

ECHO2 WP1

Network Real-time Mission Monitoring

of Launch and Re-entry Missions

ECHO 2

From DLR prototype (RMM tool) to Space Desk in NM Operations Center





ECHO 2 Solution 1 at a glance



Co-funded by
the European Union



Mission: Validate a new service in European ATFCM and NM to be implemented as part of an upcoming NM Space Desk

Lead: DLR, German Aerospace Center

Partners: EUROCONTROL, HyImpulse, NATS, ENAC-IT, ENAV, ESSP, ENAC-FR, OKAPI, ENAIRE, INECO, LFV, LIU

Total Effort: 264.4 PM

Duration: Sep 23 – Aug 26

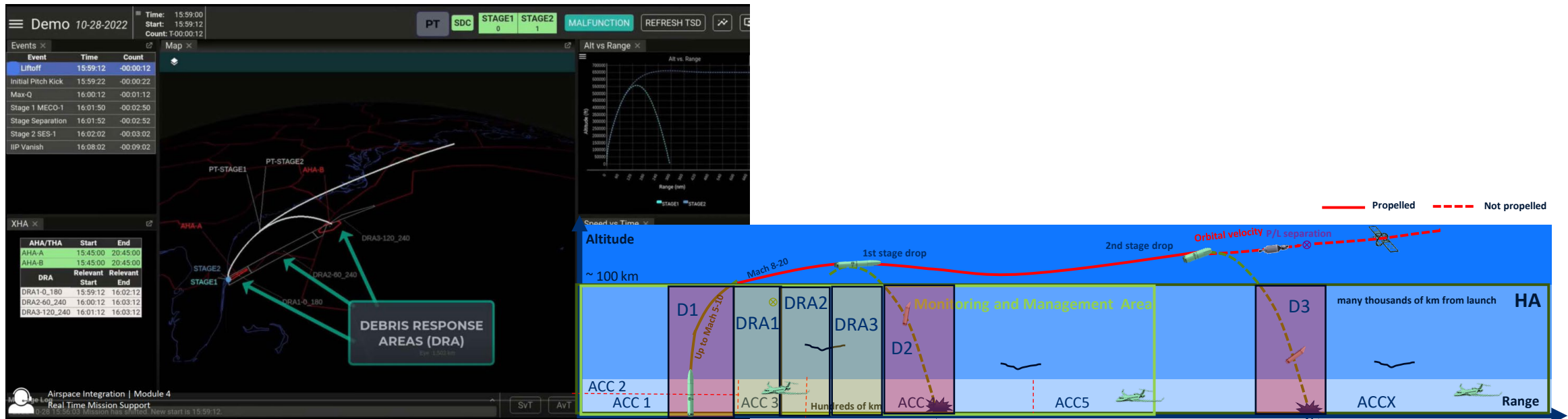
Initial TRL: TRL 2

Target TRL: TRL 6

Solution 1 will...

- integrate and display **space mission data**,
- increase **situational awareness** for the European ATM Network Manager,
- contribute to enhanced airspace utilisation and operational efficiency and contingency management for **commercial space operations** executed to/from the European continent while maintaining safety.
- It will be tailored for the needs of the European ATM Network Manager, will be accompanied by a related bespoke **operational procedural package** and tested in the context of the EUROCONTROL NM.

Background – Dynamic airspace segregation using DRAs:



Source: FAA ATO – Airspace Integration of Launch and Reentry Operations

- **Danger Area (D):** Statically segregated hazard area published via NOTAM
- **Debris Response Area (DRA):** Pre-planned hazard area known to ATC to be activated in case of a non-nominal event

NM Space Desk procedures

NM Spacedesk
Spacedesk Operator
supported by
N-RMM performs...

ASM Procedures,
acting as airspace
coordinator

Optimise airspace use to maximum extent possible for all users
(Create airspace restrictions, notify consolidated airspace and
space operations information)

