

A technical and programmatic outlook on the ESCA (Atlantic Constellation) project

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Ref. ESCA-HO-ESA-PM-0047

24/06/2025

- ❑ ESCA Programmatic Background (3/3)
 - ✓ The Atlantic Constellation context
 - ✓ The ESCA Consolidation Phase
 - ✓ The ESCA Implementation Phase
- ❑ ESCA Mission Objectives (1/1)
- ❑ ESCA System Technical Overview & anticipated Data Products (7/7)
- ❑ ESCA Project outlook (1/1)
- ❑ Summary (1/1)

- ❑ The Atlantic Constellation (Constelación Atlántica) -> bilateral cooperation initiative between Spain and Portugal, established in 2021 (Treaty of Friendship and Collaboration, Trujillo)
- ❑ Constellation open to further potential future collaboration with other national or international partners or complementary projects
- ❑ Agreement for Technical Assistance concerning Earth Observation between the Kingdom of Spain and the European Space Agency established in 2022, updated in 2023 and entered into force in its current version on 14th September 2023
- ❑ The Spanish Component of the Atlantic Constellation (ESCA) covers the development of a constellation of small Earth observation satellites with the aim of providing Earth Observation data with a guaranteed accessibility over the peninsular and extra-peninsular territories of Spain and Portugal, and their Exclusive Economic Zones

- ESCA Project split in:
 - ESCA Consolidation Phase
 - ESCA Implementation Phase
- ESCA Consolidation Phase:
 - 2 parallel Industrial contracts
 - Duration: 3 months (April-June 2024)
- ESCA Consolidation Phase - Lessons Learned ->

‘The ESCA Project Phase 1 has been concluded by Open Cosmos and Deimos. These 3 months of very intense activities have provided important technical and programmatic elements for the definition of the Atlantic Constellation and have identified the available capacities in Spain for this kind of innovative high revisit/low-cost EO systems based on a constellation of microsatellites.

This Phase 1 allows us to define the next steps of the Programme, the implementation phase, by targeting the best value for money for the Country’

❑ ESCA Implementation Phase -> ITT closed in early May 2025

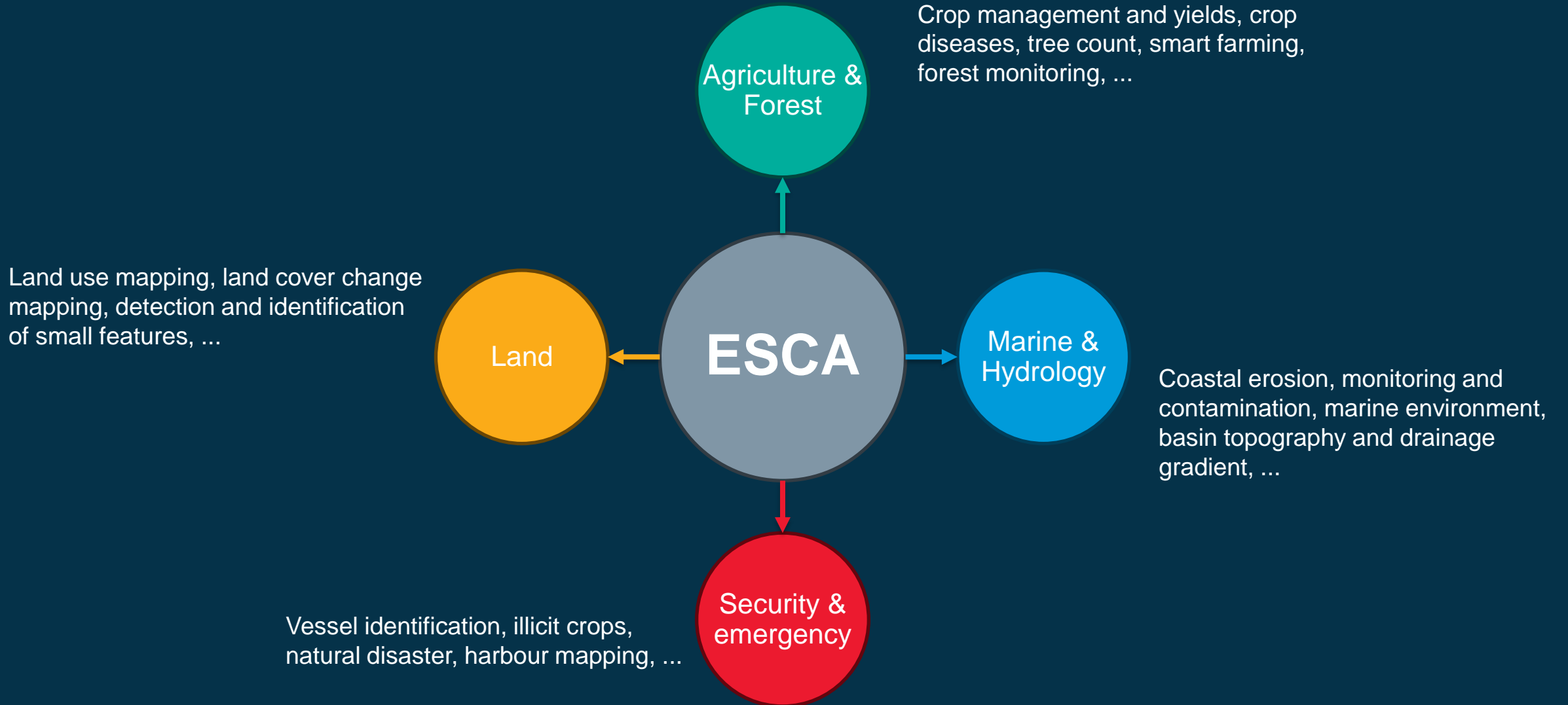
❑ Key elements:

