

TBO in SESAR

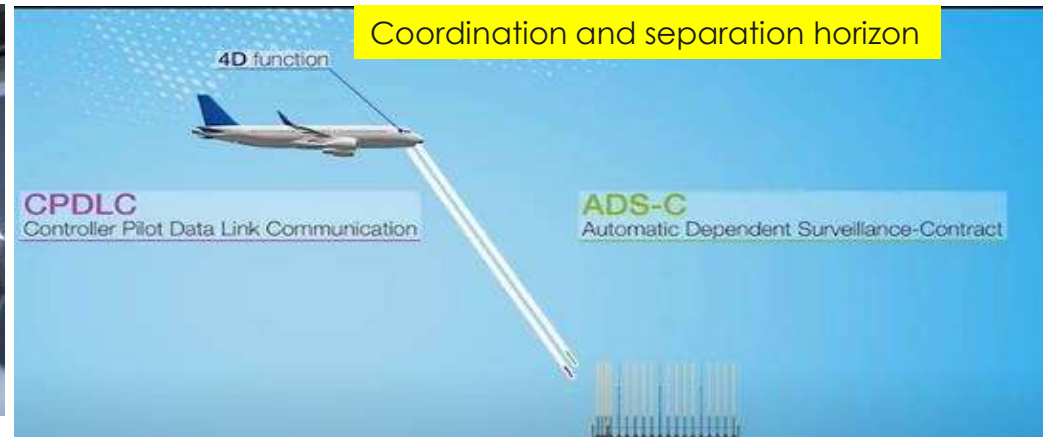


Trajectory Based Operations

NET-TBO

ATC-TBO

Planning > Strategic Execution > Tactical Execution



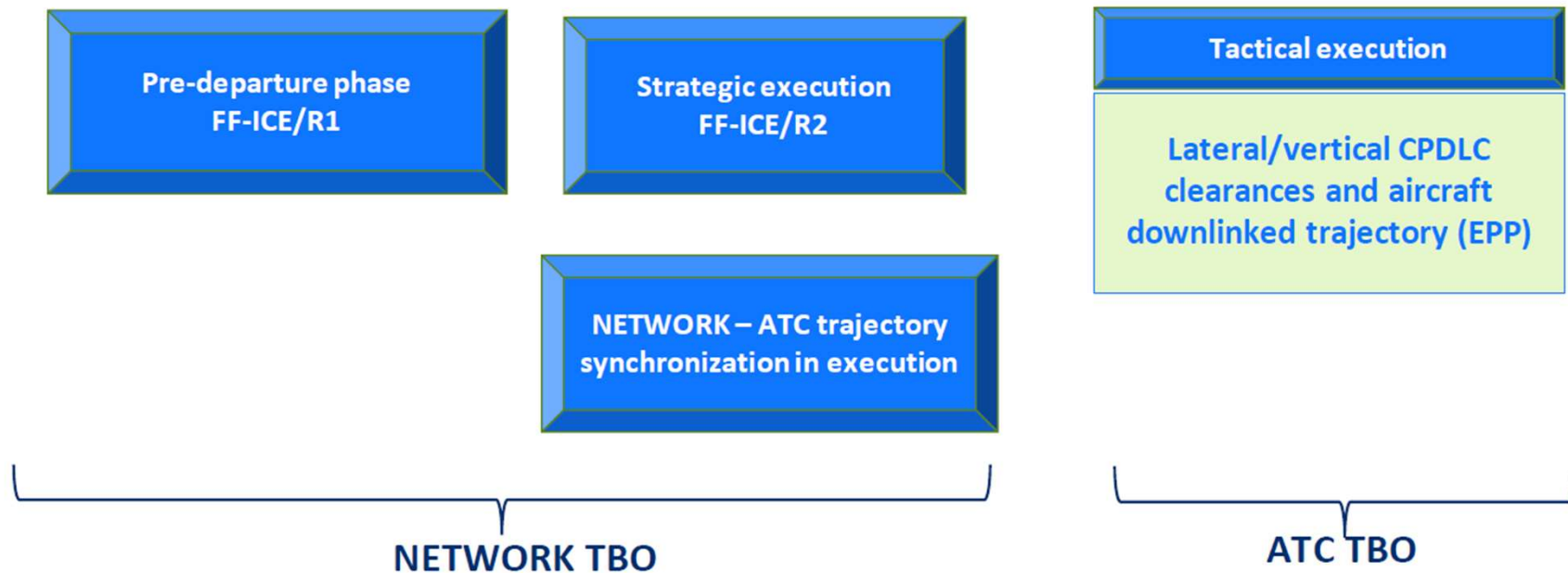
The trajectory describes the lateral, vertical and temporal profile of a flight. TBO shares the common plan for a flight's trajectory. Accuracy, and control to that plan is tailored to the performance needs of the circumstances. The ATC Clearance is the means through which the trajectory is delivered.

