ESA’s Commercial In-Orbit Servicing Mission

“In ESA we are implementing a policy that by 2030, we have a ‘net zero pollution’ strategy for objects in space, by consistently and reliably removing them from valuable orbits around Earth immediately after they cease operations. We need to lead by example here.”

ESA Director General, Josef Aschbacher

In-Orbit Servicing for Space Sustainability

By 2030

Design and operate for **probability of successful disposal well above 90%**

Removal services for remaining in-orbit failures

By 2050

Circular economy in space:
Reposition, Repair, Repurpose, Recycle

In-Orbit Servicing – ESA mission proposal preparation

OBJECTIVES

1. To enable a **commercial** service involving a **service provider** and **customer**.
2. To **limit further losses** of **potential market share** for European IOS service providers.

In-Orbit Servicing ESA Requirements

Service Development Requirements:

IOS-01: Rendezvous and capture an operational in-orbit Customer Spacecraft(s)

IOS-02: Perform in-orbit servicing of the customer Spacecraft(s). Note: must include one or multiple of Cooperative AOCS takeover, assembly, refurbishment, manufacturing, refuelling.

IOS-03: The service shall comply to the space debris mitigation requirements stated in AD1.

IOS-04: Provide a robust business model for in-orbit servicing activities beyond the initial mission.

IOS-05: The proposed service shall assume a procurement of the launch service for the initial mission in accordance with the ESA launch service procurement policy and payload allocation policy for ESA missions.

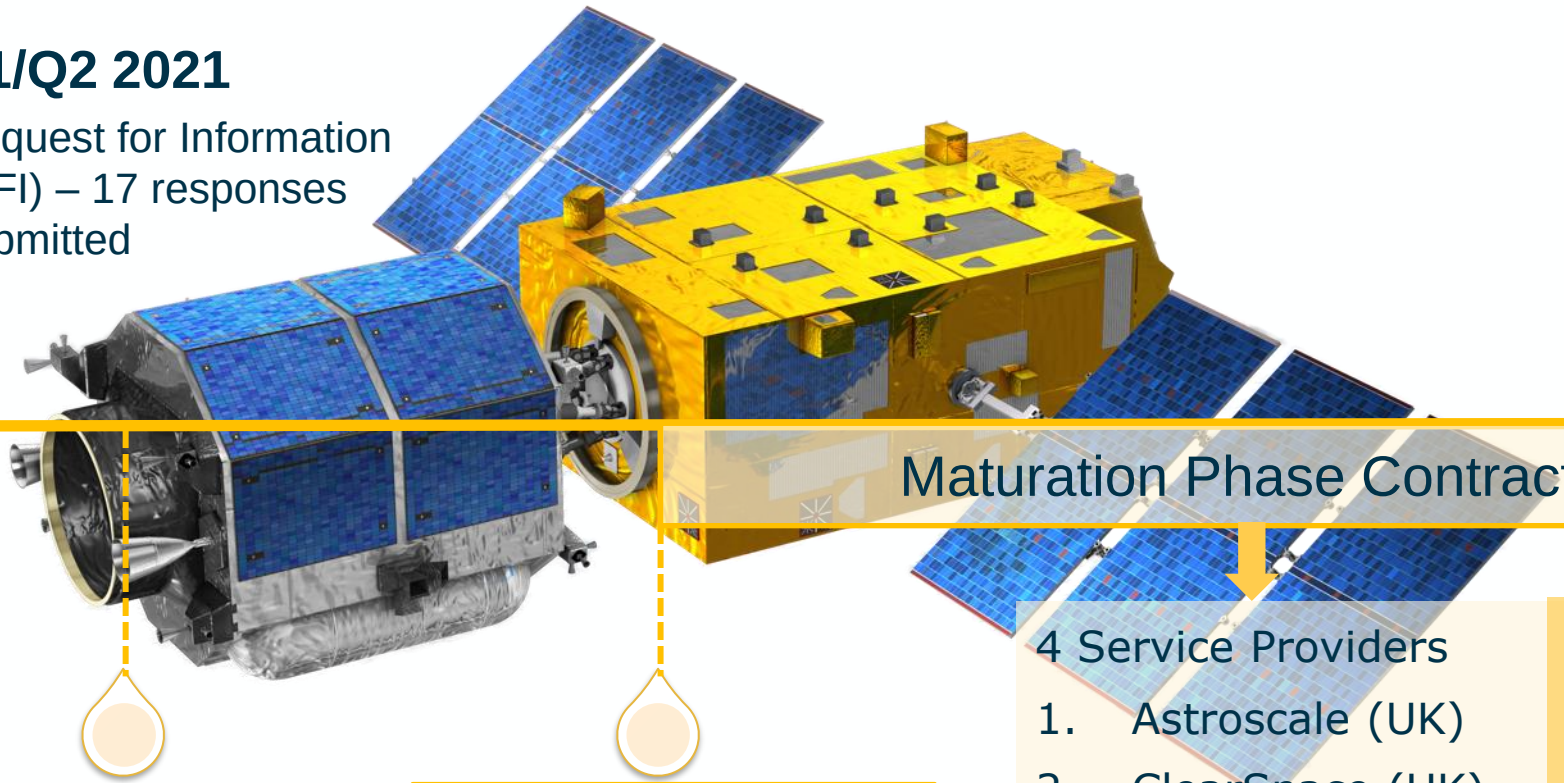
IOS-06: The onset of service shall occur by the end of 2028.