- specific Industrial Policy rules to ensure adequate Spanish content on overall scope of work and on instruments
- emphasis on adoption of technically mature solutions

❑ ESCA technical specifications as per slides#10-15

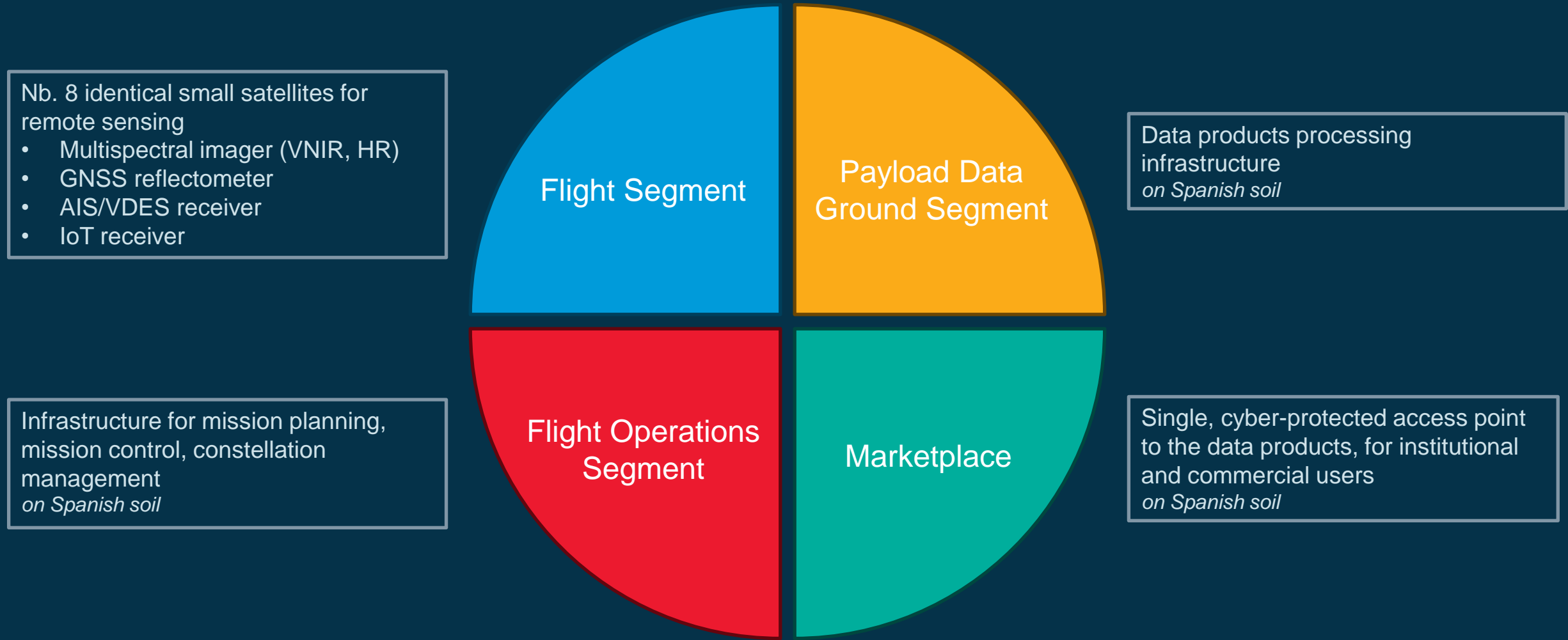
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ESCA Mission Objectives

