



**EUROPEAN COMMISSION**

Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs

Space Policy, Copernicus and Defence  
**Space Policy and Research**

**CALL FOR EXPRESSION OF INTEREST  
IN ORBIT DEMONSTRATION/VALIDATION (IOD/IOV)  
EXPERIMENTS**

*Disclaimer: this Call is not binding for the European Commission and does not preclude future decisions.*

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## **1. DESCRIPTION OF THE INITIATIVE**

### **1.1. Background**

One of the main objectives of the Space strategy for Europe is to foster a globally competitive and innovative European space sector in particular by improving support to technological maturity, for sub-systems, equipment and technologies, including in-orbit demonstration and validation activities, to reduce time to market.

To ensure European non-dependence and competitiveness in technologies, there is a clear need for a regular, sustainable, cost-effective and responsive In Orbit Demonstration/Validation (IOD/IOV) service in Europe. Space flight heritage in real conditions and environment is often required to de-risk innovations such as new technologies, products, concepts, architectures, and operations techniques are they for unique or recurrent, institutional or commercial missions.

Although flight opportunities do exist, these are often difficult to find ad hoc at affordable cost and/or in the required timeframe, and at an acceptable risk for the main mission.

The main challenge of the overall IOD/IOV activities is to provide a regular and cost-effective solution for common flight ticket actions (management, spacecraft design including reuse of existing solutions, assembly, integration and tests, launch and operations) based on European solutions both for the spacecraft (i.e. platform and aggregate of experiments) and for the ground and launch services.

Indicatively, support is envisaged, through Horizon 2020 SPACE-18-TEC-2019-2020: In-orbit validation/demonstration – Mission design, integration and implementation, for all the necessary tasks to prepare, provide and operate spacecraft(s), together with the related ground segment, which accommodates the selected IOD/IOV experiments. The activities include:

- System studies, at ground and space level, including the compatibility with the available launchers;
- Input to the launch mission analysis performed by the launch service provider;
- Selection, assembly, integration and testing of the spacecraft(s) and related ground segment;
- Management of interfaces with and between the different IOD/IOV experiments, between the spacecraft and the launcher and between the spacecraft and the ground segment;
- Preparation of the spacecraft(s) for the flight;
- In-orbit testing and operations including data provision.

Concerning launch aspects, IOD/IOV shall support the European launcher exploitation policy, therefore relying on European manufactured launcher solutions.

With regard to the launch service, the Commission intends to fully support the launch service activities for the selected projects via a direct contract with the European launch service provider.

ESA shall provide project and technical management support to the Commission. A non-exhaustive list of possible tasks could include: support to the preparation of a guidance document to be published together with the call; supervision of projects in compliance

with the reviews foreseen in the guidance document; interface with the launch service provider.

## **1.2. Objectives**

The purpose of the Call is to gather feasible experiments (e.g. instrument, part of instrument, equipment, technologies, system experiment, mission concept) which could be considered for IOD/IOV actions.

Only experiments which have reached a sufficient maturity level would be considered to proceed as IOD/IOV experiments. It shall be noted that experiments will have to bear the costs of their own development up to and including the flight models.

Experiments will be self-standing with simple and direct mechanical, thermal, electrical and data interfaces with the host spacecraft (i.e. carrier). Direct interfaces means that it is not required a space unit to be developed around each proposed experiment.

## **1.3. Constraints and requirements**

Experiments shall comply with the following constraints and requirements:

- a) The launch of the dedicated IOD missions will be performed with European manufactured launcher solutions (i.e. VEGA/VEGA C, Ariane 6 for the first cut-off).
- b) The candidate experiment providers are expected to perform all Product Assurance (PA) activities (including Configuration Management, Quality Assurance, Safety, EEE Components, Materials, Mechanical Parts and Software Product Assurance), according to plans drawn up by the provider, during all phases of the project to ensure that the experiment will perform its functions as intended with a high probability of success.
- c) Beside the delivery of the flight model, the experiment provider will support, for its experiment(s), the integration and testing of the spacecraft and as required with engineering analysis, engineering models and adaptations to interface requirements.
- d) The approach for the achievement of the experiment qualification (TRL 7) from the current TRL level (preferably 5/6) shall also be part of the providers' response.
- e) In order to establish the full Technical Dossier (description and interfaces requirements) of the experiment, the experiment provider shall engage a dialogue with ESA at the request of the Commission.
- f) At the project implementation stage, Interface Document(s) including all technical and programmatic interfaces will be established by the spacecraft integrator with the support of experiment(s) provider(s) and the Launch service provider and will be applicable to the experiment provider(s). Experiment (s) provider(s) and other concerned entities shall provide adequate visibility to ESA given its role to ensure the overall coherence of interfaces.
- g) Indicative overall planning respectively to the envisaged calls for proposals:
  - Mission phase CD: early 2020 (call 2019) and early 2021 (call 2020)
  - Flight model delivery: late 2020 (call 2019) and late 2021 (call 2020)
  - Indicative launch: 2021 – 2023