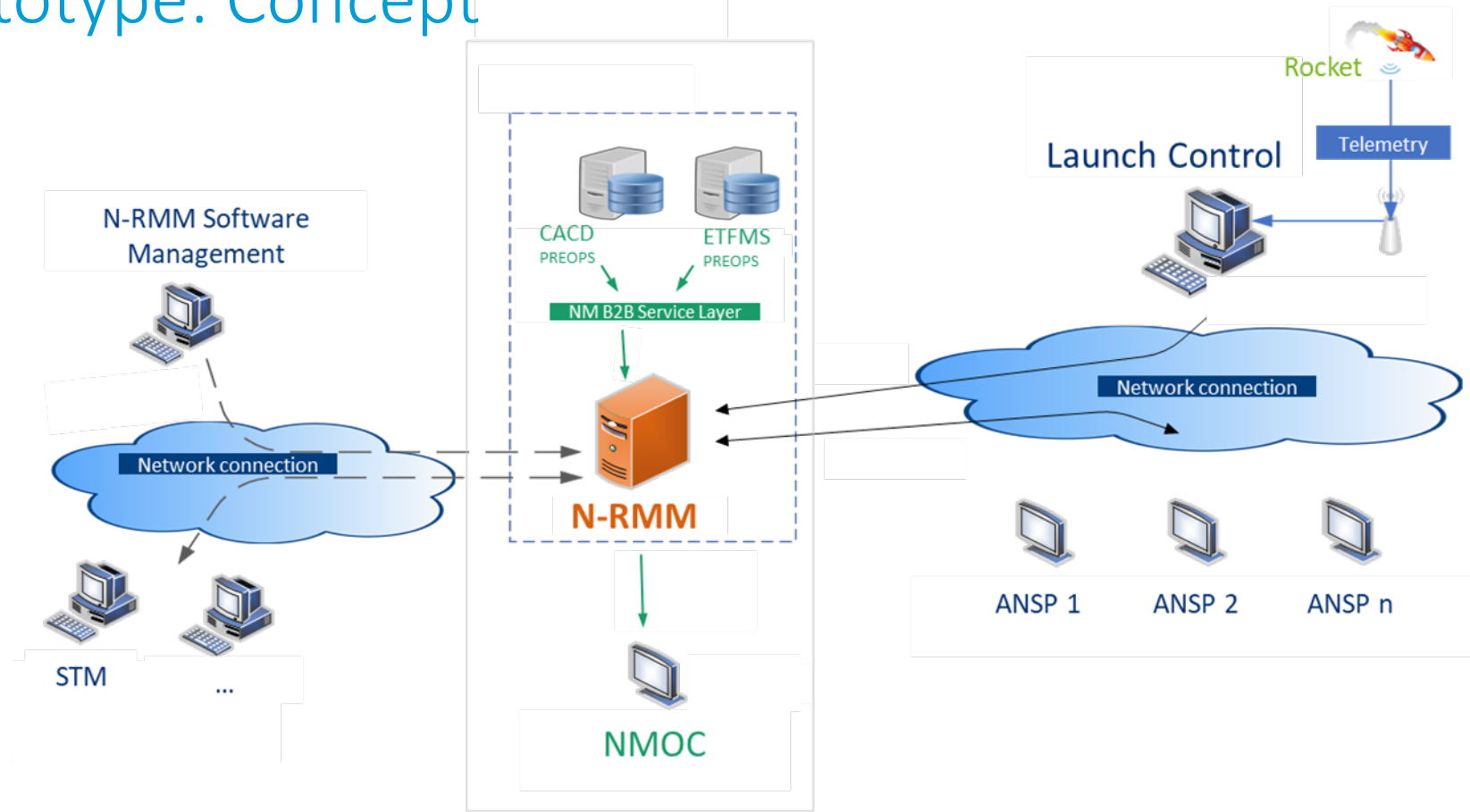
**General Coordination
Procedures**

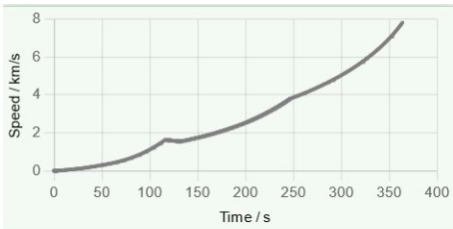
Coordination with internal (NMOC) and external stakeholders
(FMPs, ANSPs, AMCs, AUs, APTs, LROs, LRSOs, Defence
partners) within terms of agreed and prescribed procedures

Contingency Procedures

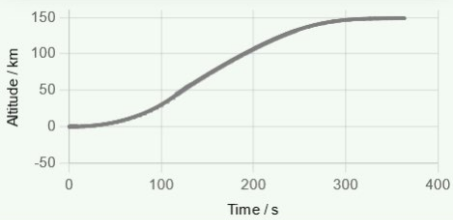
Initiate network contingency procedures;
Notify stakeholders, NMOC functions and management of
disruptive situations

