

(Update on) EO programmes and CM25

CCI Colocation Meeting
17 October 2024

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Key programmatic highlights/achievements

FutureEO

Harmony

- Ph B2/C/D initiated.
- SAR instrument kicked off.
- Satellite prime contract including TIR instrument in negotiation following IPC approval

Earth Explorer 11

- WIVERN and CAIRT Ph A, feasibility studies, ongoing

Earth Explorer 12

- Ph 0/A/B1 grouped procurement proposal approved at Jun IPC
- Ph 0/A ITT in preparation for 4 candidate missions (CryoRad, ECO, Hydroterra+, Keystone)

Scouts

- Scout-3 (NanoMagSat) & -4 (TANGO) approved by PB-EO. Procurement proposal approved by IPC, RfQ issued, procurement process on-going (TEB)
- 2nd Scout Cycle approved by PB-EO. System consolidation studies procurement proposal approved at Jun IPC. ITT for consolidation phase in preparation

Sentinels

(early phases)

- S2 NG and S3 NGO: Ph A/B1 ongoing
- S6 NG: Ph 0 about to start

Aeolus-2

- Phase A/B1 studies and Instrument Consolidation study completed.
- Various pre-developments on-going as planned.
- Laser Transmitter Assembly supplier selected.
- Technically, ready to start Phase B2/C/D.
- Two Aeolus-2 Coordination Meetings with Participating States held to clarify / discuss financial situation and options for the way forward.

Copernicus Space Component

- Sentinel-1 NG phases B2/C/D (ITT on-going)
- Sentinel-3 NG TOPO Phase A/B1 completed the Intermediate System Requirements Review (ISRR) milestone

