

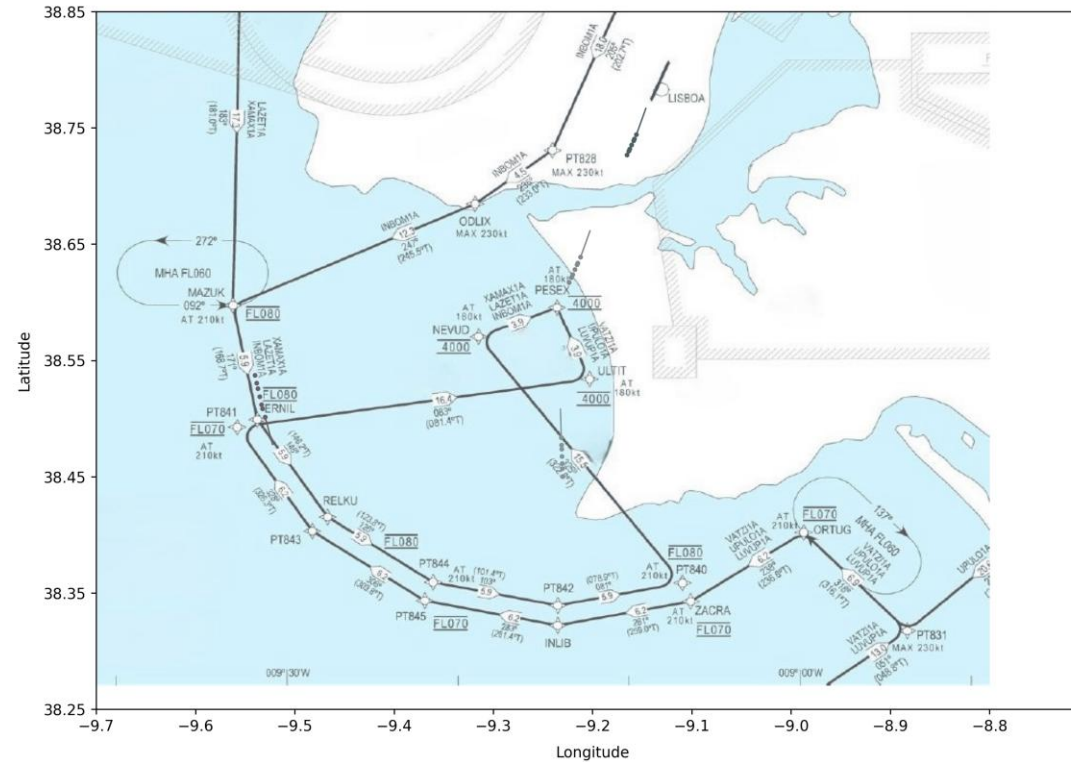
ORCI

Optimized Runway Centreline Interception

Point Merge Stakeholder Event
4th Jun 2026

Designing and developing an AI-based tool that will support Air Traffic Controllers to manage arrival traffic in the most optimal manner regardless of the traffic load or complexity.

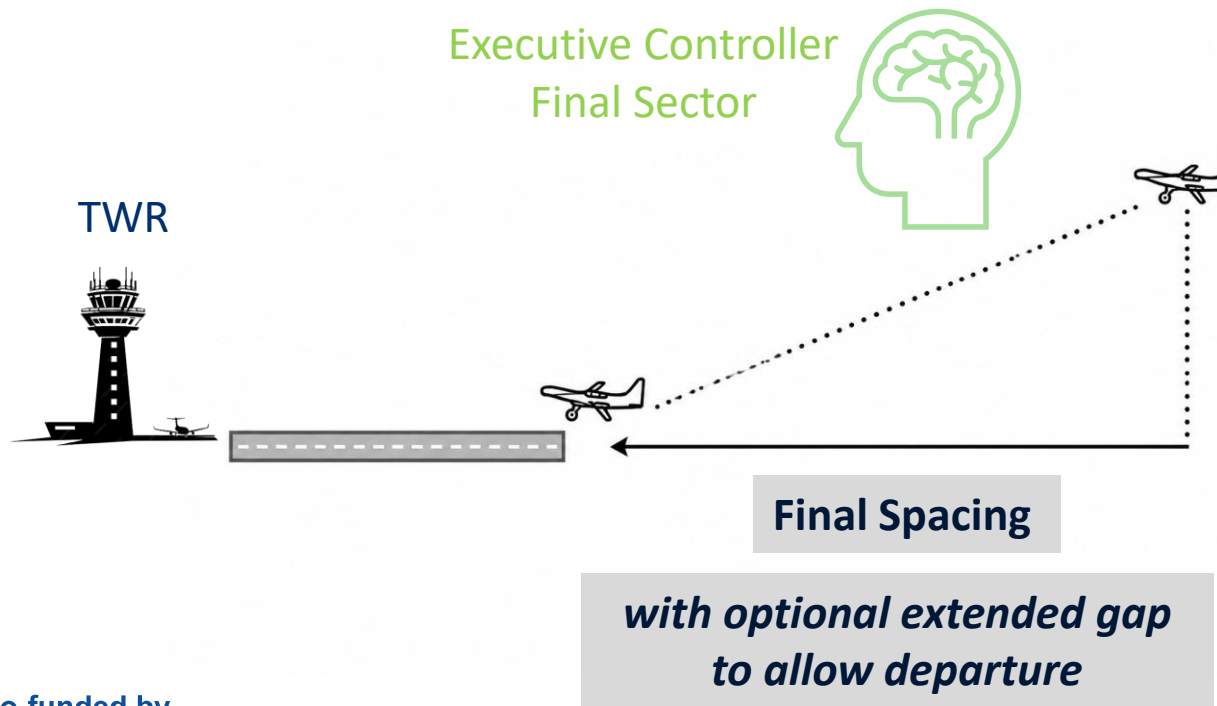
ORCI Lisbon Point-Merge Approach (*south*)



