plans

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.

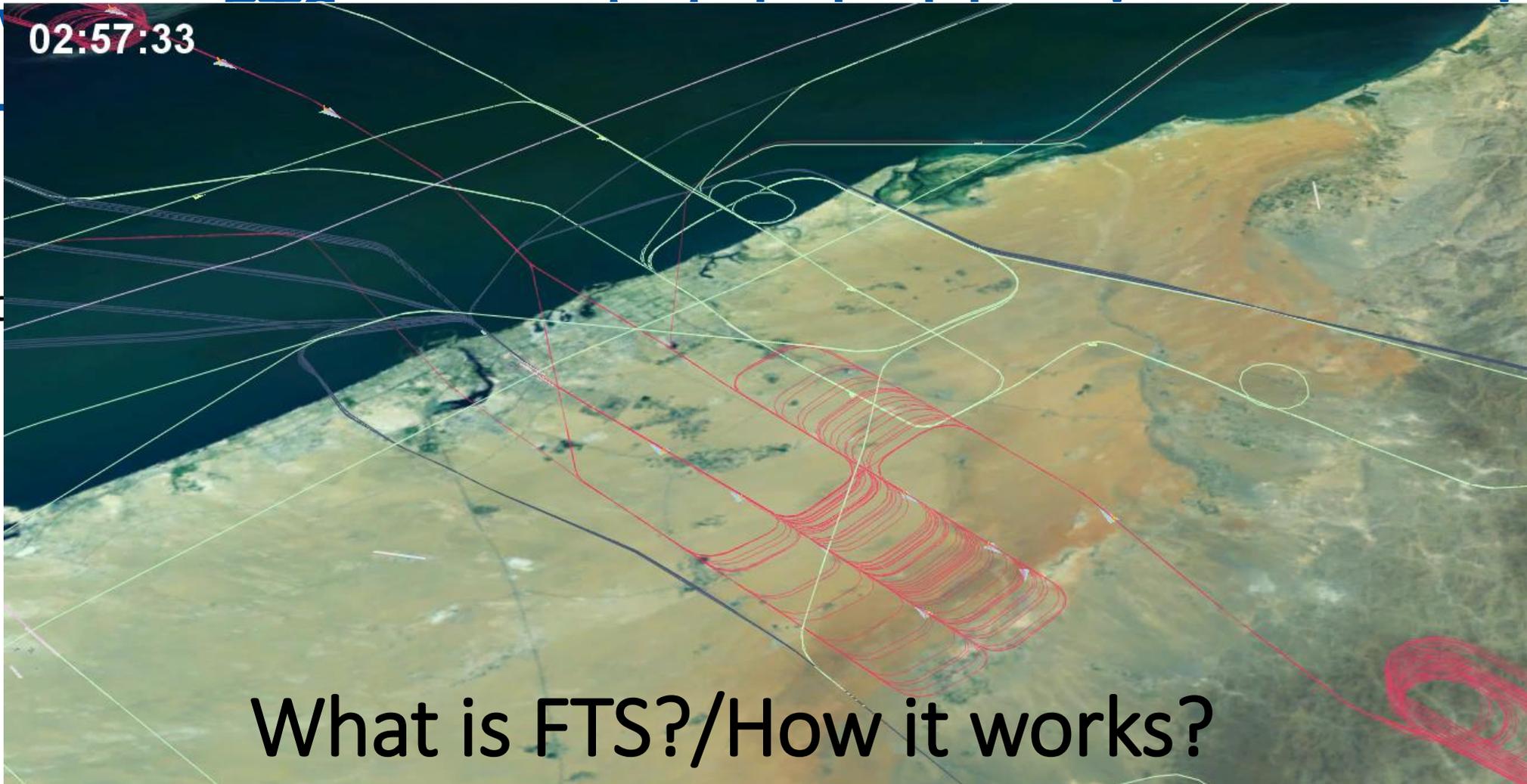


CCO-CDO Constraints for the implementation*

- 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

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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