EO Launches

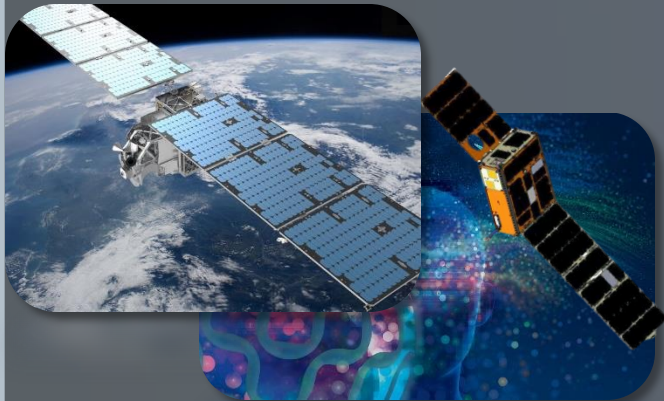
5 Satellites on 4 Launches in 2024



29 May *EarthCARE*



Sept. *Sentinel-2C*



July *Φsat-2 + Arctic Weather Satellite*



Early Dec. *Sentinel-1C*

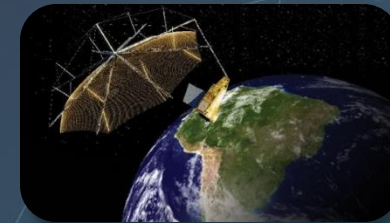
5 Launches in 2025

Q2 2025
HydroGNSS



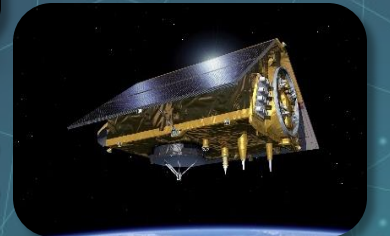
July
MTG-S1

October
MetOp-SG A1

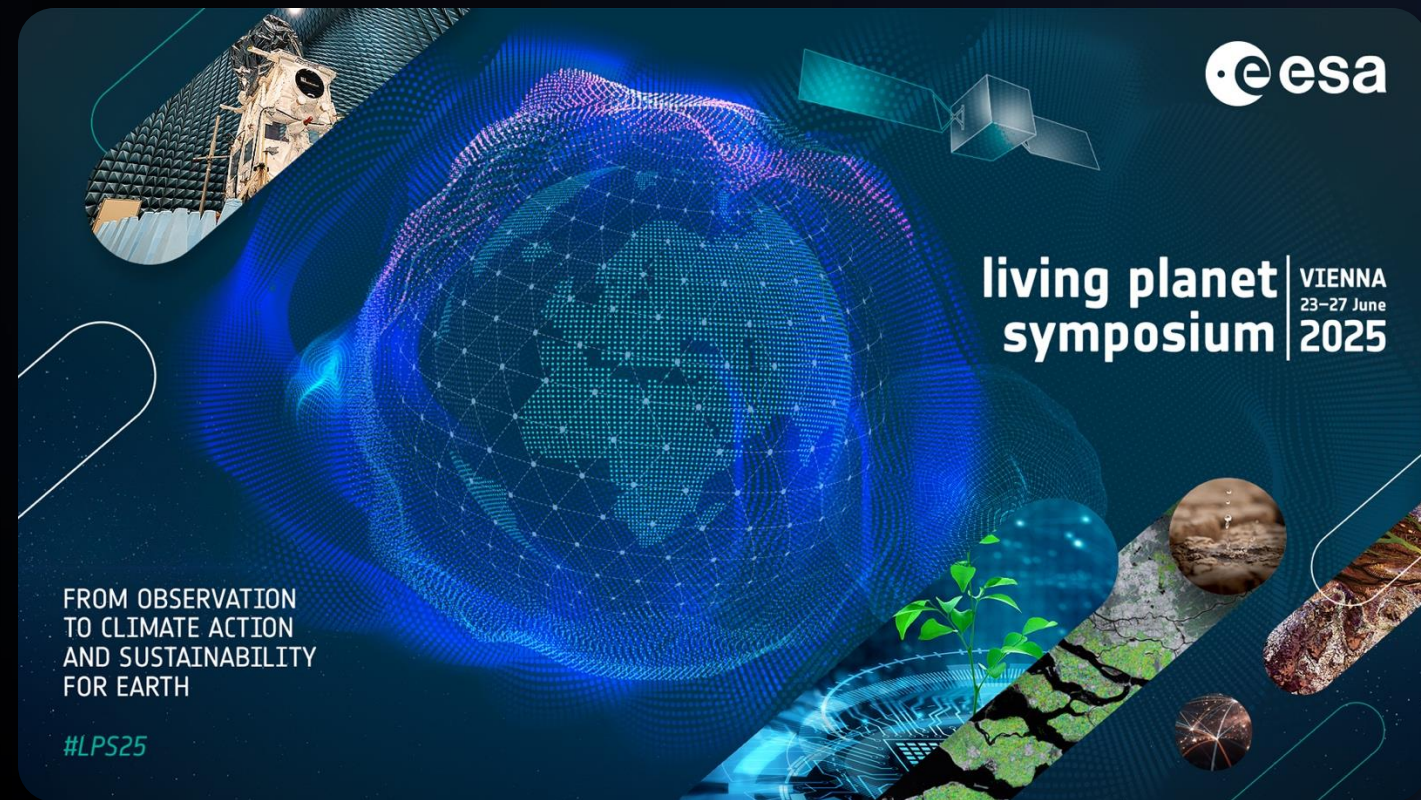


Q4 2025
Biomass

Q4 2025
Sentinel 6B



2025 - Bringing LPS & 50 Years since Signing of ESA Convention



The graphic features a central blue wireframe globe with a satellite in the upper right and a small green plant growing from a cracked earth in the lower right. The ESA logo is in the top right corner.