N-RMM (Network Real-time Mission Monitoring) technical prototype: Concept





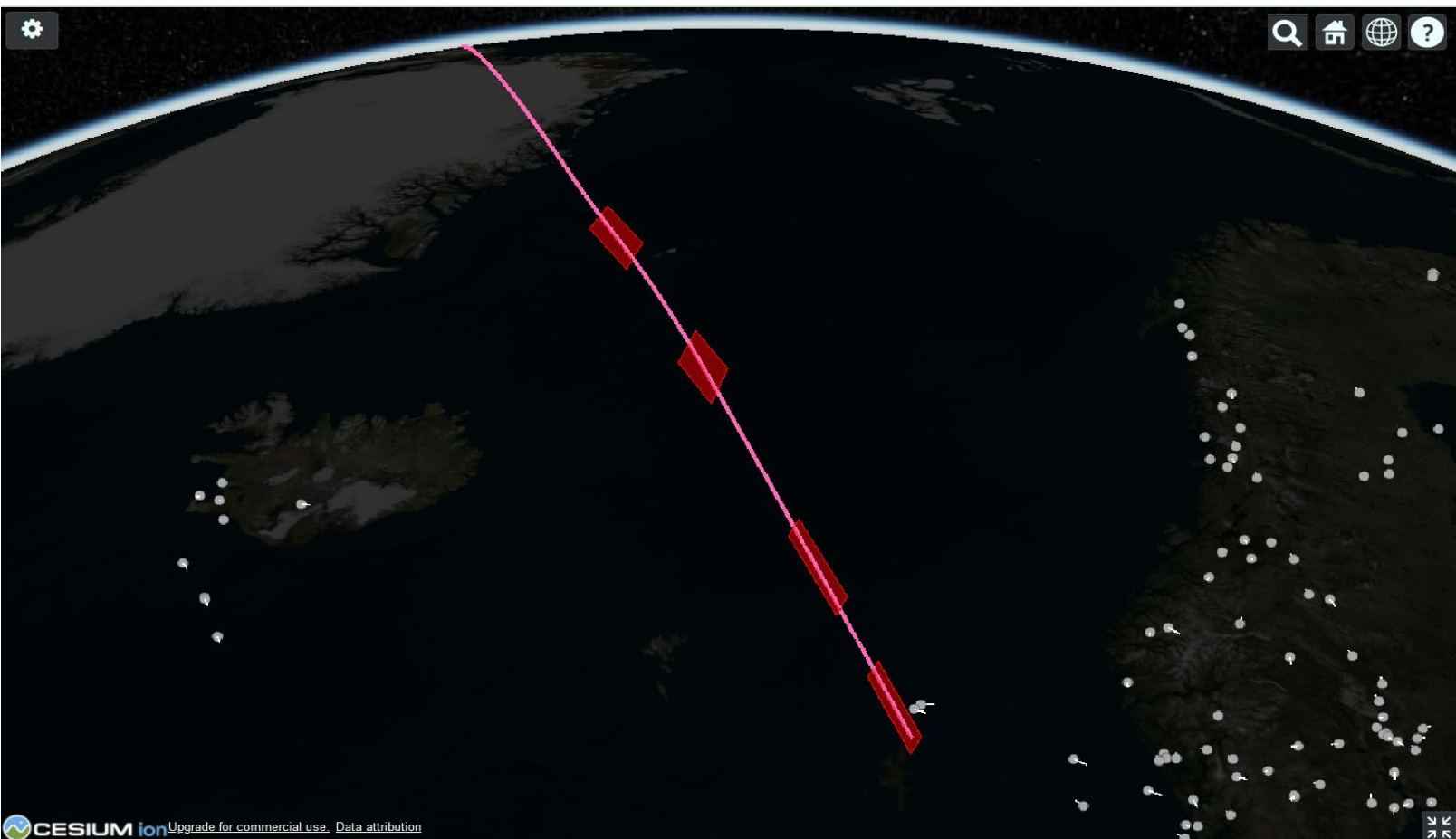
Speed over Time



Altitude over Time

Event	Time	Count
Lift-off	14:00:00	T+00:00:00
1st Stage Cut-off and Separation	14:01:56	T+00:01:56
2nd Stage Ignition	14:02:12	T+00:02:12
Fairing Jettison	14:03:22	T+00:03:22

Flights	Id	Time
FPY7	4cc552	T-00:01:13
UAE238	89644e	T-00:00:16
FPY7	4cc552	T-00:00:41
FPY7	4cc552	T--1:-1:-1



08:27:34 UTC T+18:27:34

DLR

SpaceTracks: Automated c...

DLR

Space Tracks

AUTOMATED COORDINATION OF ROCKET LAUNCHES
WITH AIR AND MARITIME TRANSPORT

Mission Info: Small Launcher 1 - HyImpulse

Weather Info ⚙️ 🌡️

DA	Status	Start	End
DA1	active	13:30:00	15:30:00
DA2	active	13:30:00	15:30:00
DA3	active	13:30:00	15:30:00
DA4	active	13:30:00	15:30:00

Pop-up DRA calculation

Conduct Pop-up DRA calculation

Pop-up DRA	Status	Start	End
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Current Event



EXE-01

Technical verification

10-13 February 2025

Outlook

EXE-02 in January 2026

- TRL6 validation, covering all validation objectives
- NMOC Space Desk, EIH, FMPs (NATS, ENAV), HyImpulse, OKAPI
- Procedural package, custom HMI, HIL RTS
- All Use Cases covered

ECHO2 WP1 Use Cases

- UC1: Uncrewed vertical rocket launch from a European spaceport to orbit with stages & fairing drop
→ **EXE-01 (Technical verification)** + EXE-02 (TRL6 validation)
- UC2: Uncrewed space vehicle re-entry from orbit to a European spaceport with horizontal landing
→ EXE-02
- UC3: Uncrewed vertical rocket launch from a location outside the monitoring and management area
→ EXE-02

THANK YOU FOR
YOUR ATTENTION