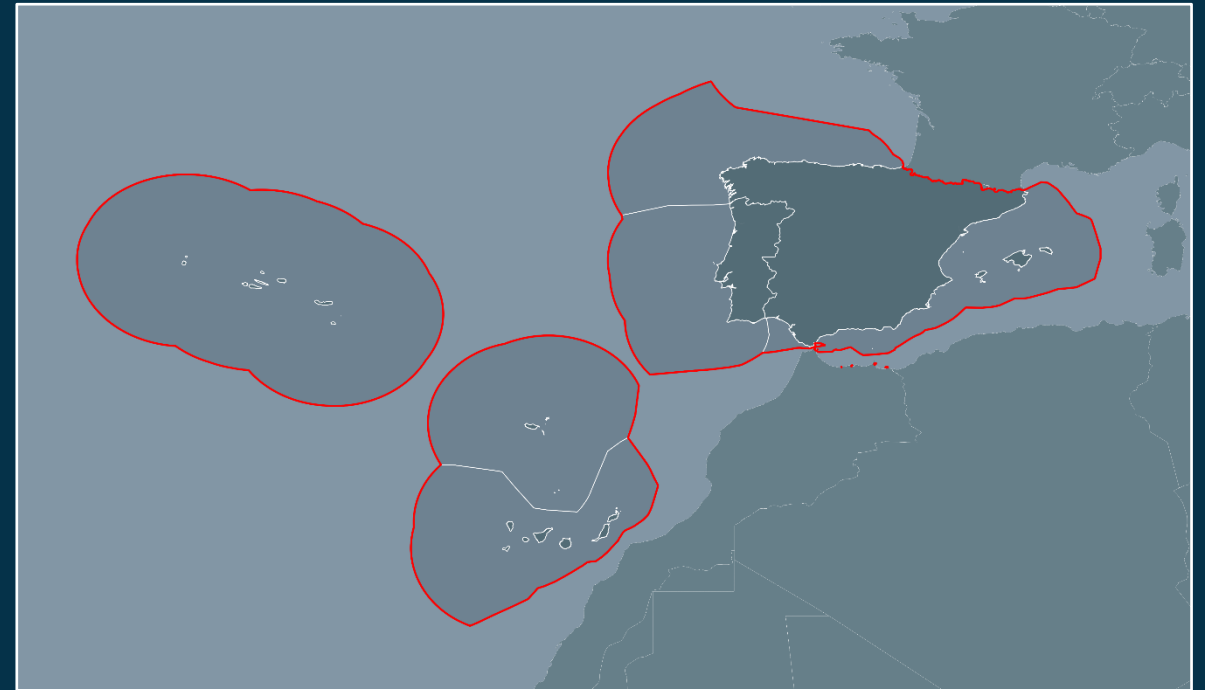


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ESCA End-to-End System Description