IOS-07: A minimum private co-funding from the proposers of 20% is required.

IOS-08: The system development shall implement a tailoring of ECSS standards.

IOS-09: A minimum TRL of 6 for critical technologies shall be reached by the end of 2023.

In-Orbit Servicing Maturation Contracts



Q1/Q2 2021

Request for Information (RFI) – 17 responses submitted

CMIN 2022

Maturation Phase Contracts

Q3/Q4 2021

In-Orbit Servicing Proposal Request – 11 Responses

Q1 2022

Selection / negotiation of 4 Maturation Phase contracts

4 Service Providers

1. Astroscale (UK)
2. ClearSpace (UK)
3. Telespazio/TAS (Fr)
4. D-Orbit (It)

- Technical
- Price Estimate
- Customer
- Business Plan
- Industrial Consortium

Maturation Phase Insight

Key Elements

Consortium Definition
Identification of potential suppliers, RFIs, co-engineering…

Technical Development
CONOPS, system trade-offs, identification of critical elements…

Cost Estimate / Industry Contribution
Model philosophy, cost contingency…

Mission Master Schedule / Planning
Identification of major milestones, key activities, developments plans for critical items…

GEO-Return
Derive Geo-Return scenarios for the potential suppliers…

Business Plan
Service pricing strategies, market analysis, target customers …

Customer
Deriving a Provisional Service Agreement (PSA)

In-Orbit Servicing – mission implementation proposal

At CMIN-22, ESA will present a mission with the **total mission cost** of approximately **180 M€**:

- Costs **include design, development, launch and operations**.
- Industry will contribute a **minimum of 20% co-funding**, ESA is considering an increase to this threshold, discussions on-going with the primes; **this will become a key selection criteria.**

ESA is requesting at **CMIN-22 a budget of 100 M€**, enabling the direct implementation of the mission. Different approaches are possible depending on contribution, this will impact the launch date.

Within the Cosmic element of the Space Safety Programme, we will also run future IOS mission preparation activities and IOS technology developements e.g. for circular economy, in-orbit manufacturing, assembly and recycling.

Timeline to CMIN-22

12 July 2022

In-Orbit Servicing Webinar

14 Sep. 2022

PB – Space Safety Programme

Sep/Oct 2022

Bilaterals between ESA and the operators (potential customers)

November 2022

Ministerial meeting with a decision on support for IOS

Potential Participants Meetings

18 July 2022

Maturation Phase Milestone:

- Customer term sheet
  - Mission schedule
  - Updates to design

End-Sep. 2022

Bilaterals with MS as requested

Sep/Oct 2022

IOS implementation

Q1/Q2 2023