Source = ICAO draft Global TBO Concept





SESAR TBO overview & scope



Source: SESAR3 NET-TBO and ATC-TBO Global TBO Symposium



ATC-TBO project description

> Solution #4 (0468) – TRL6

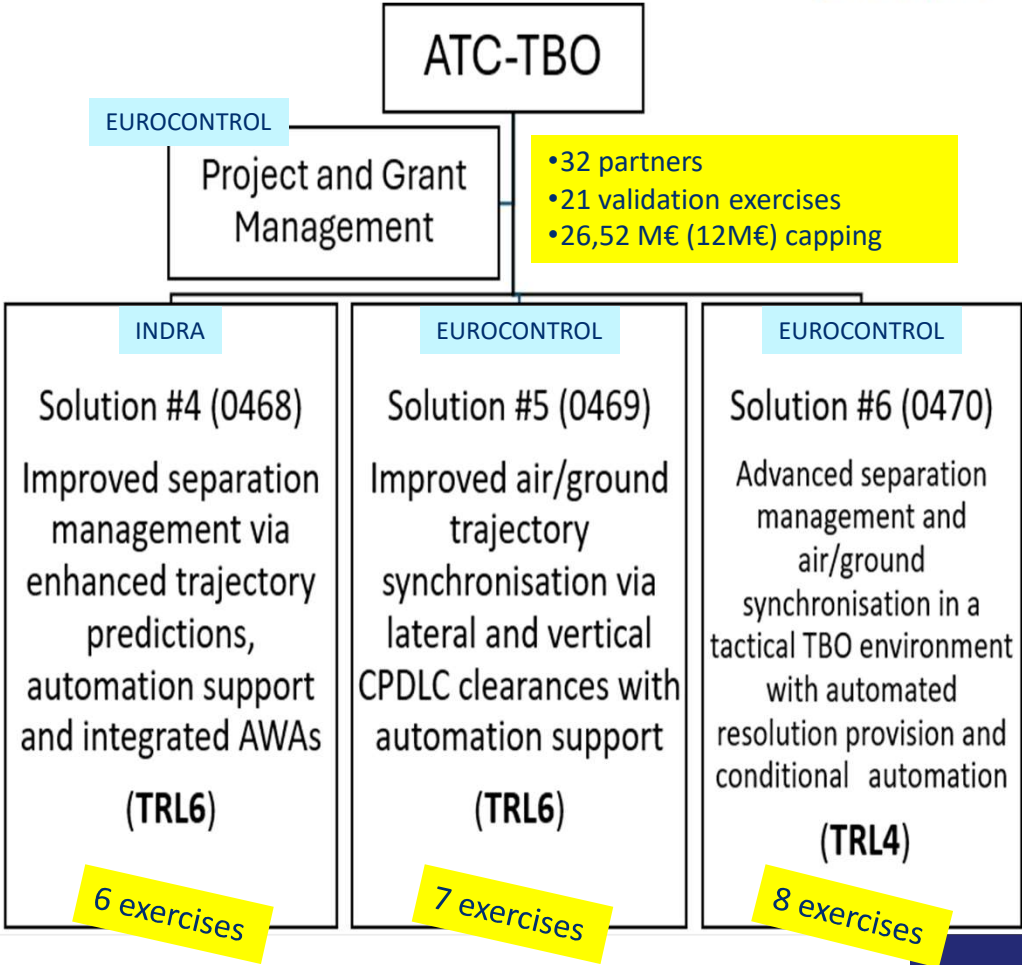
- Complete validation operational and technical integration aspects
- Conclusions on maturity, concept clarification, technical feasibility, performance
- Recommendations for industrialization & implementation**