living planet symposium | VIENNA
23-27 June 2025

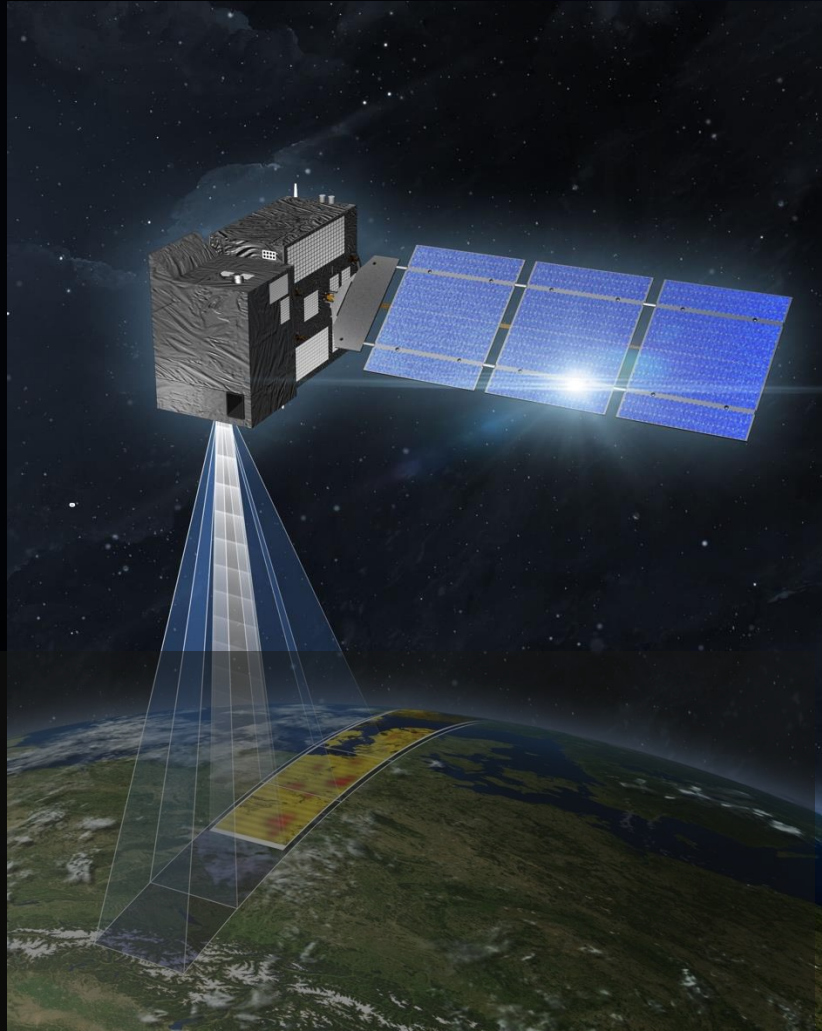
FROM OBSERVATION
TO CLIMATE ACTION
AND SUSTAINABILITY
FOR EARTH

#LPS25



Programmatic Challenges

CO2M



Aeolus-2



Launchers





- Strengthen relations with EU
- Reinforce and strengthen science ambitions including earth sciences
- Play a key role in support to policies
- Boost commercialisation, make Europe a hub for space commercialisation (ref Draghi Report)
- Work on Resilience, Safety and security activities

Seville 2023 Space Summit Resolution on

“Lifting Europe’s Ambitions for a *Green and Sustainable Future*, Access to Space and Space Exploration”



ESA mandated to:

- Continue next gen EO missions, incl. Copernicus
- provide EO (demonstrators of) green solutions

EO programme strategy driven by Green/Digital solutions
Leverage decades of public investments via Accelerators



Brussels 2024 Space Council Resolution on

“Strengthening Europe’s Competitiveness through Space”



Affirmation of the importance of the space programme for Europe’s strategic policies and actions and for strengthening the competitiveness and resilience of our space industry.



Drivers in Developing EO Proposals for CM25

Starting point

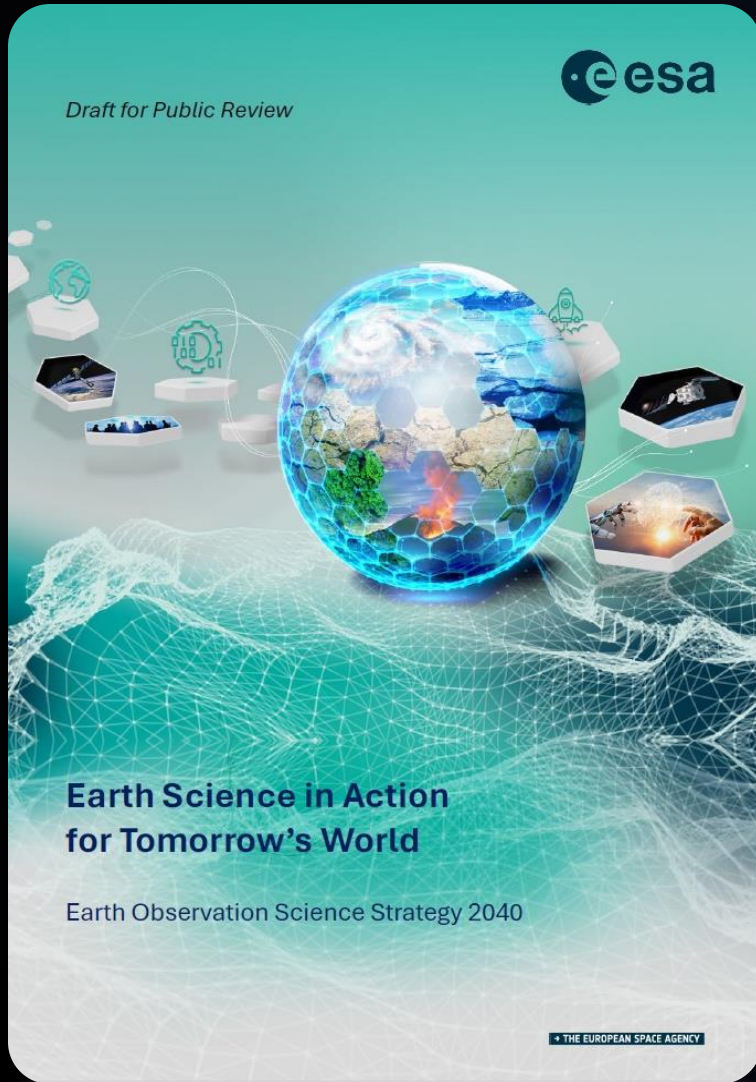
EO programmes provide critical information to understand and address major climate and environmental challenges from global to citizen level



