



EU Space R&I Activities

In-Orbit Demonstration and Validation (IOD/IOV) Service

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#EUSPACE
#IOD_IOV

Objective: to enable new technologies to be tested in orbit

To foster a **globally competitive** and **innovative** European space sector by improving support to technological maturation, de-risk innovations and reduce time to market.

To ensure **EU non-dependence** by providing services based on EU solutions both for the spacecraft and for the launch services

To support a **high-level European Education system** by providing a generation of European engineers with hands-on experience in real-world space programmes.

IOD/IOV Service in Horizon Europe

Expected outcome

- To contribute to reduce the time to market or operational use of new technologies, products, concepts, architectures, and operations techniques;
- To provide a cost-effective service for regular aggregation (if needed), launch and operations in orbit for IOD/IOV experiments, **based on EU solutions both for the spacecraft and for the launch services**;
- To have **at least one opportunity every year** during the Horizon Europe implementation period.

Implementation of all procurement activities is entrusted to ESA on behalf of the European Commission

IOD/IOV Service in Horizon Europe

- The IOD/IOV service is **broadly open** to experiment providers from academia, research organisations, SMEs and large industrial companies, space agencies, etc.;
- **IOD/IOV experiments** are defined as innovative technologies, products, concepts, architectures, and operations techniques that require in orbit demonstration/validation. Experiments may be instrument, equipment, technologies, system experiment, missions, industrial payloads, etc.;
- Experiments may be **accommodated on IOD/IOV Spacecraft(s)** or be provided as **complete system(s)**;
- Selected IOD/IOV experiments will have free of charge **IOD/IOV services** that include:
 - aggregation** of the experiment on a carrier (if needed),
 - launch services**,
 - operations**.

Call for IOD/IOV experiments – Open for application

- Call for Expression of Interest to gather experiments which could be considered for IOD/IOV actions is open in Europa website.
- **Deadline for application: 31/05/2022 at 17:00**



The screenshot shows the top navigation bar of the European Commission website. It includes the European Union flag, the text "An official website of the European Union", and a dropdown menu "How do you know?". Below this is the European Commission logo and a search bar with "EN English" and a "Search" button. The main navigation bar is dark blue with white text, listing "Defence Industry and Space" and several menu items: "Home", "Events", "News", "Priorities", "EU Space Policy", "EU Defence Industry", "EU Aeronautics Industry", "Funding and Grants", and "Publications". Below the navigation bar is a breadcrumb trail: "Home > Calls for tenders > Call for Expression of Interest for In Orbit Demonstration/Validation (IOD/IOV) Experiments". The main content area is white and displays "CALL FOR TENDERS | Open" followed by the title "Call for Expression of Interest for In Orbit Demonstration/Validation (IOD/IOV) Experiments".

[Link: Call for Expression of Interest for In Orbit Demonstration/Validation \(IOD/IOV\) Experiments \(europa.eu\)](https://european-commission.europa.eu/calls-for-tenders/call-for-expression-of-interest-for-in-orbit-demonstration-validation-iod-iov-experiments)

Constraints and requirements for IOD/IOV experiments

- Candidate IOD/IOV experiments shall preferably have flight readiness level (TRL 5/6);
- For **IOD/IOV experiments needing aggregation**, compliance with resources and interfaces compatible with:
 - Small satellites missions in the range of 150 kg;
 - Cubesat missions with a volume of 3U or 6U format.
- For IOD/IOV experiments in the form of **complete systems**, compatibility with EU manufactured launcher solutions;
- Indicative overall **planning**:
 - Flight model delivery: from 2023 to early 2024
 - Indicative launch: 2023 – 2025
- All experiment providers shall provide a Declaration of “**Commitment of Flight Model delivery**” as part of the application package.

IOD/IOV Experiment – Selection process ⁽¹⁾

1. Analysis of received applications on the basis of four criteria (next slide);
2. Experiment pre-selection:
 - a. IOD/IOV experiments needing aggregation will undergo an **accommodation analysis** with a view to allocating the highest number of experiments to IOD/IOV mission(s);
 - b. Considering available resources, a list of pre-selected IOD/IOV experiments will be established.
3. Final selection of IOD/IOV experiments:
 - a. For experiments needing aggregation, the final selection will be confirmed by the European Commission after the **System Design Review** (SDR) that will validate the feasibility of the relevant IOD/IOV mission;
 - b. The final selection of the IOD/IOV experiments in the form of complete systems will be confirmed based on flight availability.

IOD/IOV Experiment – Selection process (2)

Criteria	Threshold/ score
<p><u>Technical fit:</u> Acceptable technology readiness level for actions to be considered for the IOD/IOV service; Compatibility and complexity of the experiment needing aggregation in terms of interfaces and resources (e.g. Self-standing experiments, simple mechanical/thermal/electrical/data Interfaces with the host spacecraft, mass, volume, etc.) or compatibility with EU launcher for complete systems.</p>	15/20
<p><u>Programmatic fit:</u> Need and justification for the experiment demonstration and exploitation plan. Analysis of experiment programmatic elements (e.g. risks, planning, funding, etc.). Analysis of challenges related to the business case following IOD/IOV opportunity (if applicable), industrial competitiveness, European non-dependence, scientific challenge, etc.</p>	20/30
<p><u>Policy relevance:</u> Compliance with Union policy objectives stemming from: Horizon Europe, Space Programme components (EGNSS, Copernicus, GovSatCom, SSA), Space Strategy for Europe, Secure connectivity programme, European Quantum Communication Infrastructure, Space Traffic Management, other relevant Union programmes.</p>	20/30
<p><u>Complementarity with ESA, EU MS/AC activities:</u> Analysis of action in comparison with other existing/ planned actions within ESA, EU Member States/ associated countries or industry.</p>	10/20
Total (threshold/ score)	65/100

