EU Space R&I Activities

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

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DEFIS B.2 – Innovation, Start-Ups and Economics
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**

Link: Call for Expression of Interest for In Orbit Demonstration/Validation (IOD/IOV) Experiments (europa.eu)
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.
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

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Threshold/ score</th>
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<tbody>
<tr>
<td><strong>Technical fit:</strong></td>
<td></td>
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<tr>
<td>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.</td>
<td>15/20</td>
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<tr>
<td><strong>Programmatic fit:</strong></td>
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<td>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.</td>
<td>20/30</td>
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<td><strong>Policy relevance:</strong></td>
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<td>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.</td>
<td>20/30</td>
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<tr>
<td><strong>Complementarity with ESA, EU MS/AC activities:</strong></td>
<td></td>
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<td>Analysis of action in comparison with other existing/ planned actions within ESA, EU Member States/ associated countries or industry.</td>
<td>10/20</td>
</tr>
<tr>
<td><strong>Total (threshold/ score)</strong></td>
<td>65/100</td>
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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](mailto:DEFIS-IOD-IOV@ec.europa.eu)
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;

• 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