Objectives

- strengthen **science excellence** and **worldwide leadership in EO infrastructure** while ensuring operational mission continuity
- ensure **availability and uptake of valorised EO data & information** products to better understand climate, environmental and natural resources crises
- further develop **space solutions to enable Earth action**
- promote worldwide **European industrial competitiveness in the EO market** and lead on uptake of technology innovation and synergies with other digital domains
- **simplify** programme offering and georeturn management

EO Science Strategy



Frontier Science and Discovery:
a strong foundation

From Science to Benefits:
meeting society's needs

Reducing critical knowledge gaps:
taking immediate action

Filling critical observation gaps:
preparing for tomorrow starts today

Science Questions and their Relevance to International Treaties, Agreements & Conventions

On 12-13 June ACEO reviewed the draft EO science strategy and feedback from its Review Workshop. ACEO proposed adjustments/changes to parts of the Strategy with the aim to present the updated EO Science Strategy as an Info Note at September PB-EO for Member State endorsement.

EOP @ CM25: FutureEO Programme Elements



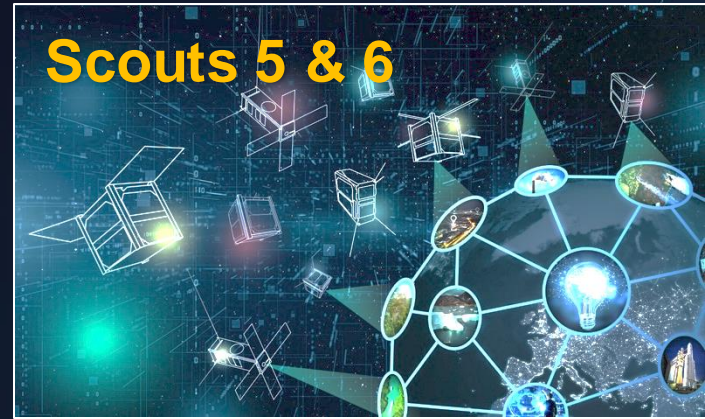
Decision on EE11 for either CAIRT or WIVERN mission implementation.



Implementation of NGGM. Disruptive mission for water cycle and climate change. Corner stone of the water observation system



Completion of Harmony mission.



Implementation of up to 2 new Scout missions.

Earth Action: A New Pillar of FutureEO,

Combines knowledge/expertise/experience gained from Block 4, CCI/Climate-Space/GDA and PhiLab

Addresses the full life cycle of data exploitation under a single programmatic umbrella

Responds to “all” relevant policy frameworks, Int. and Eur. climate/sustainability legislation & Sevilla resolution

...and of course the EO2040 strategy



Responds to EO Science strategy → *frontier R&D that only ESA can do across six priority objectives; expert system models for future digital twins, green solutions*

Climate and Paris Agreement → *support and verify the UNFCCC Paris Agreement pledges; R&D for climate related services; IPCC AR7 support; business innovation for green transition*