## 2. CALL FOR EXPRESSION OF INTEREST

### 2.1. Submission process

The Call for Expression of Interest shall be open throughout the duration of Horizon 2020 with a first cut-off date on 22 May 2018.

Applicants are invited to submit their proposal for one or several experiments. Each experiment shall constitute a separate candidature file.

All proposals submitted by the first cut-off date shall be assessed in view of preparing a guidance document to be published at the opening of the call for proposals<sup>1</sup>.

All correspondence and documentation shall be sent in English.

Applications shall be sent to [GROW-I1-IOD@ec.europa.eu](mailto:GROW-I1-IOD@ec.europa.eu) with "**Call for Expression of Interest – IOD/IOV experiments**" in the subject line, together with the completed annexed forms.

Applicants are kindly invited to register by email to [GROW-I1-IOD@ec.europa.eu](mailto:GROW-I1-IOD@ec.europa.eu) their intention to apply.

The Commission will inform applicants of the outcome of the assessment.

Any requests for additional information must be made in writing to the Commission using the following e-mail address [GROW-I1-IOD@ec.europa.eu](mailto:GROW-I1-IOD@ec.europa.eu).

### 2.2. Analysis of applications

First, each application will be assessed on the basis of the following criteria:

No	Criteria
1.	<b>Technical fit:</b> Acceptable technology readiness level for actions to be considered for the IOD/IOV service; The complexity of the experiment in terms of interfaces (e.g. Self-standing experiments, simple mechanical/thermal/electrical/data Interfaces with the host spacecraft, etc.).
2.	<b>Policy relevance:</b> Possible actions should comply with Union policy: Space Strategy for Europe, Union programmes, IOD necessity justification and when applicable business case following IOD/IOV opportunity.
3.	<b>Programmatic fit:</b> Analysis of the compatibility with Horizon 2020 Space. Analysis of experiment programmatic risks.

<sup>1</sup> <http://ec.europa.eu/growth/sectors/space/research/horizon-2020>

4.	<p><b>Complementarity:</b></p> <p>Analysis of action in comparison with other existing/planned actions within ESA, EU Member States / associated countries or industry.</p>
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Applications which fulfil these criteria will undergo a feasibility study with a view to allocating experiments to a space mission(s).

The Commission will publish a guidance document for IOD/IOV actions taking account of the aforementioned process at the opening of the call for proposals.

### **2.3. Application Package**

The application is composed of four parts.

Please complete all forms electronically and send them by email to [GROW-I1-IOV@ec.europa.eu](mailto:GROW-I1-IOV@ec.europa.eu) with the subject "Call for Expression of Interest – IOD/IOV experiments" by **22 May 2018 17:00 (GMT)**.

**Part I:** Application and compliance matrix (annex I)

**Part II:** Letter of support (annex II)

**Part III:** Legal Entity forms<sup>2</sup>

**Part IV:** Declaration of honour on exclusion criteria and absence of conflict of interest<sup>3</sup>

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<sup>2</sup> Please download from:

[http://ec.europa.eu/budget/contracts\\_grants/info\\_contracts/legal\\_entities/legal-entities\\_en.cfm#en](http://ec.europa.eu/budget/contracts_grants/info_contracts/legal_entities/legal-entities_en.cfm#en)

<sup>3</sup> Please download from:

[http://ec.europa.eu/employment\\_social/calls/pdf/dechonor\\_en.pdf](http://ec.europa.eu/employment_social/calls/pdf/dechonor_en.pdf)

## ANNEX I

### PART I: APPLICATION AND COMPLIANCE MATRIX

*The proposal should not exceed 30 pages.*

<b>1. Name of the proposed actions</b>

<b>2. Applicant : Entity (ies) making the proposal and type (e.g. individual, consortium, industry, research centre, university)</b>	
Name of organisation(s) (Experiment provider)	
Country (ies)	
Person(s) <sup>4</sup> responsible for implementation	
Phone(s)	
Email(s)	

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<sup>4</sup> Where the application is being made by a group, one lead person should be identified.