> Solution #5 (0469) – TRL6

- Complete validation operational and technical integration aspects
- Conclusions on maturity, concept clarification, technical feasibility, performance
- Recommendations for industrialization & implementation**
- Recommendations for Wave 2 R & I (e.g., TMA, automated downstream clearances)**

> Solution #6 (0470) - TRL4

- Validate operational feasibility for future TBO concepts with actions increasingly initiated by automation
- Recommendations for Wave 2 R&I (Automation Levels 3 &4)**



ATC-TBO members



Thales in ATC-TBO





Thales ATC-TBO context

> Sol#4 : Improved separation management via enhanced trajectory predictions with automation support

- Partner: DSN A and COOPANS

- Scope:

- Aircraft-Aircraft automatic resolution proposal including aircraft-zone conflicts avoidance (restrictive and adverse weather areas)
- Integration of the received airborne trajectory (EPP) and lateral/vertical conformance monitoring alert
- Simple and ATS B2 enhanced CPDLC clearances proposed to solved conflicts
- Top of Descent alignment in ground trajectory
- Introduction of new automation support

- Environment:

- Use of SkyLab platform in a representative operational En-Route and Approach environment with part of the real system
- Use of realistic dataset (France and Austria) and recorded traffic scenario (including adverse weather)





Cloud based real time ATC simulations platform from wherever you want



> Real Thales ATC functions

- › ...test the latest Thales ATC functions direct from a web browser.
- › ...prepare your R&D simulations from anywhere.
- › ...play and run a full simulation from your own laptop for testing Thales ATC solutions.



> Cloud based simulation

- › Skylab integrates the real Thales components and gives you the opportunity to test them in a web browser.
- › The web radar display is tuned to match your operational look and feel.
- › During the simulation, the integrated voice comms allow you to speak to the pseudo-pilots.

