ECHO 2

SESAR ECHO 2 project

NAT Workshop on New Entrants Integration

ICAO EUR/NAT
Paris, 13-14 May 2024

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ECHO2 - general

- **Project: 101114697 — ECHO 2 — HORIZON-SESAR-2022-DES-IR-01**
- **Coordinator – EUROCONTROL**
- **23 partners (2 associated – UK based)**
- **Budget**
  - **Estimated Project Cost:** €14,849,731.25
  - **Requested EU Contribution:** €7,030,567.87
- **Start date: 01/09/2023, 36 Months**

Big picture

- Operational baseline – ECHO ConOps (ECHO1 Project)
- Validate **essential ECHO ConOps elements** related to transit through controlled airspace and interfacing with HA (not entire ConOps)
- ATM –space ops interface
  - **Network perspective** – use space ATM relevant space data to improve procedures; integration of DLR's Rel-time Monitoring Module with NMOC systems
  - **Local perspective** – Grottaglie Spaceport (Italy)
- HAPS integration in European ATM
- 3 solutions aiming for TRL6

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ECHO 1 Project

- A two-year project led by EUROCONTROL that delivered a comprehensive demand analysis and the concept of operations (ConOps) for higher airspace to allow safe, efficient and scalable operations.

- The ConOps provided the basis to identify future infrastructure needs that would be required to support Higher Airspace Operations (HAO) and it covered short, medium and long-term time frames. The ConOps addressed operations of today's existing vehicles as well as of vehicles and activities still to be developed.

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ECHO 1 CONOPS

The ConOps provides the basis from which future operational roles, responsibilities, procedures, and infrastructure required to support HAO over the short, medium and long term can be identified.

Following collaboration in the ECHO project with several new entrants, the ConOps describes their operations in Higher Airspace (HA), ranging from low to high-speed activities, plus space missions originating from, to and outside the EUROCONTROL Network Manager area.

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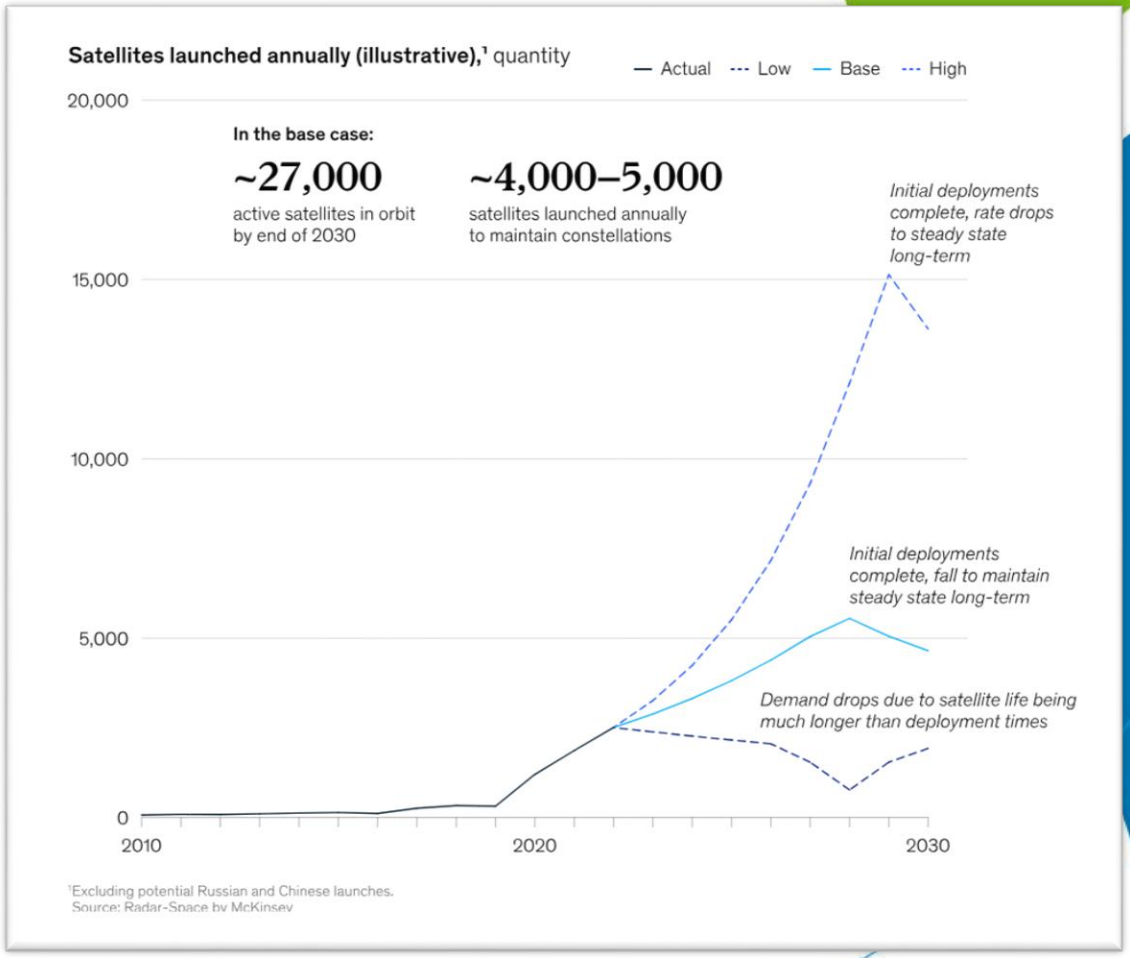
Traffic Growth