Biodiversity → *becoming as relevant as climate, so far “unchartered” territory from space*

Applications for nature-related and digital policies → *e.g., AI act, nature restoration, carbon; support by ESPI*

International collaboration and partnerships → *strengthens ESA role; EU: widening across DG CLIMA, RTD, ENV, INTPA, AGRI, EUROSTAT; UN: UNEP, UNSD; International Financial Institutions; etc.*

Resilience → *replacing notion of Security, strong EO dependence; details later*

Space for a Green Future → *space for green transition, funded by non-space multi-lateral partners*



Earth Action Readiness

Action Readiness **for Global Cooperation – Selling Points**

- Enables ESA and MS to take **Earth Action at scale through partnerships** – even beyond space & Europe
- **Leverages and aligns development cooperation and green finance** to invest in EO globally and across sectors (International Financial Institutions, Global Gateway, Green Climate Fund)
 - Current alignment with EOP programs ~150M€ DG RTD, 75M\$ with IFI (GDA) and 39M€ so far delegated by INTPA
 - Potential – active portfolio of partners: World Bank 80 B\$, ADB 20B\$, Global Gateway 300BEUR, Green Climate Fund 13.5 B\$, Green Environment Facility 8.6 B\$, Horizon Europe?
- **Positions Europe as geopolitical partner and increases its competitiveness** by exporting European EO capabilities for global challenges & markets
 - Global Gateway (DG INTPA) and Global Development Assistance (GDA) allows to engage and even invest globally in EO solutions leveraging European EO Capabilities
- **Earth Action strengthens ESA as the implementation agency of the EC** for space – DG INTPA, DG CLIMA, DG RTD, DG JRC, DG ENV, DG CNECT

As part of the Earth Action element, we propose a solid R&D package called

EO4SocietalResilience

Stands on ~20 years of civil security activities/credibility in EOP

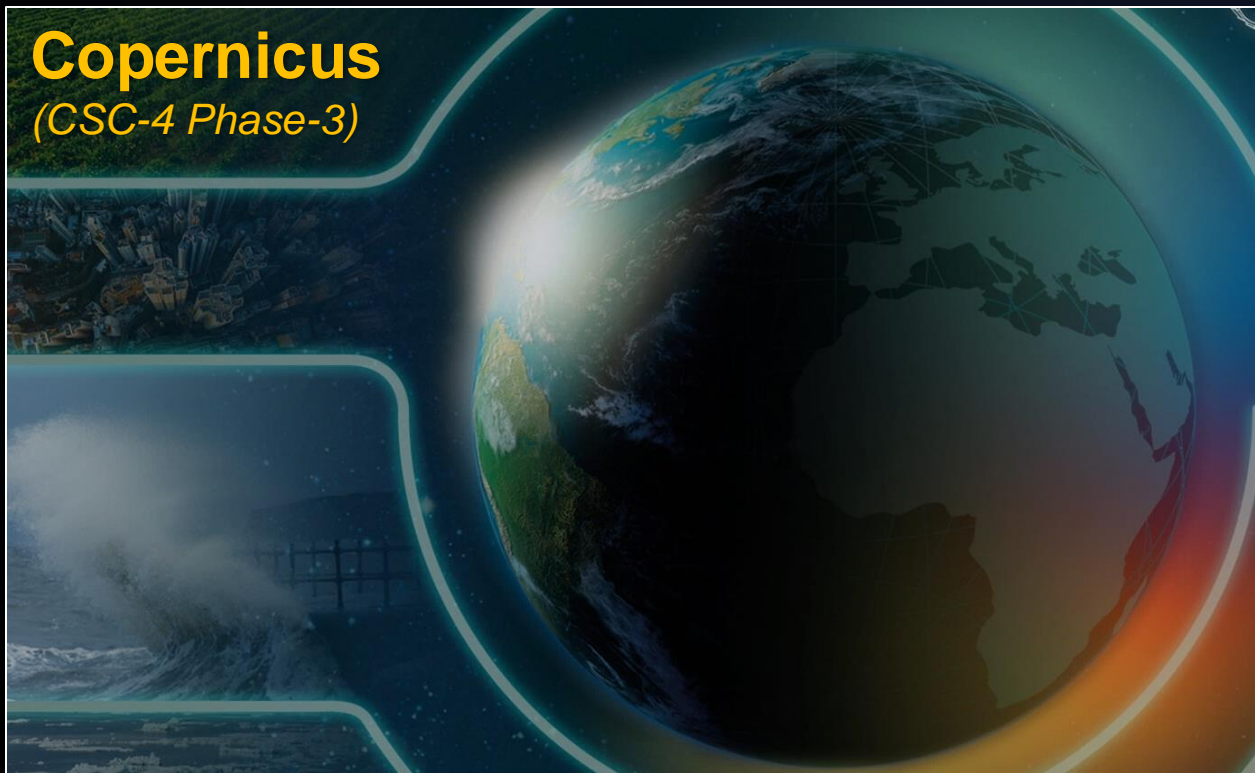
Works with “*all*” relevant institutional partners