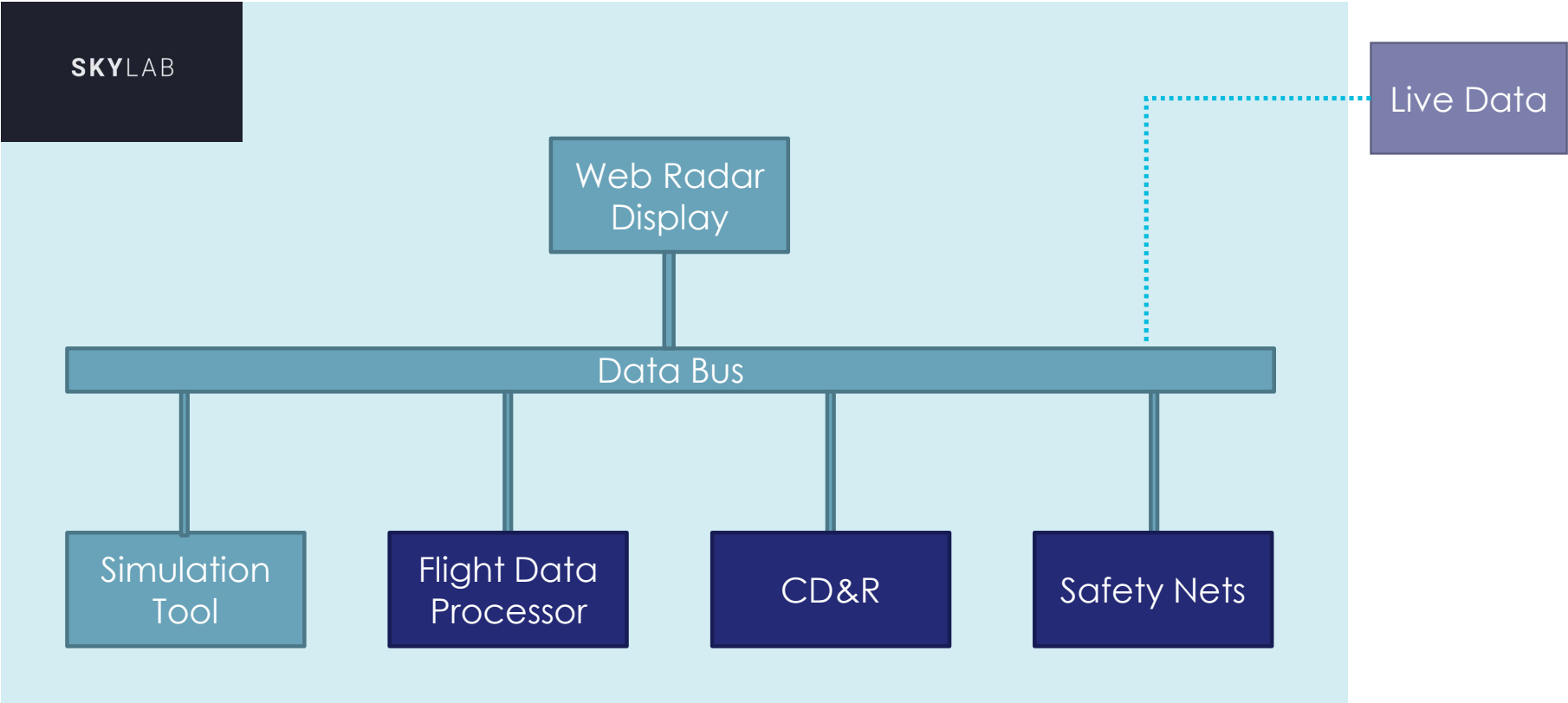


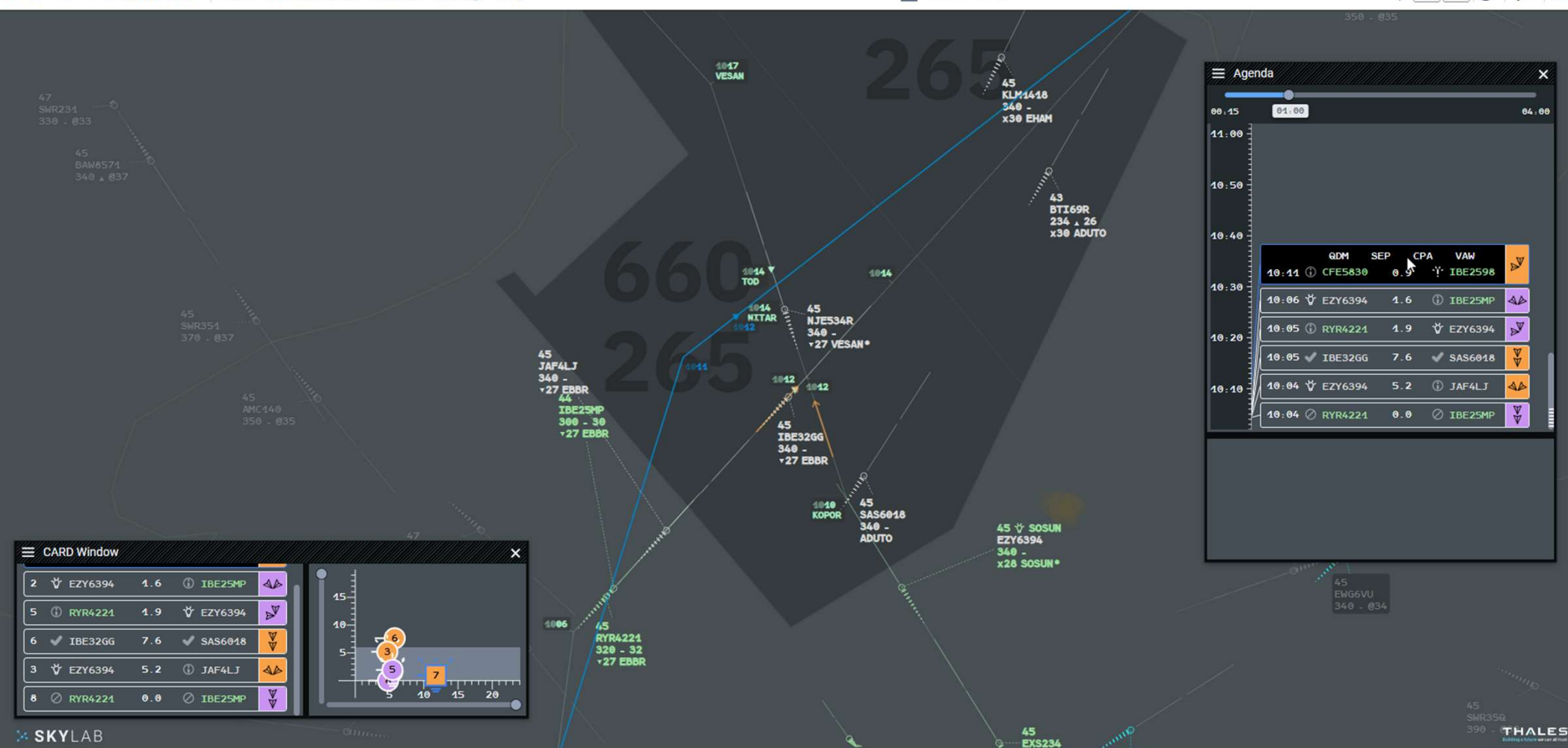
> Interop simulation bus

- › Multi-site, multi-simulators can also be achieved through an interop ATM simulation bus.



Thales Innovation Platform – SkyLab







ATC-TBO Solution#4 overview

- Improvements to the separation management services are achieved through three distinct threads, namely
 - 1) Improved trajectory prediction accuracy by using ADS-C, Mode-S and meteorological data,
 - 2) Increased automation support in the form of conflict resolution assistance tools
 - 3) Controller support tools to assist in the avoidance of adverse weather areas.



ATC-TBO Solution#4 Exercises scopes

Thread 1 – trajectory prediction
Thread 2 – conflict resolution
Thread 3 – AWAs

ATC-TBO EXE04.01	Enhancement of trajectory prediction and increased automation in CD&R tools using dynamic MET predictions and flight parameters PANSA, Indra, UNIWARSAW – INDRA iTEC Platform		
ATC-TBO EXE04.02	CD&R improvements through incorporation of adverse weather areas and wind information received from ADS-C/EPP into the trajectory prediction BULATSA, ROMATSA, Airbus D&S – BULATSA Innovation Grid platform		
ATC-TBO EXE04.03	CD&R between A/C and AWA in TMA and cross-border/sector NLR, Deep Blue – NLR NARSIM Platform		
ATC-TBO EXE04.04	Aircraft to aircraft Conflict Resolution Service, in DSNA En-Route high complexity environment DSNA, Thales LAS – Thales SkyLab Platform		 
ATC-TBO EXE04.05	Enhanced Conflict Detection and Resolution (CD&R) tool with automated conflict resolution proposals and Adverse Weather Areas (AWAs) integration COOPANS, Thales LAS – Thales SkyLab Platform		 
ATC-TBO EXE04.06	TP improvement and CD&R tools enhancement (ADS-C data, MET data, Dynamic wind grid) Skyguide, Skysoft, Airbus, Airbus D&S – Skyguide Platform IBP (skytics)		



Thank you

www.thalesgroup.com