- It is expected that traffic growth in the Hight Altitude Airspace will grow rapidly over the coming decades.
- For 200+ actual operations per year, comprising sub-orbital and orbital launches plus re-entries from orbit, up to 600 airspace reservation activations per year could be possible.



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Spaceports

- Spaceports expected to be operational by 2035 and contributing to more than 200 actual operations per year.

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ECHO 2 Overview

- ECHO 2 is the next stage of the ECHO project, designed to further advance the work accomplished by in ECHO, particularly in the realm of ATM integration for HAO.

- While the ECHO project laid the groundwork in developing a comprehensive ConOps and addressing various **ATM-related challenges**, ECHO 2 is tasked with taking these initial developments to the next level of practical implementation and integration.

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Spaceports

- The project has 3 main Work Packages:
  - WP1 - Procedural package and system developments (NMOC & DLR's RMM module) for **integrating space operations transiting airspace within the NM area**
  - WP2 - Procedural package for **HAPS operations integration**
  - WP3 - Procedural package **for supersonic, hypersonic, and suborbit**al vehicles

- Accompanied by:
  - WP4 – Communication and Dissemination
  - WP5 – Management and Coordination

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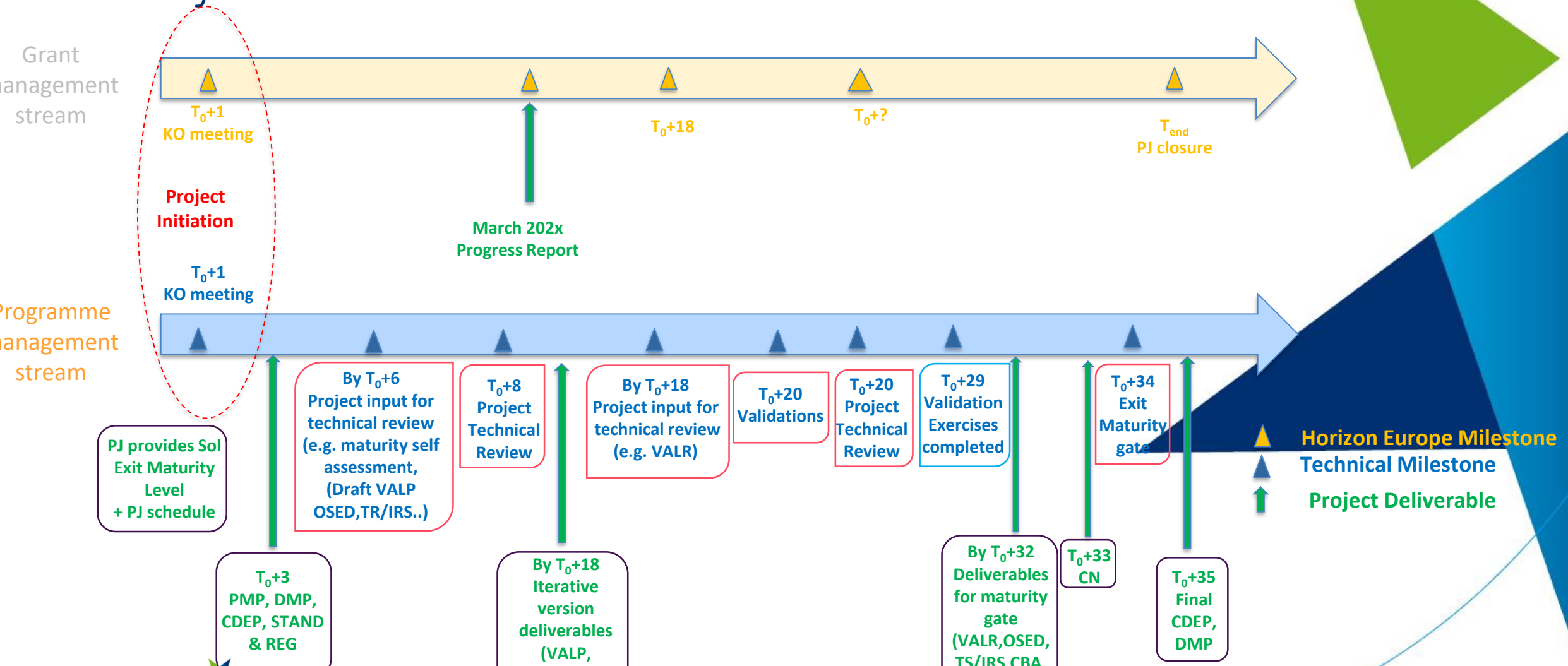
❖ Project Schedule