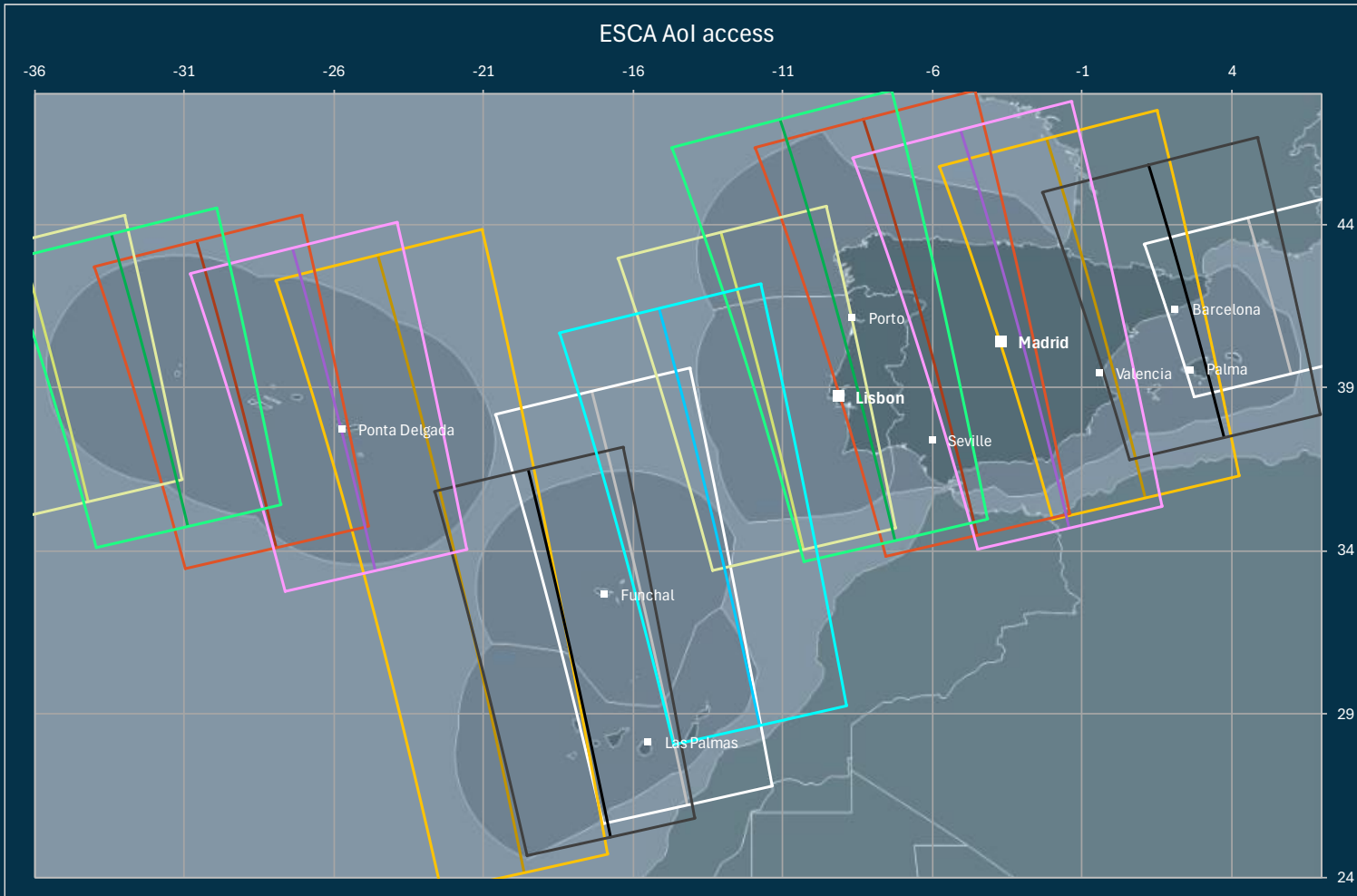
- Frequent access to the AOI
- Global coverage
- Agile operations
- Low latency, rapid timeliness
- On-demand and systematic acquisitions
- Marketplace to accept requests also from other Partners