Safety

Optimise Final Spacing as much as possible to maximise Runway Throughput

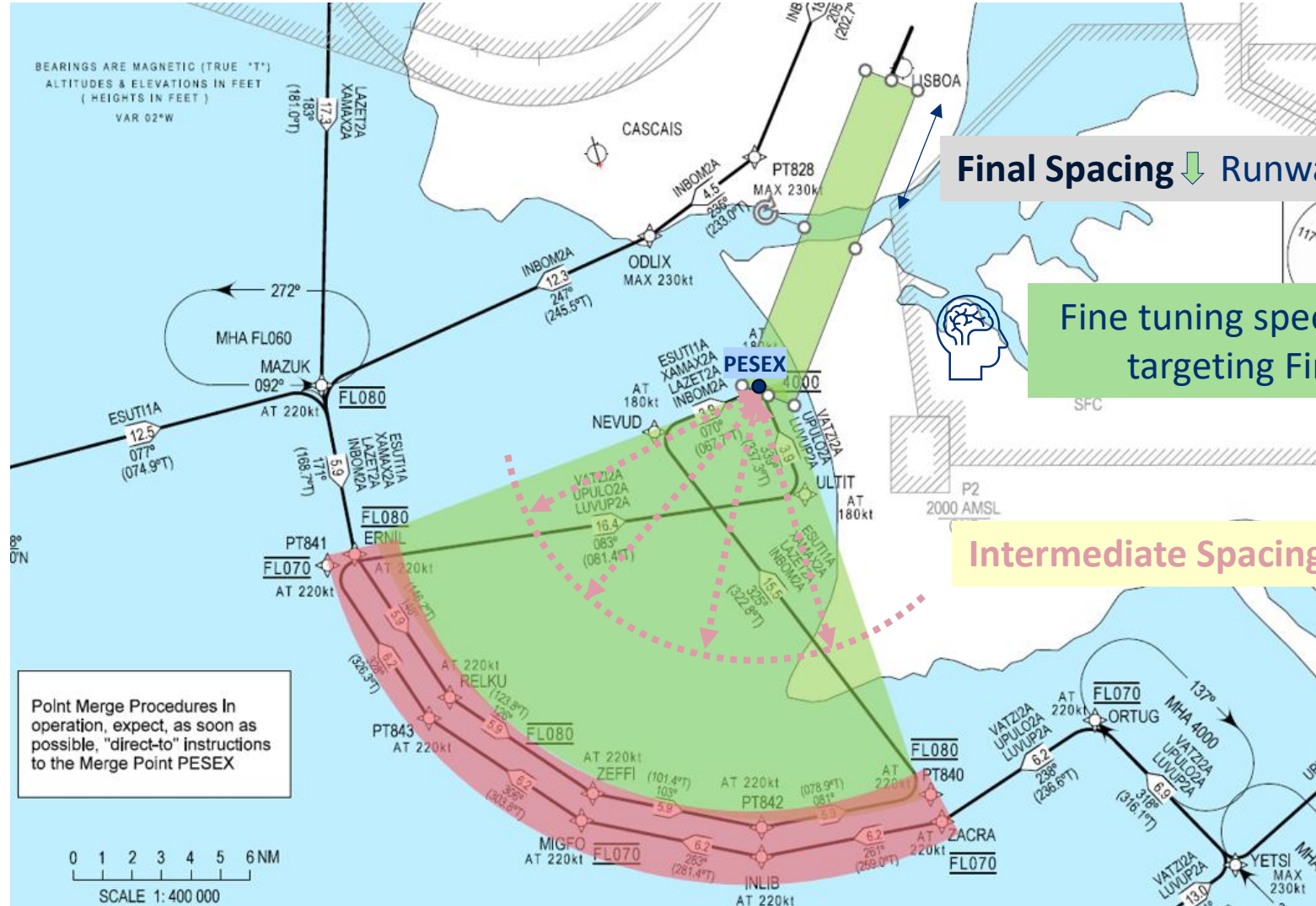
- For mixed-mode runway operations



Two Cognitive tasks:

1. Direct to/Turn
2. Speed Adjust

Final spacing
achieved via larger
intermediate
spacing at PESEX



Final Spacing ↓ Runway Throughput ↑

Fine tuning speed adjustments
targeting Final Spacing

Intermediate Spacing

Direct-to instructions targeting
Intermediate Spacing (PESEX)

ORCI – Main Objectives



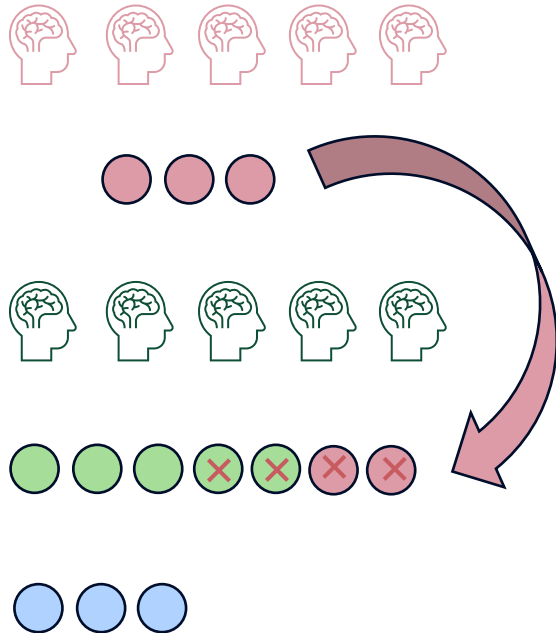
HUMAN-CENTRIC • AI-POWERED • SAFE • EFFICIENT



Effort available or Workload (10)



Current Scenario



Lack of accuracy to be refined adjusting speed



Direct-to targeting
Intermediate
Spacing at PESEX

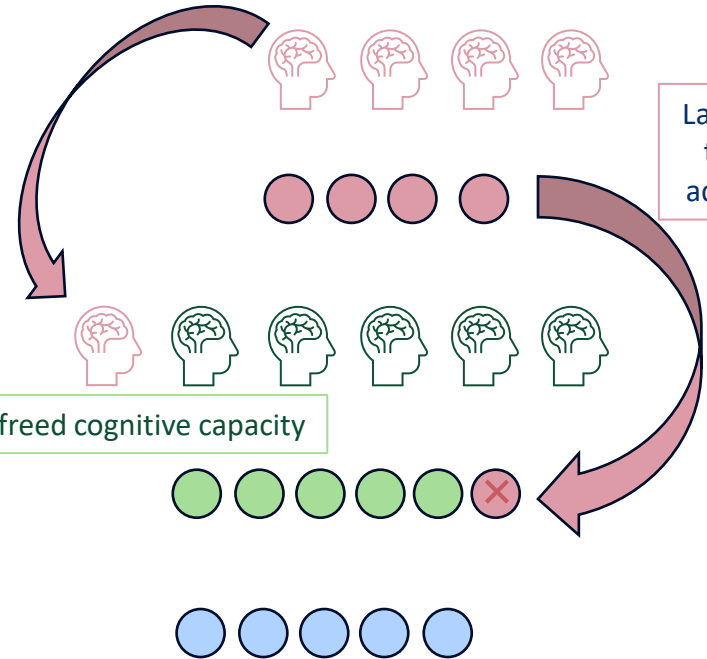
Intermediate Spacing
Accuracy ●●●●●

Speed
adjustments
targeting
Final Spacing at THR

Spacing at THR Accuracy



ORCI Scenario



Lack of accuracy to be refined adjusting speed



freed cognitive capacity

ORCI continuously provides the **predicted intermediate spacing at PESEX** between two specific arrivals, assuming the ATCO immediately begins ** issuing a “Direct To PESEX” instruction to an aircraft at the current location on the PMS arc