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Work Package 1

Procedural package and system developments for **integrating space operations transiting airspace within the NM area**

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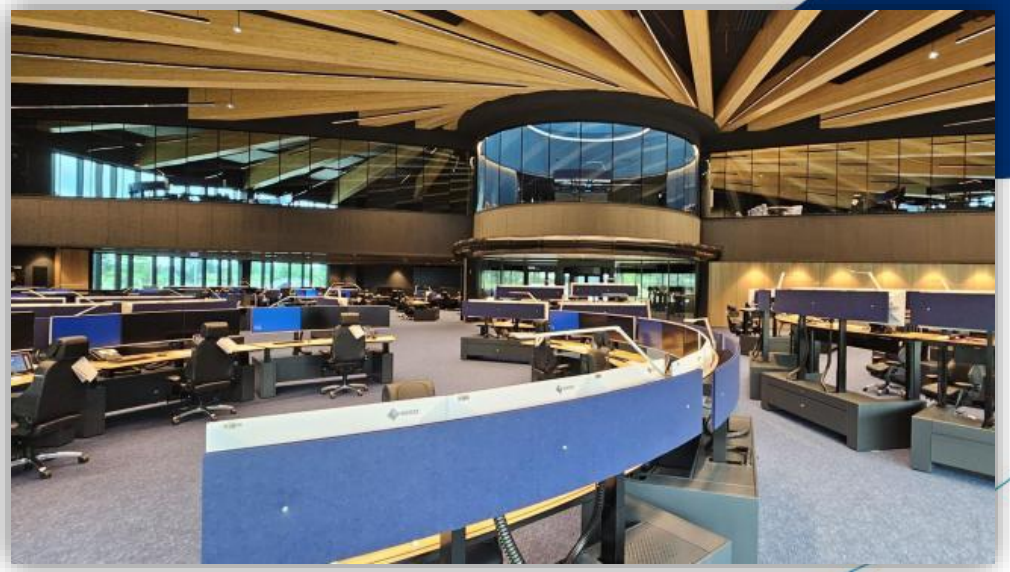
Work Package 1

- This work package is dedicated to developing a Space Launch Real Time Monitoring Module for EUROCONTROL, in its pivotal role as the Network Manager for the European air traffic network under the Single European Sky initiative.