Feeds multi-domain pre-operational programmes (like CSS/Serenity and R3) and/or Digital Twins etc.

(*silently*) **Builds** industrial capacity ready also for “*dual use*”

Retains ESA’s role as enabler/architect/co-creator

Phases B2/C/D of Sentinel-2 / Sentinel-3 NG Optical as well as Ground Segment Development & Collaborative Ground Segment (*Expansion Mission-specific developments sub-element*).



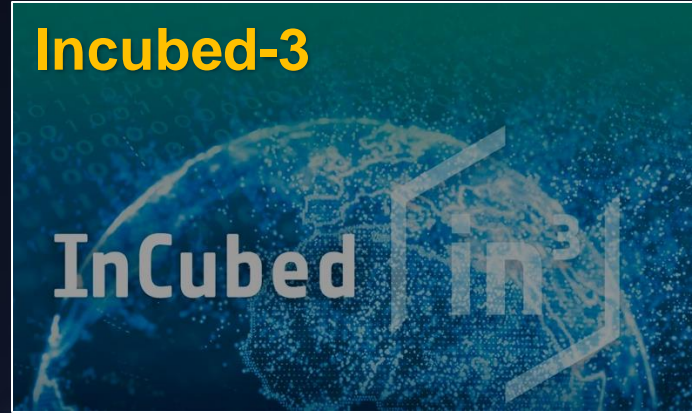
Background

- CM19: Expansion missions, GS & CollGS, Coordination
- CM22: S1 NG & S3 Topo NG, GS & CollGS, Coordination
- CM25: S2 NG & S3 Opt NG, GS & CollGS
- Agreement with COM that cost of the first 2 units of NG missions is shared between ESA and EU
- ESA funding for NG missions at CM22 and CM25.
- On EU side, most NG funding is expected for MFF 2028-2034

EOP @ CM25: Details on non-FutureEO Programmes



CM25 will cover the procurement of Phase C/D of the Space Segment (payload and platform PFM procurement and AIT0 and of the Ground Segment, including the Level-2 processor).



InCube development activities, partnership and strategy

Digital Twin Earth (DTE-2)

Artificial Intelligence and Quantum-components

Delivering a set of EO Digital Twin Components offering a single-entry point to an advanced “ESA reference” virtual mock-up of the Earth system for open collaborative research and smart application development.

EO CM25 budget – Detailed Overview

CM 25 Programme proposals for PB-EO Sept 2024 (in M€, 2025 e.c.)	CM25 Funding
FutureEO Programme	2,060
EO Foundations	300
EO Missions & Data	1,245
Earth Action	435
Contingency	80
Copernicus Programme	800
InCubed Programme	60
Digital Twin Earth Programme	40
TRUTHS Programme	290
Total EO CM 25 Proposal	3,250



Basic Activities – Earthnet

1. Third Party Missions (TPMs):

- ✓ Ensure free access to Third Party Missions data for R&D purposes in ESA Member States (including access for other ESA programs, e.g. BICs, DPTD)
- ✓ Quality benchmark data from commercial & NewSpace missions
- ✓ Enable as first buyer of NewSpace EO data to be promoted to broader European scientific community for research & pre-operational applications development



2. Charter: Support & safeguard the International Charter of Space and Major Disasters, through which satellite data are made freely available for disaster management activities worldwide.



3. International presence: Guarantee coordination and leadership within international bodies (e.g., CEOS, GEO) to support the growing demand for collaboration & specific international projects

FutureEO ?
Hybrid Constellations

BA ?

FutureEO ?
Earth Action

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