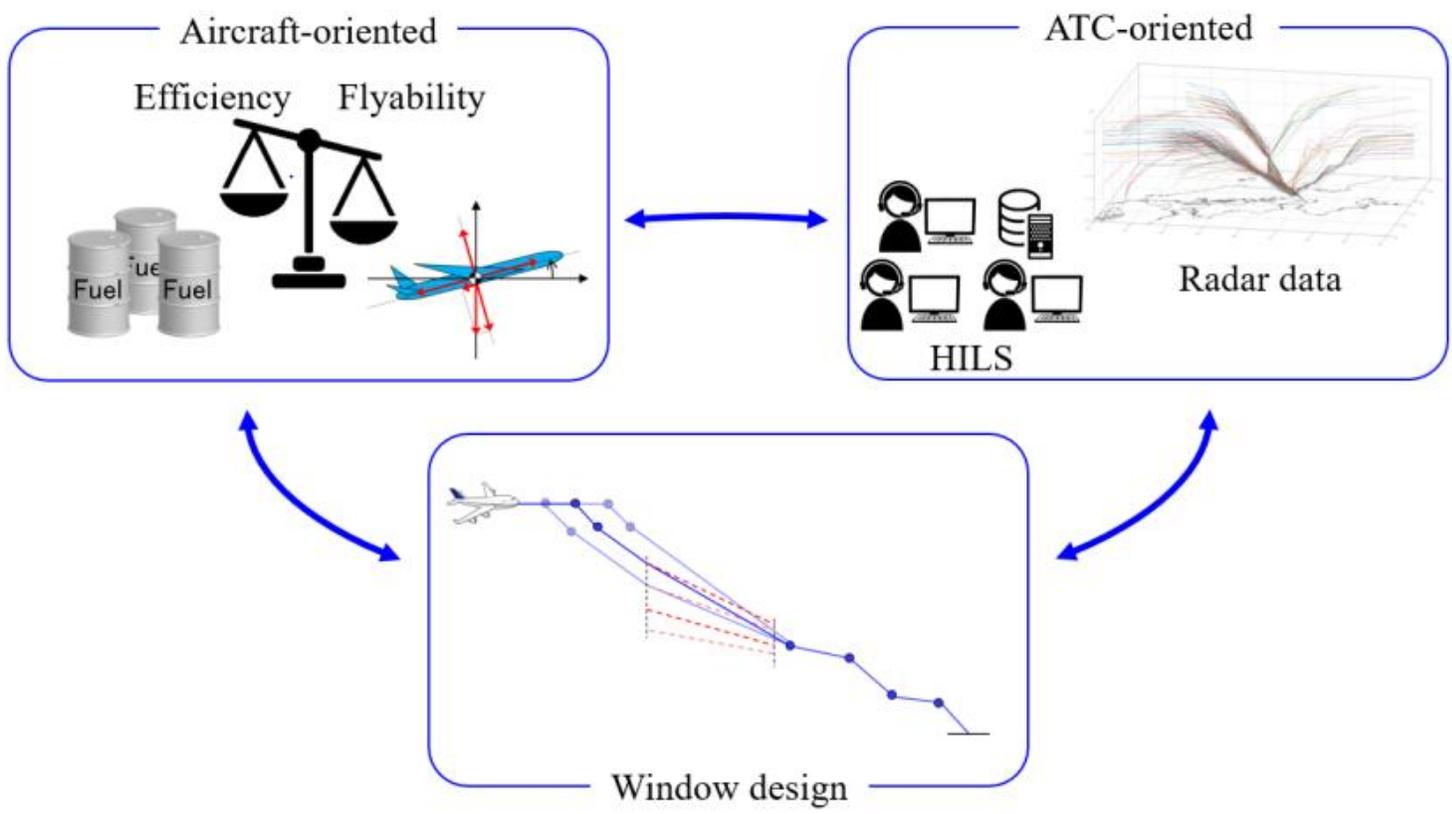
Why to use: Cost saving tool, requiring limited resources, quick what-if options available