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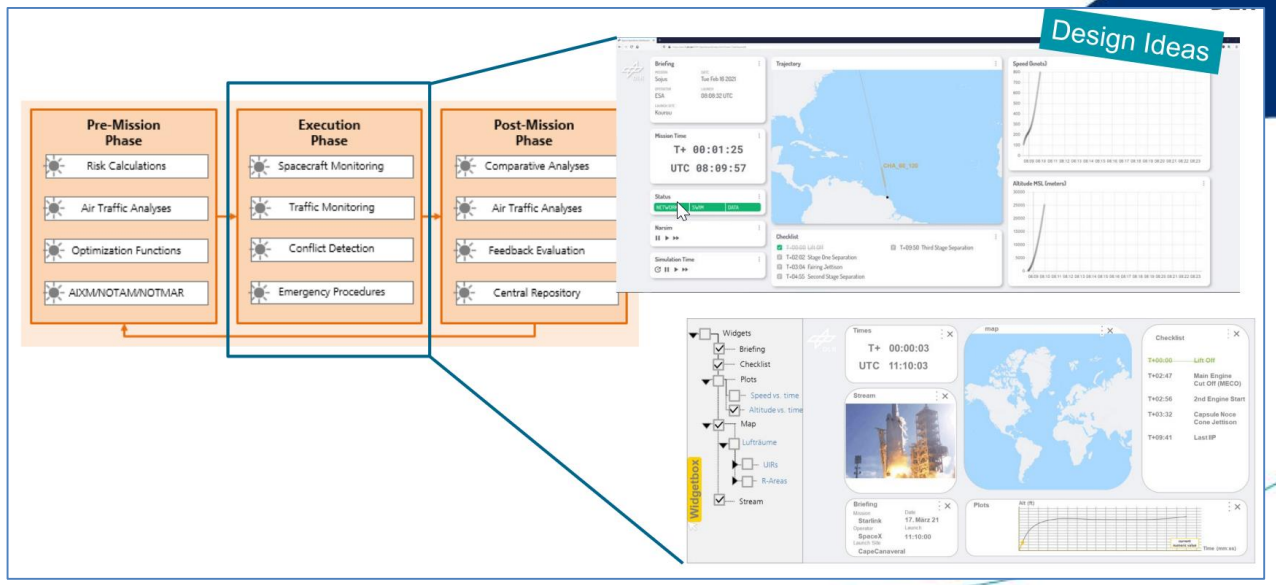
- The primary objective is to significantly enhance situational awareness at the network level. This enhancement is crucial for EUROCONTROL, as it involves supporting Air Traffic Flow Management and effectively managing crises or contingencies, particularly those related to space launches (cross-border)



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WP1 Validation

- The procedural framework for Solution 1 will be built on existing NM operational procedures (airspace management, contingency, etc.). This includes accommodation procedures for launch and re-entry operations, like determining hazard areas before a mission, mostly realized as Temporary Danger Areas (TDAs). These procedures are published via NOTAM (Notice to Airmen).
- DLR's RMM (real-time monitoring module) prototype will be tested with NM systems to improve safety and efficiency of the operational procedures'package

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WP1 Validation

- The RMM will provide situation awareness, enable and support timely release of airspace restrictions when no longer necessary, enable real-time information provision in case of non-nominal events, link to European Crisis Coordination Cell, and demonstrate capabilities of real-time provision of safety critical information to ANSP responsible for affected airspace in case of such non- nominal situations.

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Work Package 2
Procedural package for HAPS operations integration

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Aim of WP 2:

Development and **validation** of specific elements of the European High Altitude Operations ConOps related to the integration of High-Altitude Platform Systems (HAPS) in Air Traffic Management (ATM).

- Procedures based on performance of the HAPS
- Weather Impact (especially during take-off, climb and descent phase)
- Network Impact (effects on overall capacity)
- CNS Requirements (e.g. ADS-B, Mode N, separation)
- Datalink Infrastructure (Datalink requirements, Lost Command and Control Link)
- Ground handling of HAPS on airports

Based on the “ECHO target concept”, the 4d trajectory of the HAPS is the central part of the development. The concept will be applied to both individual vehicles, flying according to their agreed trajectories, and to operating volumes defined as 4d zones.