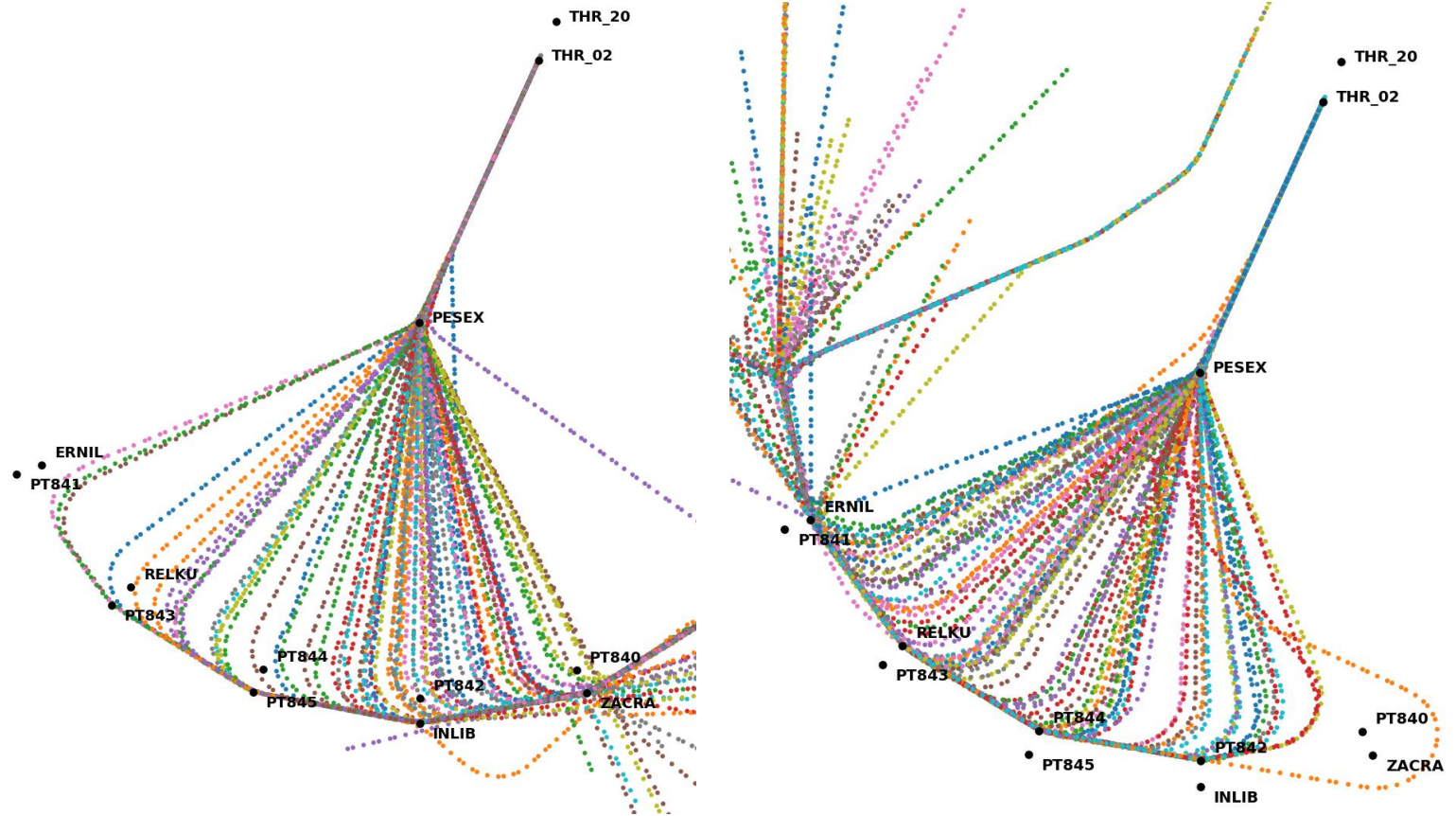
**ORCI already takes into consideration the following time lags:

- ATCO phraseology
- Pilot response time
- Aircraft turn dynamics/momentum
- Wind/compression effects

The ORCI AI Decision Support Tool has been trained on real data provided by NAV PT based on:

- ❑ +18.000 real trajectories or
- ❑ +900 Executive Controller peak hours

With two resulting models (one for each PM ARC direction)



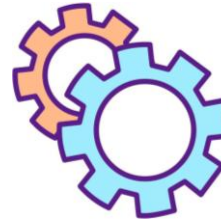
Input Data:

1. Follower (still on arc)
2. Preceding (flying to PESEX)

- ☐ Latitude
- ☐ Longitude
- ☐ Flight Level
- ☐ Ground Speed
- ☐ Heading
- ☐ Wake Turbulence Category