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



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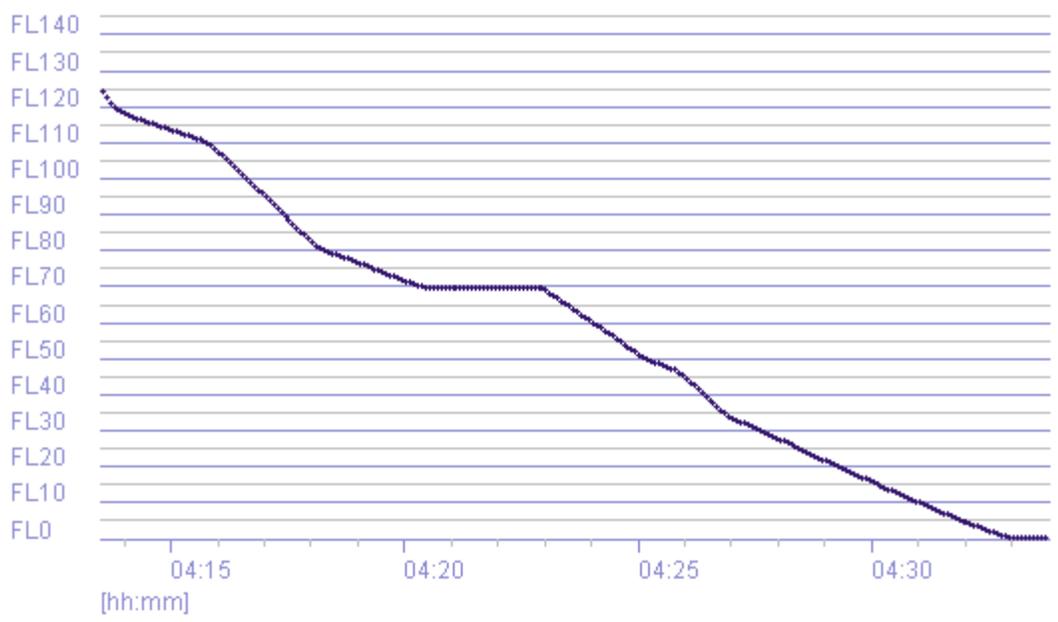
Constraints addressed using FTS

- ✓ Identifying constraints 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