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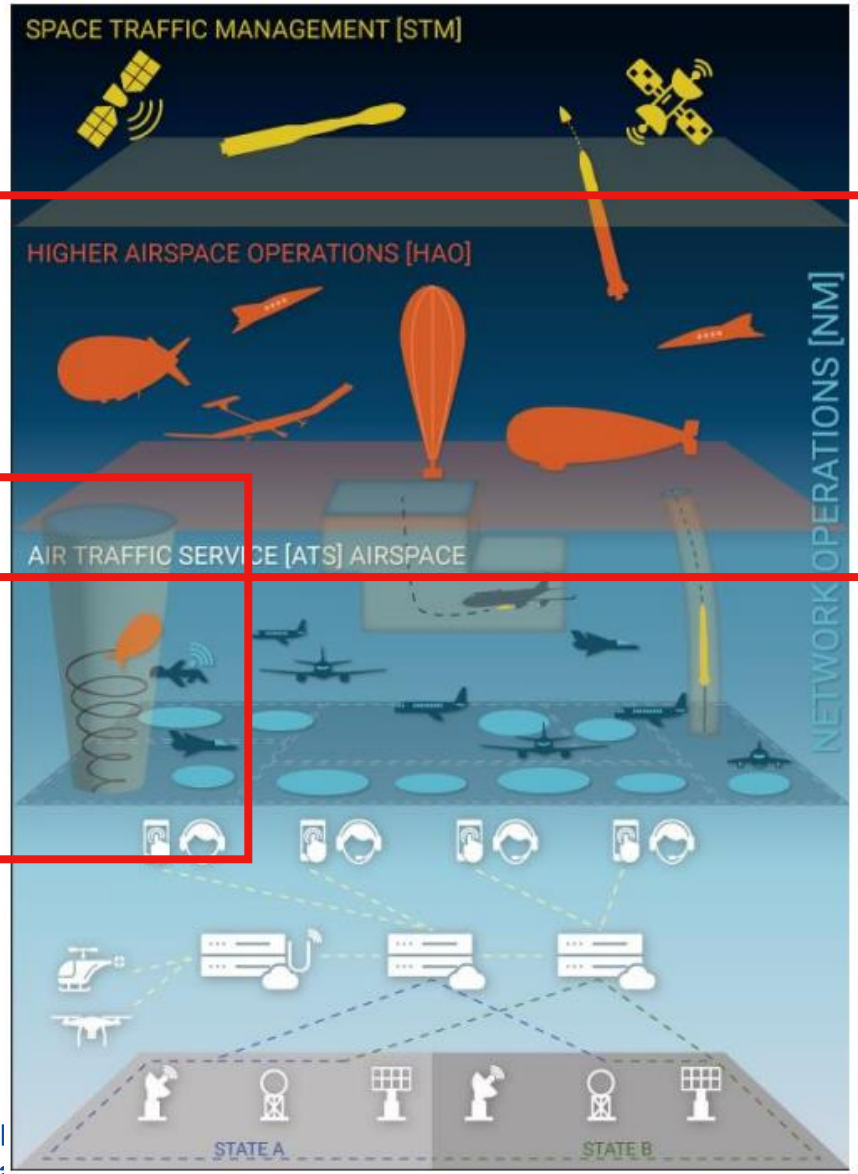