ESCA AoI definition

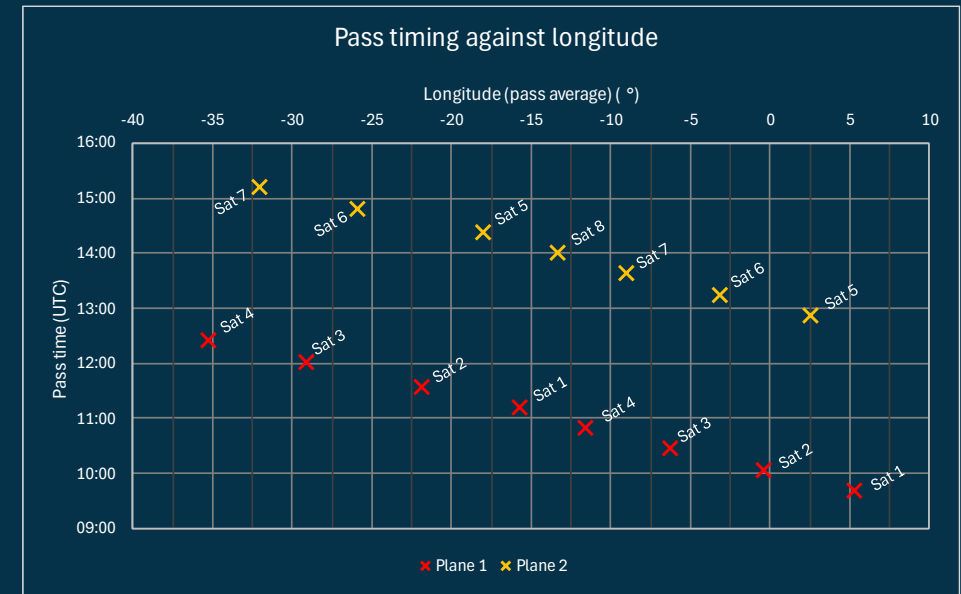
Region	Surface area
Land (PT + ES)	598 000 km ²
Sea (PT + ES)	2 770 000 km ²
Overall AoI	3 368 000 km ²

ESCA Constellation – Key Specifications (1/3)



ESCA daily access for multispectral payload.