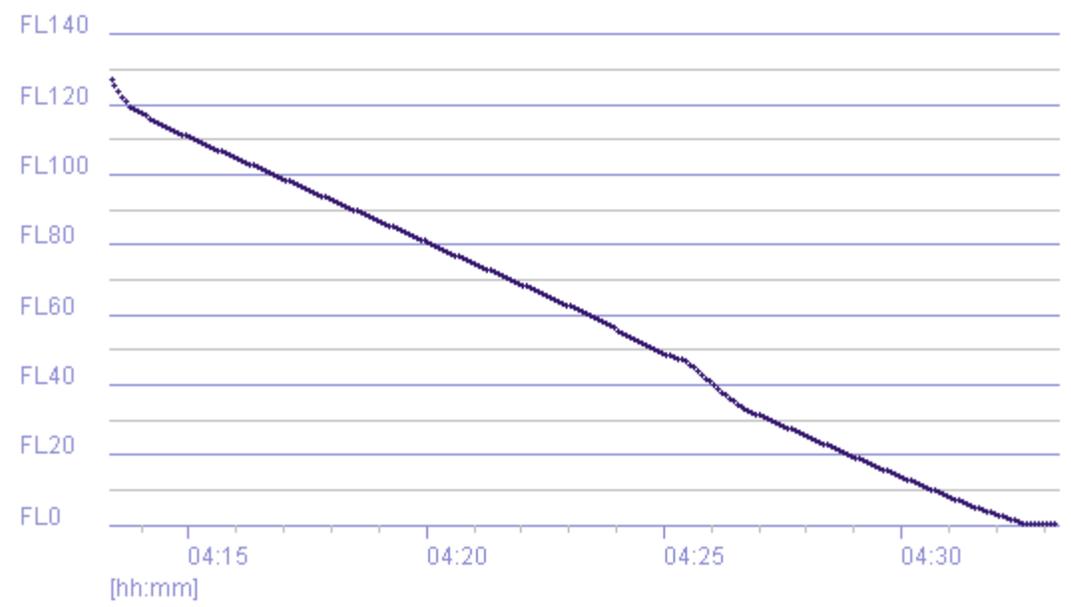


FTS study- Example ARRIVALS

Baseline Scenario – Current Procedure - Sim



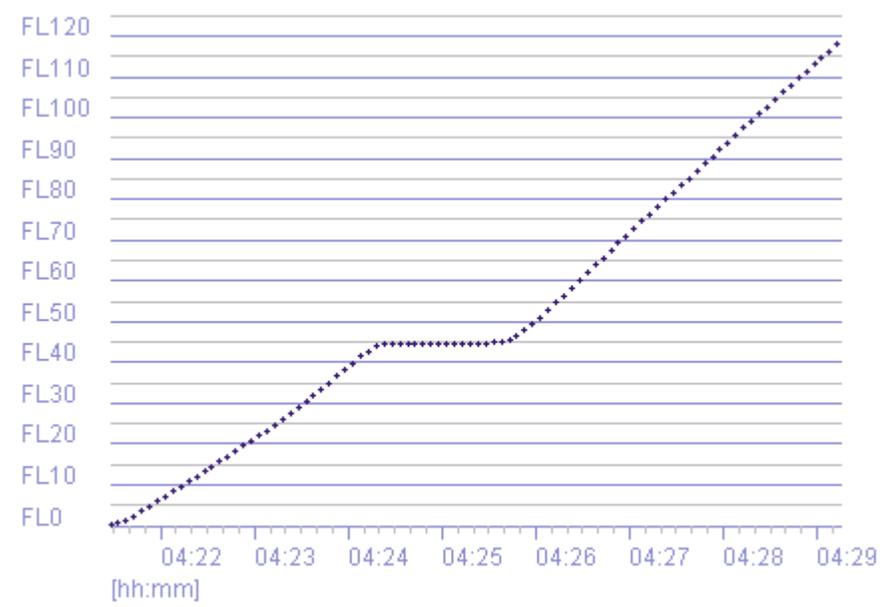
Scenario – CDO - Sim



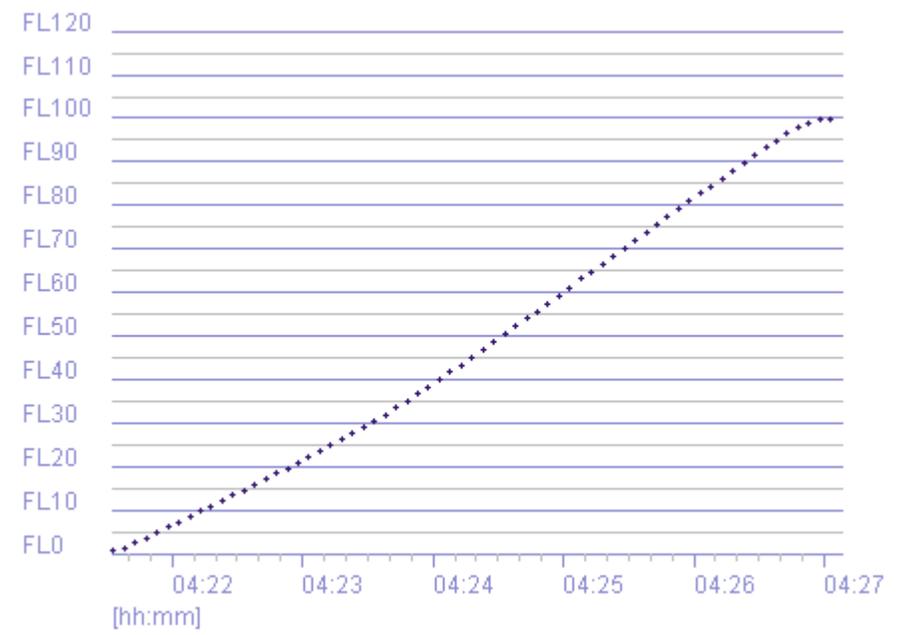