WP 2 Content

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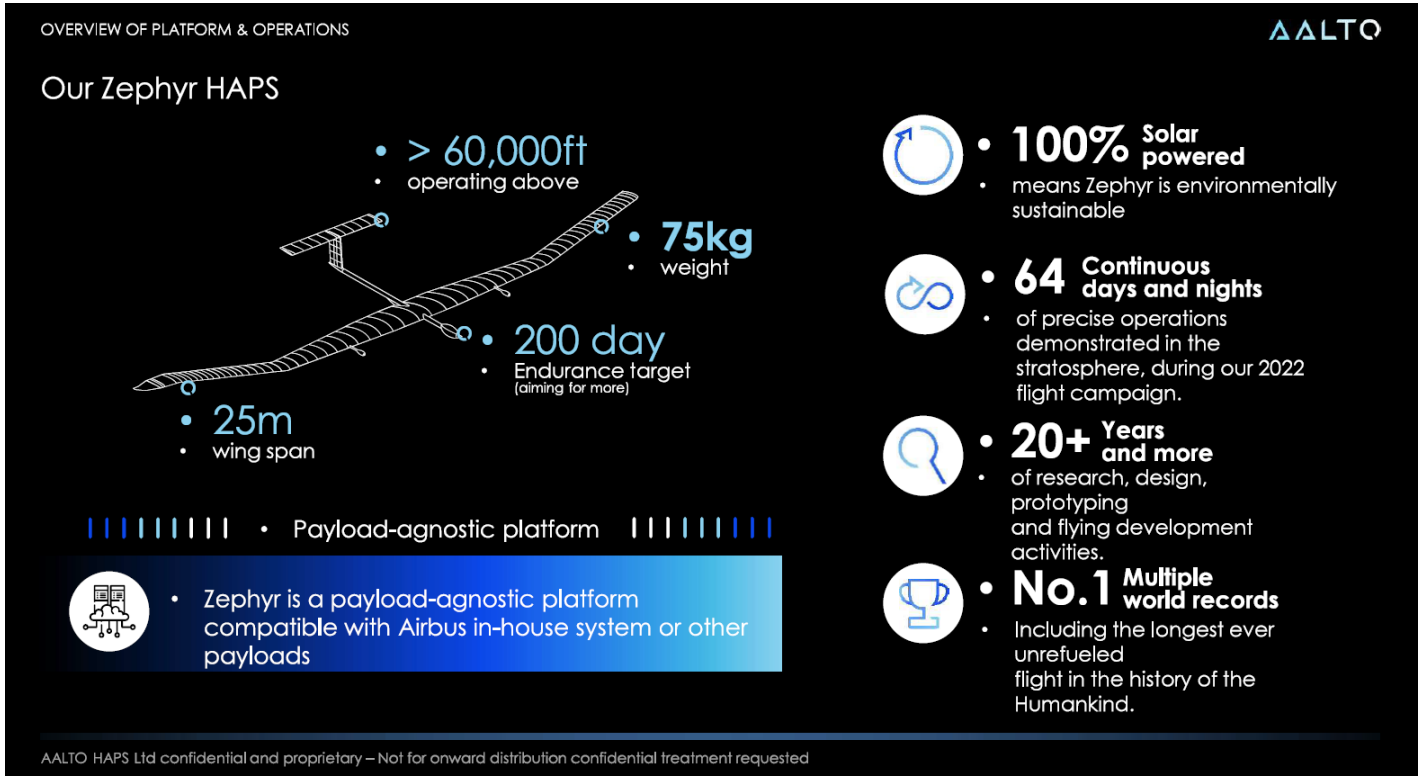
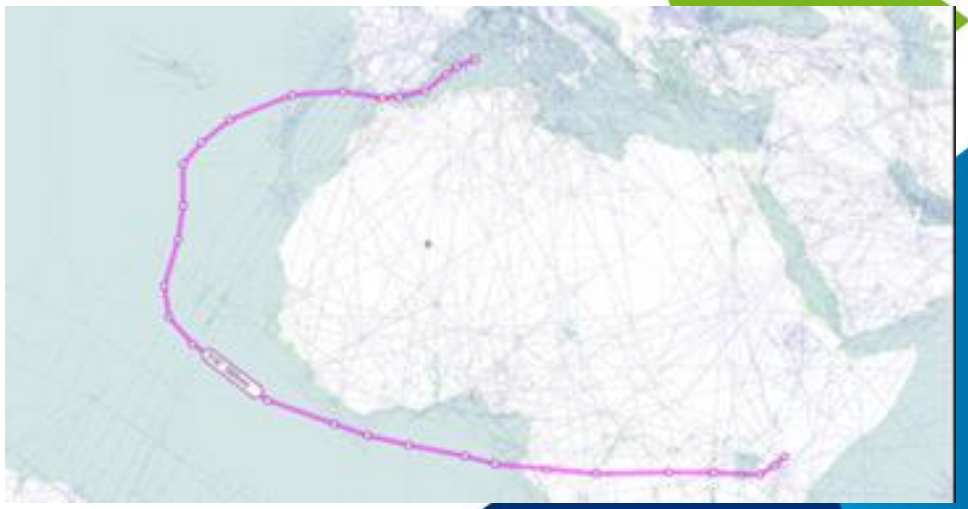
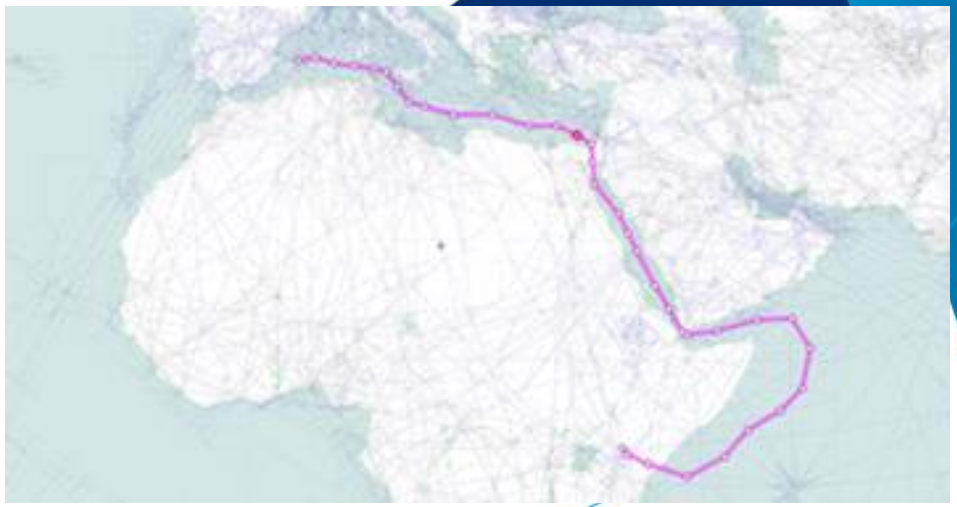
Validation with Zephyr