Time Refresh < 3seconds

Machine
Learning
Model

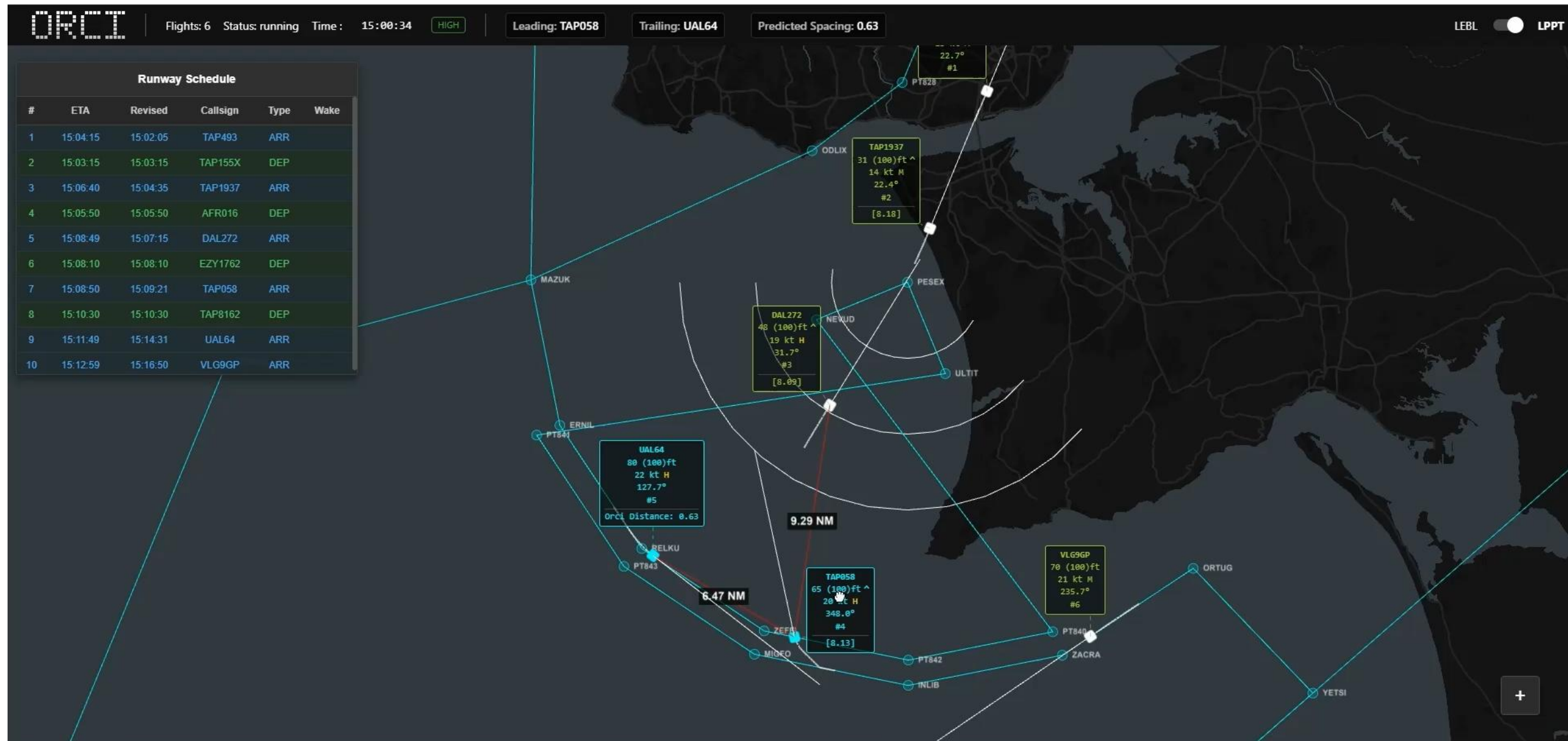


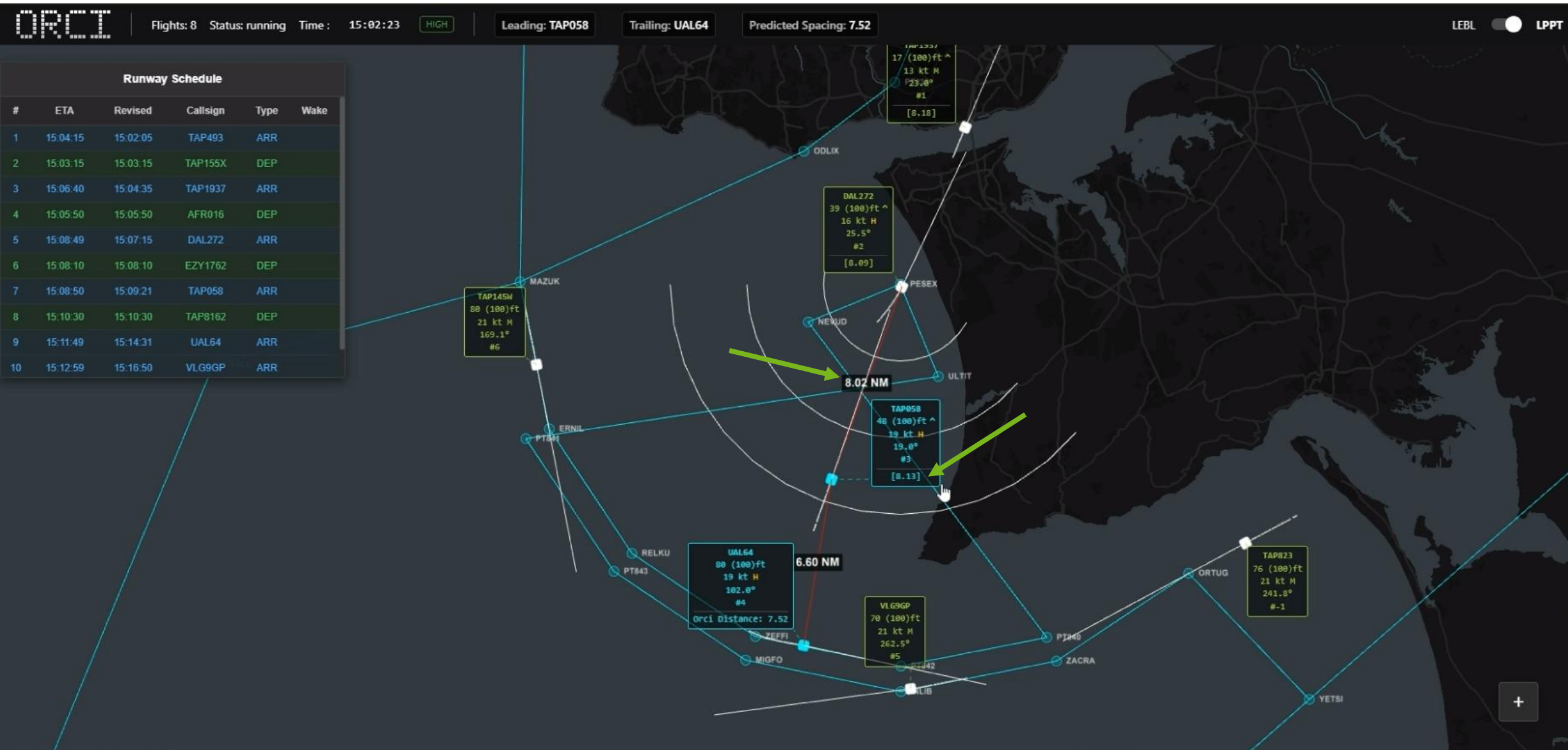
Two ML models
depending on the
following arrival-arc
(i.e. West and East)

Intermediate Spacing Prediction at PESEX

```
VLG77DP
64 (100)ft
22 kt M+
67.9°
#5
Orci Distance 2.37
```







CLOUD-ENABLED DISTRIBUTED SIMULATION PLATFORM

Distributed Interoperable Simulation Services for Next Generation Arrival Management