FTS study- Example DEPARTURES

Baseline Scenario – Current Procedure - Sim



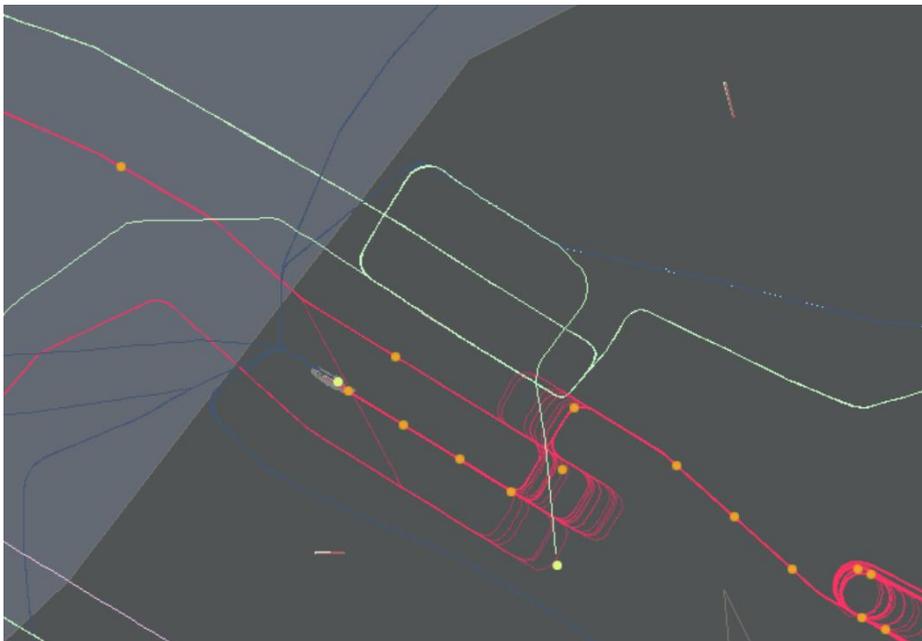
Scenario – CCO - Sim





FTS study- Example

“Fly” scenarios (runs)