Validation of procedures in mission altitude

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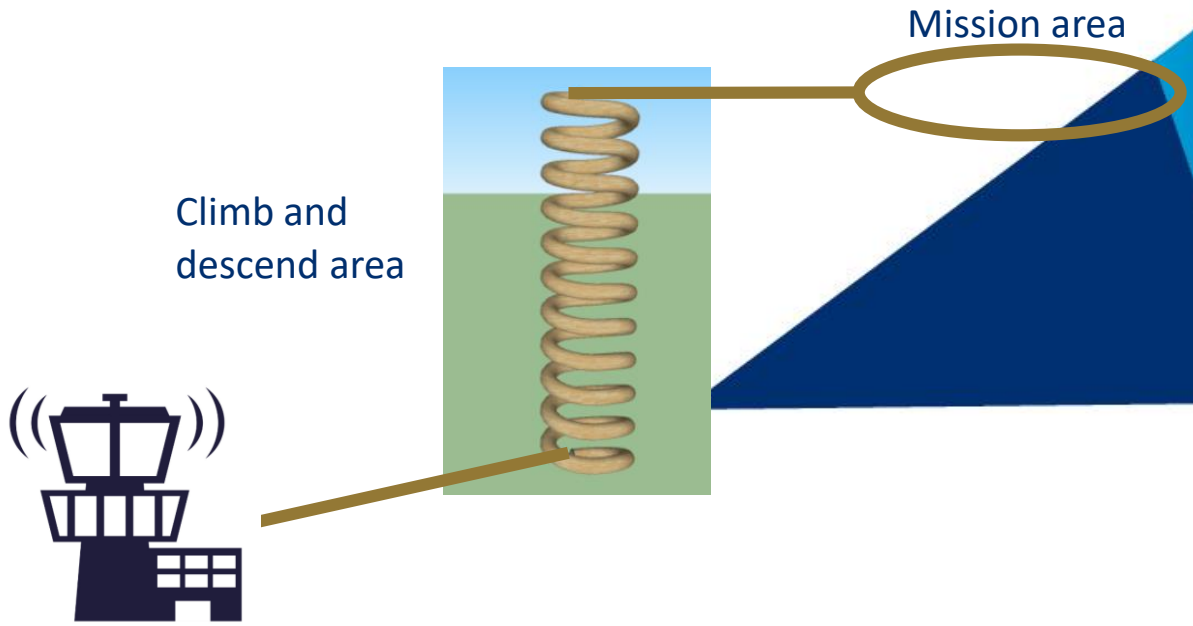
Validation with Skydweller Aircraft



Validation of procedures for climb and descend phase through different airspace classes

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Work Package 3
Procedural package for supersonic, hypersonic, and suborbital vehicles

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Main challenges for integration of WP3

- High speed transition and fast usage of airspace
- Low capabilities to change trajectories during the flight
- Possible debris generation affecting HA, airspace outside HA, and the ground
- Regulation under development, and EU / MS competences to be clarified
- Cross border issues related to States' coordination, security and defence
- Operations influenced by Weather and Space Weather
- Low capabilities at high altitudes of current surveillance and tracking systems
- ATM/STM interface for very high altitude suborbital flight (above 150 km)

Key Issues for ATM

THANK YOU FOR YOUR ATTENTION

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