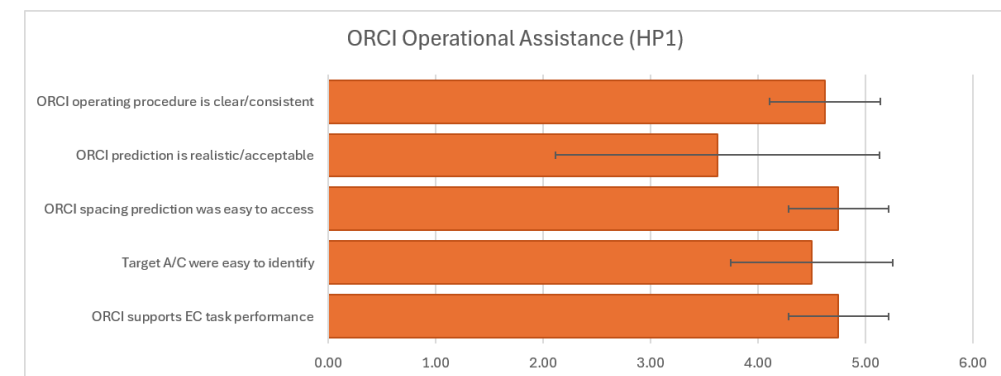
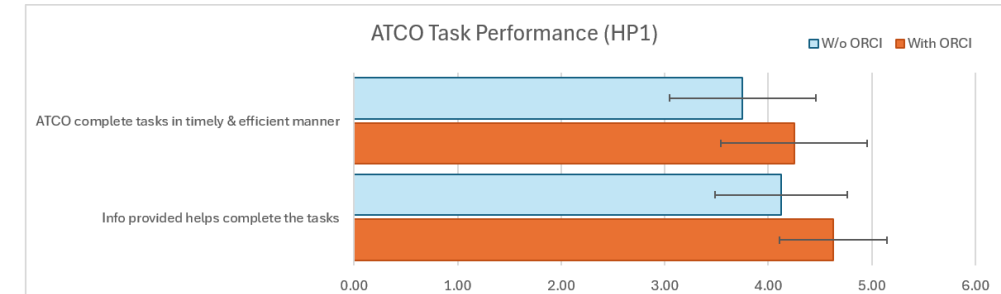
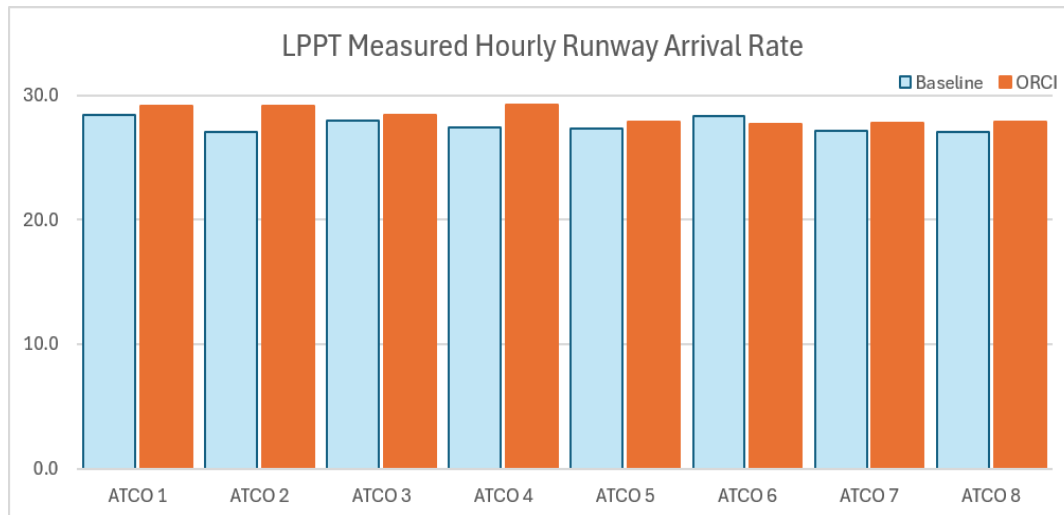
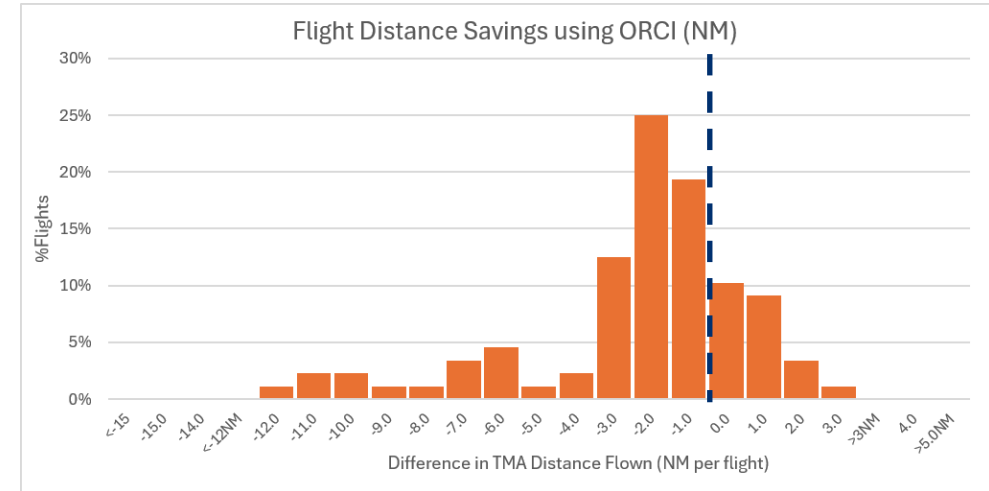
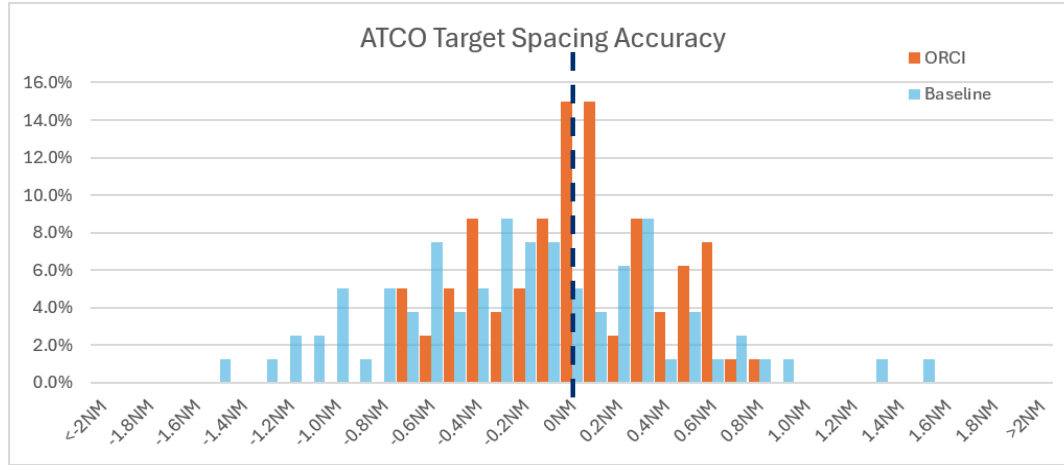
ATC Experts in Lisbon/Barcelona manage arrival flows using "Hybrid" Human-in-the-Loop / Model-based simulations (RAMS / ORCI-AI DST / ORCI-ATCO HMI) in a fully distributed ATM simulation environment via the cloud