Application package and Submission

- The application package is composed of four parts:
 - **Part I:** Application and compliance matrix (Annex I)
 - **Part II:** Commitment on Flight Model delivery (Annex II)
 - **Part III:** Legal Entity forms (template available online)
 - **Part IV:** Declaration of honour on exclusion criteria and absence of conflict of interest (template available online)
- Submission by email to DEFIS-IOD-IOV@ec.europa.eu with the subject "Call for Expression of Interest – IOD/IOV experiments" by **31 May 2022 at 17:00 (UTC)**.

Questions?

*Text of the **Call for IOD/IOV Experiments and Application package** can be found [here](#).*

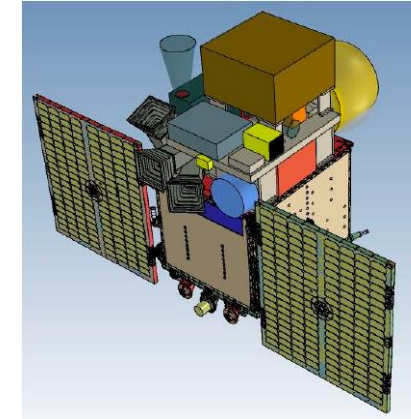
For more information/ clarification, please write to: DEFIS-IOD-IOV@ec.europa.eu

Back-up

H2020 IOD/IOV missions – ongoing

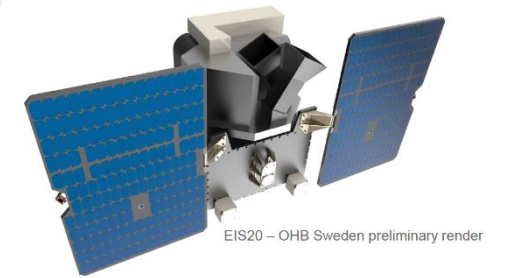
- **Project 1 – Element 1 (IOD):**

- 12 Experiments accommodated on a QinetiQ-BE P200 PF (Proba heritage)
- Mass 270kg, Average power 120W, SSO ~600km
- Kick-off on 07/2021, ready for launch on 2024



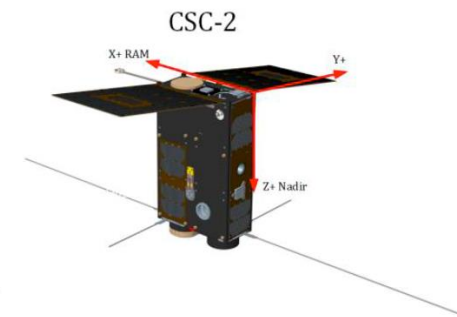
- **Project 1 – Element 2 (EIS):**

- ELOIS instrument (AMOS-BE) accommodated on a OHB-SE (InnoSat PF heritage)
- Mass 130kg, Average power 80W, SSO ~600km
- Kick-off on 09/2021, ready for launch on 2024



- **Project 2 (CSC-1 & CSC-2):**

- 7 Experiments accommodated on 2x 6U CubeSats from ISISpace-NL
- Mass <11kg, Average power 11W, SSO ~500km
- Kick-off on 05/2020, ready for launch end 2022





H2020 Launch Services – ongoing

- **Complete systems:**

- ✓ 2 Sept 2020: UPMSat-2;
- ☐ End 2022: ESTCube-2, ANSER;
- ☐ ~ 2024: MicroCarb, KSatLab;



UPMSat-2. Image credit: Polytechnic University of Madrid

- **IOD/IOV Missions:**

- ☐ End 2022: Project 2;
- ☐ 2024: Project 1-Element 1, Project 1-Element 2

- **Contribution to ESA LLL initiative:**

- ✓ 2 Sept 2020: Vega SSMS PoC flight;
- ☐ ~ 2023: Ariane 6 MLS PoC.

IOD/IOV in Horizon Europe - Tentative Schedule

28 March
2022

- **COM Call for Expression of Interest to gather experiments** that could be considered for IOD/IOV actions - [Deadline for application: 31/05/2022 at 17:00 \(UTC\)](#)

April 2022

- **ESA ITTs tendering for cubesat (3U or 6U) and smallsat carrier(s)** (in the range of 150Kg) procurement.

June - July
2022

- Analysis of received experiments applications by independent experts contracted by COM

July 2022

- **Accommodation analysis by ESA** to identify possible configurations of cubesat and smallsat missions and **confirm the experiment pre-selection**

October
2022

- Contract for first cubesat IOD/IOV mission

Early 2023

- Contract for small sat IOD/IOV mission

Mid 2023

- Contract for other two cubesat IOD/IOV missions

2023 - 2025

- Launch of IOD/IOV missions and complete systems