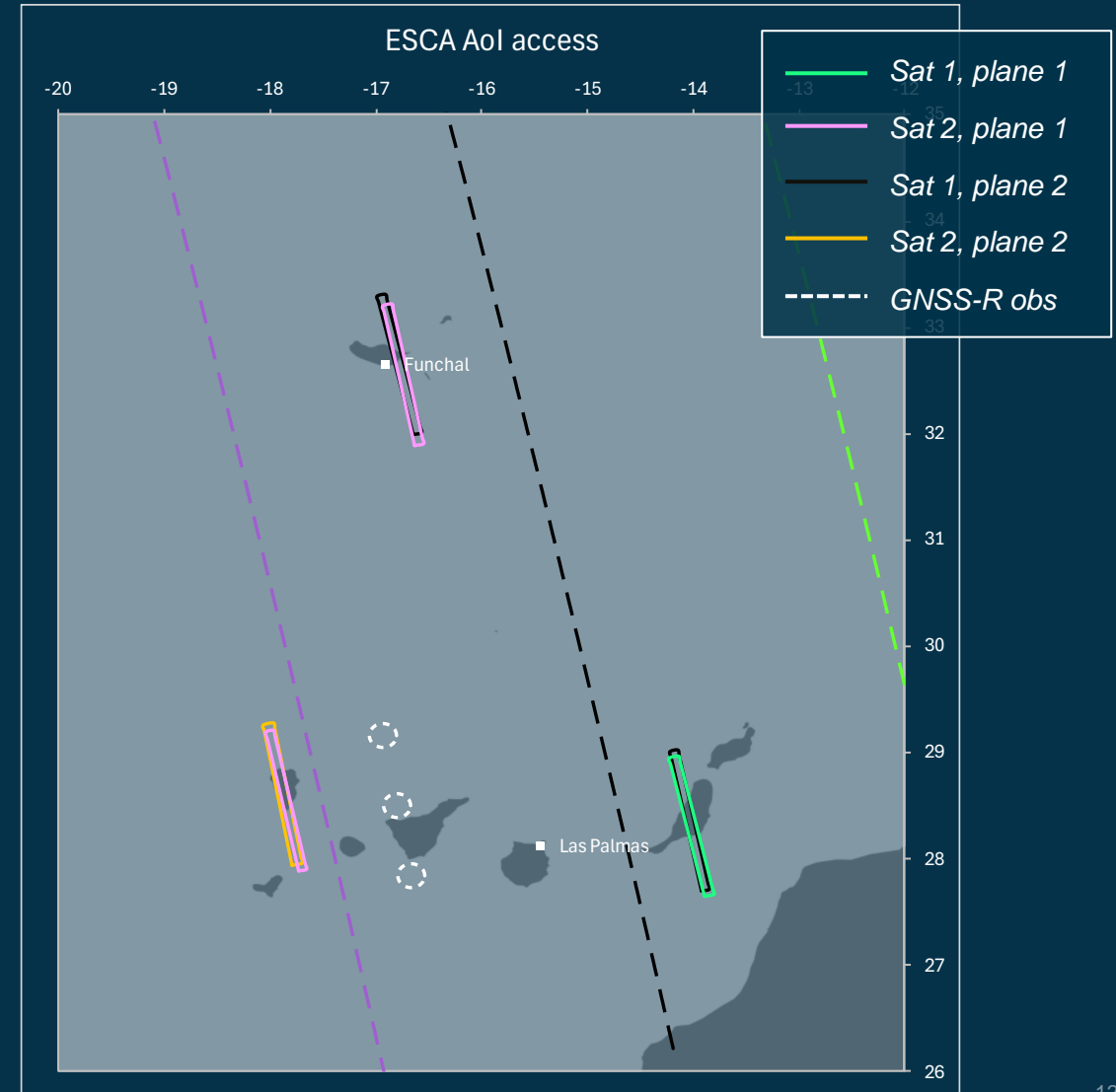
Parameter	Specification
Coverage	Global Optimised access to the AoI
Access frequency	Minimum twice per day MS payload – any location in the AoI
Orbit type	SSO, LEO