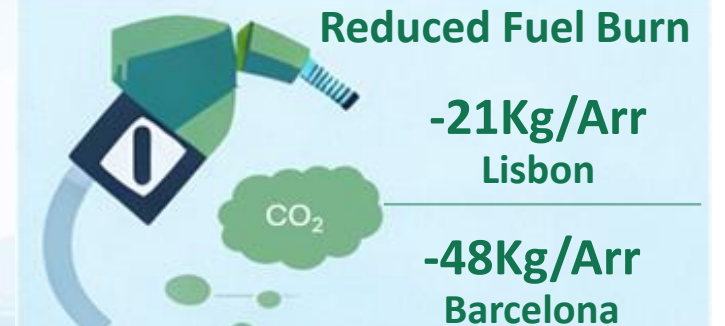
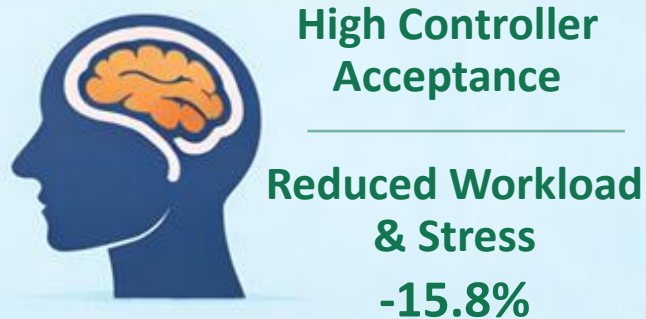
Distributed HITL Simulation Platform

- Simulator running in Paris
- ORCI AI-Decision Support Tool in Madrid
 - Running as a connected on-demand service
 - Aligned with SESAR Service-based ATM vision
- ATCO HMI at local ACC (Lisbon for PMS)
- All interactions managed through the distributed cloud-based simulation and services platform

Validation Exercises/Participants

- 8 Individual ATCO from Lisbon ACC
 - Experts in Arrival Management for LPPT
- Mixed mode runway operations
 - 6NM at threshold to allow a departure
 - 3NM (or WakeSep) when no departure
- High initial demand and complexity
 - 33 arrivals/hour
 - (*declared arrival capacity = 23/h*)
- ORCI Target spacing (at PESEX) = 8NM (5NM)
- 16 Exercises
 - 8 Baseline, 8 with ORCI support
 - ~30-35 min traffic / scenario





Optimised Runway Centreline Interception - Grant n° 101167539

ISA, renowned developer of aviation software and modelling solutions, supporting ATM simulation, validation, and bespoke concept analysis services around the globe.



INECO is an **engineering and consulting Public Entity** focused, in the scope of this proposal, on data science air transport field, including ATM and airport operations and management for more than 30 years.



ENAIRe is the **main provider of air navigation and aeronautical information services in Spain**, the fourth in Europe by traffic volume, and one of the most important in the world.



Navegação Aérea de Portugal – NAV Portugal, E.P.E., is **responsible for providing Air Navigation Services in Portugal mainland and in the autonomous regions of Azores and Madeira**



THANKS FOR YOUR ATTENTION

Questions ?