Analyze & compare results

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

AirTOP Reporter

Create Defaults AirTOP Reporter

Events Event Statistics Logs & Plots Airspaces Airports Terminal Trajectories

Change Watches Events Change Event Aggregates Change Watches

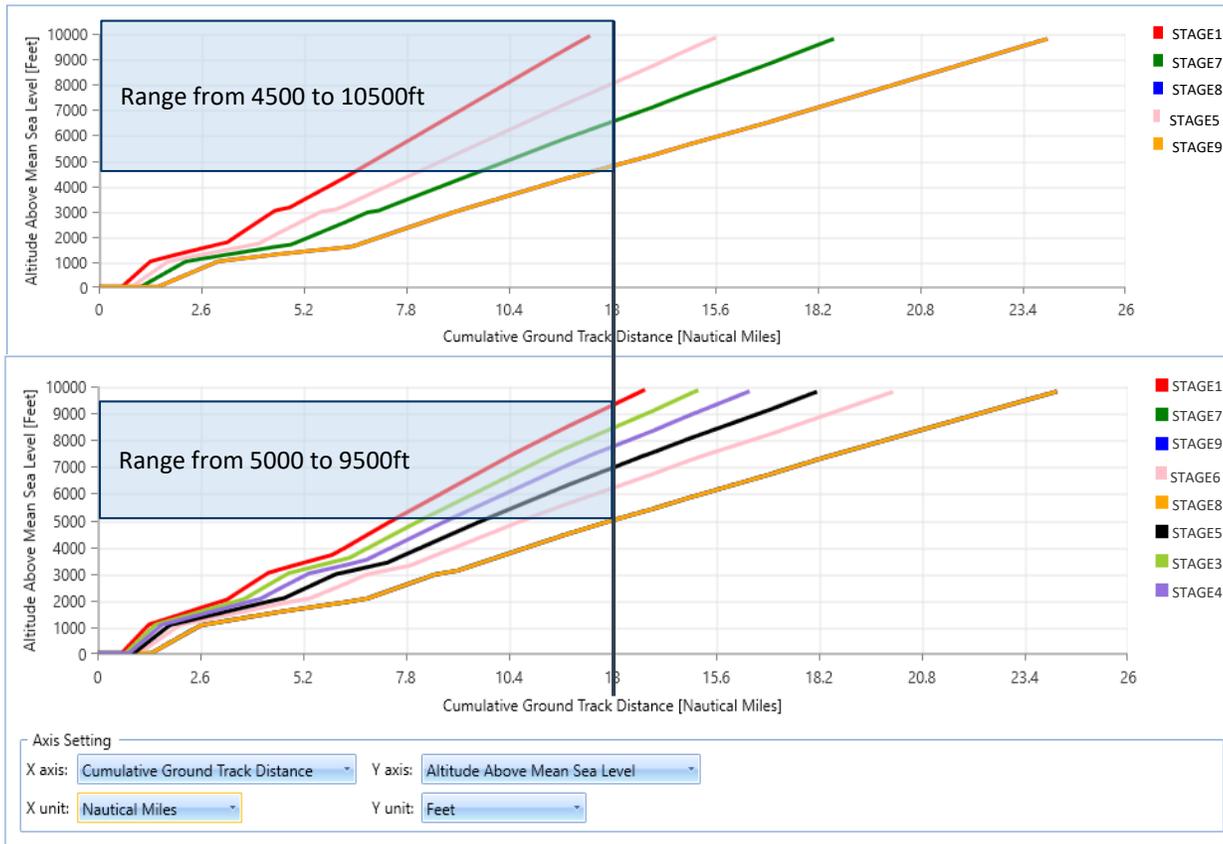
Tree Vi... Max items per table 100000 Min Time (Opt) Max Time (Opt) Refresh Query

ChangeEventSu... Selected ChangeEventSummary - OMDB.FLIGHT.ENDED.ARRIVAL_DELAY_DATA

#	Time	Aircraft	Old Flight Plan Phase	New Flight Plan Phase	Callsign	Reference Time Value	U
1	23:53:43	UAE607-2-0005	Landing	RwyDecelerating	UAE607-2-0005	2 00:05:00	-0C
2	2 00:00:18	GFA500-2-0010	Landing	RwyDecelerating	GFA500-2-0010	2 00:10:00	-0C
3	2 00:08:06	UAE353-2-0010	Landing	RwyDecelerating	UAE353-2-0010	2 00:10:00	00
4	2 00:13:15	UAE784-2-0015	Landing	RwyDecelerating	UAE784-2-0015	2 00:15:00	00
5	2 00:14:48	UAE585-2-0025	Landing	RwyDecelerating	UAE585-2-0025	2 00:25:00	-0C
6	2 00:16:46	FDB2PE-2-0010	Landing	RwyDecelerating	FDB2PE-2-0010	2 00:10:00	00
7	2 00:17:57	UAE393-2-0025	Landing	RwyDecelerating	UAE393-2-0025	2 00:25:00	-0C
8	2 00:19:26	UAE786-2-0035	Landing	RwyDecelerating	UAE786-2-0035	2 00:35:00	-0C
9	2 00:21:11	UAE708-2-0020	Landing	RwyDecelerating	UAE708-2-0020	2 00:20:00	00
10	2 00:23:00	UAE307-2-0030	Landing	RwyDecelerating	UAE307-2-0030	2 00:30:00	-0C
11	2 00:25:31	ETH612-2-0030	Landing	RwyDecelerating	ETH612-2-0030	2 00:30:00	00



CCO flight performance



- **Airbus A380-800** with engine GP7270 via **ANVIX**
- **Boeing 777-300** with engine GE90-115B via **ANVIX**



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THANK YOU