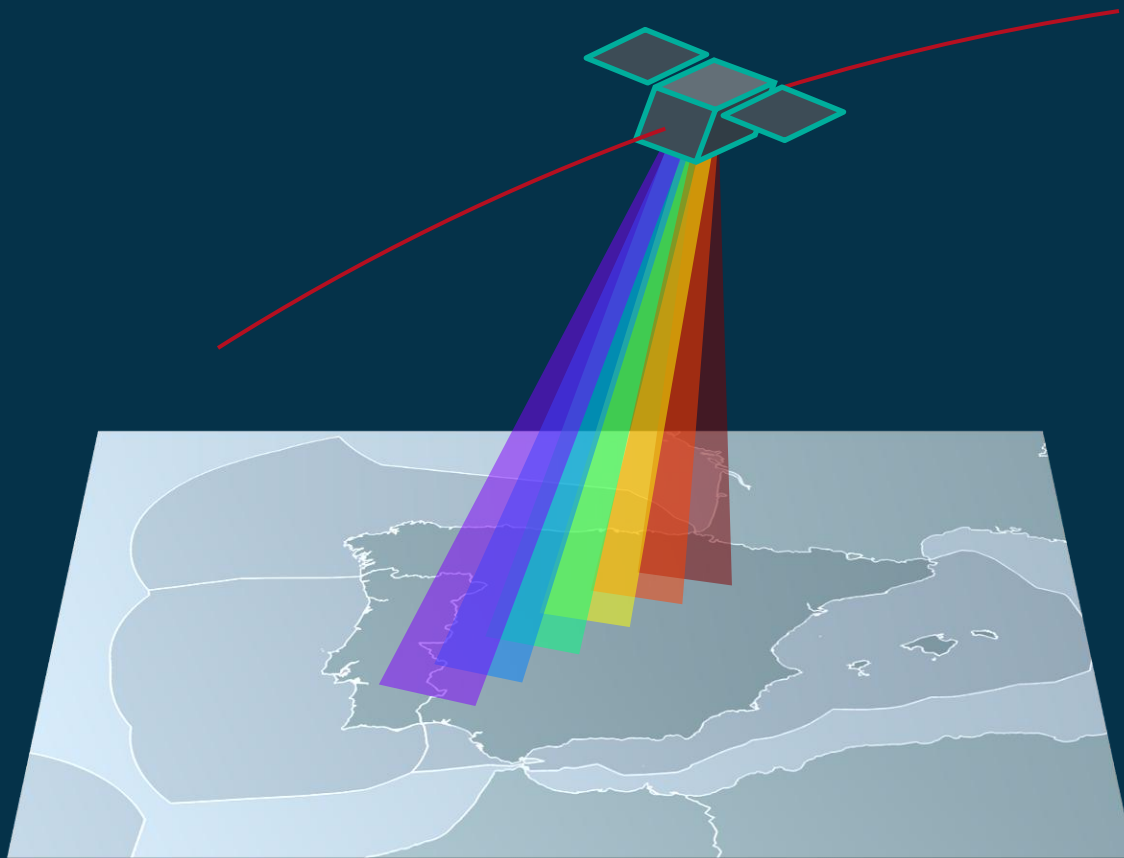


ESCA daily access timing against longitude.

ESCA Constellation – Key Specifications (2/3)

Parameter	Specification
MS payload GSD	< 2.5 m
MS payload swath width	> 7 km
GNSS/R resolution	< 25 km
L0 data latency	< 60 minutes for acquisitions within the AoI
L1C data timeliness	3 hours threshold for disaster monitoring within the AoI 6 hours goal for nominal acquisitions within the AoI
Flight Segment Lifetime	3 years (extendable to 5)
Ground Segment Lifetime	15 years

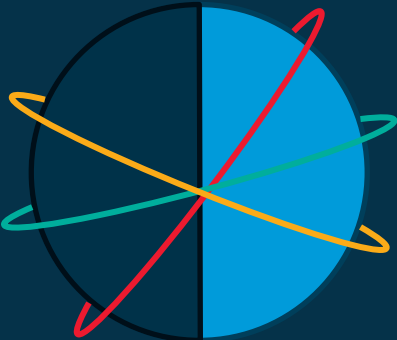




!! Note: satellite outlook not representative of ESCA technical solution

- 6 bands:
 - B (S2 B2)
 - G (S2 B3)
 - R (S2 B4)
 - Red edge 1 (S2 B5 or B6 or B7)
 - Red edge 2 (S2 B5 or B6 or B7)
 - NIR
- MTF: 10% (threshold) / 15% (goal)
- L1C/L2A geolocation accuracy: ± 2 pixel (with GCP)
- Radiometric accuracy: $< 10\%$ (threshold) / $< 5\%$ (goal)

Synergy with other potential Partners



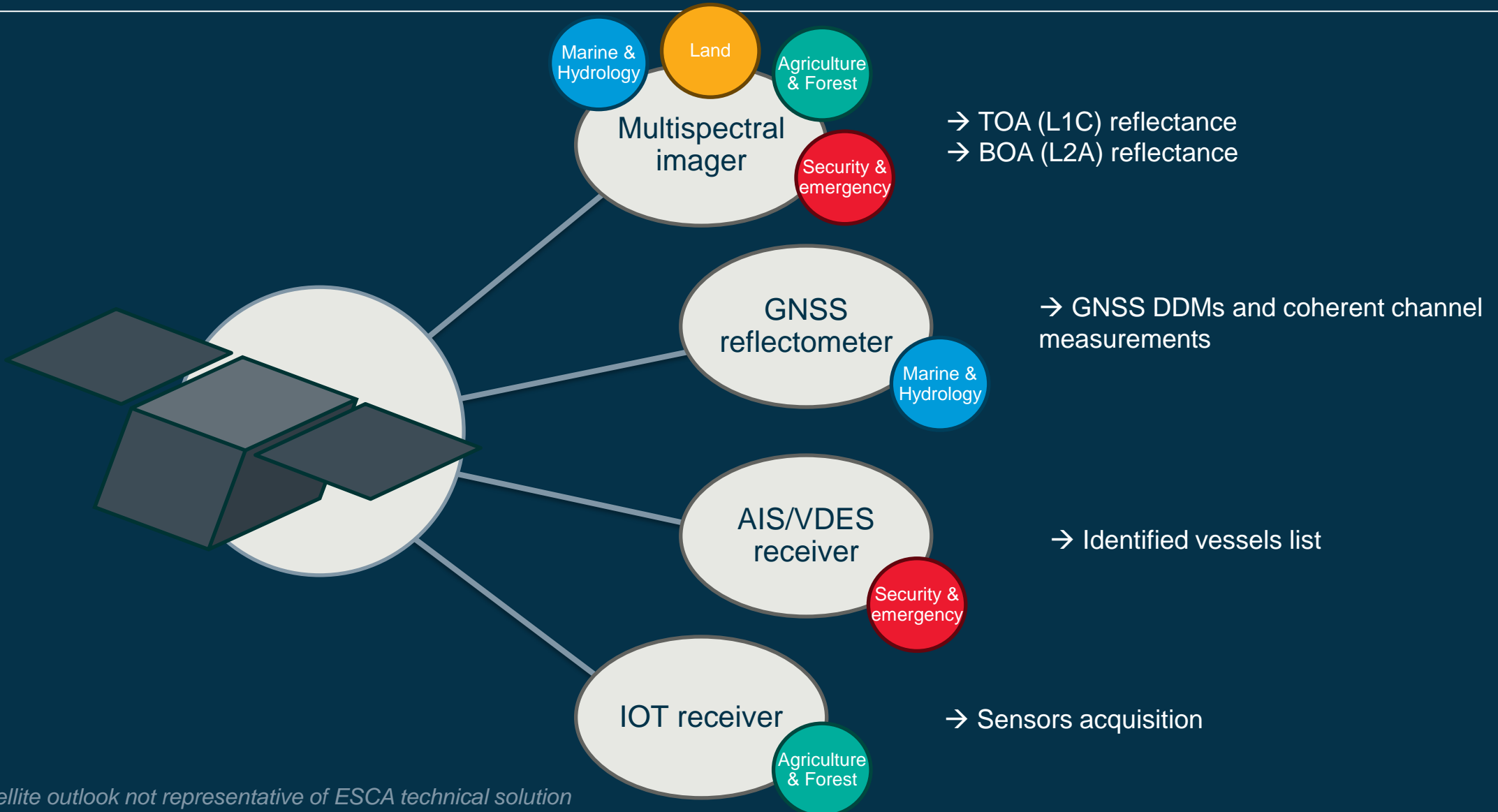
Example synergy with other partners



Pass timing



Payload and products



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- ❑ ESCA Implementation Phase start of negotiation imminent
- ❑ Key Check Point #1 (PDR) and Key Check Point #2 (CDR) envisaged in 2025
- ❑ Flight Acceptance Review of Flight Segment and Ground Segment currently envisaged by end 2026 (potential protrusion in 2027)

- ❑ *The Spanish Component of the Atlantic Constellation (ESCA) covers the development of a constellation of small Earth observation satellites with the aim of providing Earth Observation data with a guaranteed accessibility over the peninsular and extra-peninsular territories of Spain and Portugal, and their Exclusive Economic Zones*
- ❑ *ESCA integrates a multispectral imager (VNIR, HR), a GNSS reflectometer, a AIS/VDES receiver and an IoT receiver*
- ❑ *The ESCA End-to-End system targets agile operations, low latency, rapid timeliness, on-demand and systematic acquisitions and a marketplace to accept requests also from other Partners*
- ❑ *Flight Acceptance Review of Flight Segment and Ground Segment currently envisaged by end 2026 (potential protrusion in 2027)*

Q&A

Produced by

ESCA ESA TEAM

**Thank you for your kind
attention!**

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