**3. Objective of the proposed experiment**

**4. Themes**

*(e.g. Earth observation, Telecommunication, Navigation, Space Science, Technology, Space environment)*

**5. Type of experiment**

*(e.g. instrument, part of instrument, equipment, technologies, system experiment, mission concepts)*

**6. Justification of the IOD/IOV**

*(explain the necessity of the flight with respect to other options on ground and/or in space)*

**7. Previous space application/heritage of the proposed experiment**

**8. Funding plan of the flight model**

*(e.g. funding of development up to flight model, risk margin for, inter alia, potential additional qualification requirement or interfaces definitions required by the spacecraft, funding party(ies) demonstrated by letter(s) of intent)*

**9. Policy relevance**

*(e.g. relevance for research and innovation programmes, Union space programmes, Space Strategy for Europe)*

**10. Detailed description of the experiment and interface**

*detailed status of development demonstrating the estimated TRL, model philosophy, qualification status and verification activities up to TRL7*

**a. Preliminary engineering drawings of the experiment**

*Indicate the required volume including all appendages, baffles etc.*

**b. Functional description of the experiment**

**c. Total mass of the experiment; mass breakdown, margins**



*Provide the overall mass of the experiment including possible appendages, brackets, thermal hardware etc.*

**d. Field of view (if applicable)**

*Provide viewing direction, external surface and unobstructed field of view required by the experiment.*

**e. Experiment Pointing and alignment requirements (if applicable)**

*Specify experiment requirements such as pointing accuracy possibly detailed in terms of absolute/relative and performance/knowledge errors including stability requirements (e.g. thermo-elastic).*

**f. Experiment Mechanical Interfaces**

*Indicate current qualification mechanical environment.*

**g. Thermal Interfaces**

*Describe thermal interface of the experiment with the platform. The experiment shall preferably be thermally decoupled from the platform.*

**h. Electrical interfaces: average and peak power consumption for each mode of operation. Time profile.**

*Provide the power required by the experiment in the various modes and the average power requirement.*

*The average power available to the complete payload and the power duty cycle for the experiment will be determined depending on the overall demand. The power will be provided by one switched power line and should be considered non-regulated (battery regulated bus). Details specification of the power interface will be provided at spacecraft selection.*

**i. Interface with data handling. Bit rates of the experiment for different modes of operation, time profile, time reference/synchronisation required, etc.**

*The experiment will be interfaced with the avionics of the spacecraft with data links. One link will be used for the commanding and housekeeping of the experiment and if required one high bit rate link will be provided for data collection. Detailed specifications of the interfaces will be provided at spacecraft selection.*

**j. Operations scenario and mission phases**

*Provide description of the experiment operational scenario, modes of operations*

**k. Environment requirements**

*Contamination and cleanliness, electromagnetic etc.*

**11. TRL**

*current TRL, time to reach TRL 7 or 8 and identification of critical developments and risks, estimated budget and time necessary for the delivery of the flight model, envisaged sources of missing funding*

**12. Mission needs**

*Orbit(s), mission constraints, mission duration, induced constraints on the spacecraft and other payloads, and other specific needs to be described*

**13. Issue / challenge**

*commercial market (business case following IOD/IOV opportunity), industrial competitiveness, European non-dependence, scientific challenge, etc.*

**14. Please use this space to provide any other comments or additional information.**

**15. Compliance matrix**

*Please provide a declaration of compliance to the constraints and requirements listed in §1.3 of this document. Please provide rationale in case of partial and non-compliance.*

**16. Signature of organisation/partnership representatives:**

The signature certifies that the provided data result from the entity's commitments. In addition, the entity engages itself to inform immediately the Commission (by email to [GROW-II-IOD@ec.europa.eu](mailto:GROW-II-IOD@ec.europa.eu)) if any changes occur.

At any stage of the experiment development, the entity may be requested to provide additional information to the Commission if necessary.

Name

Position

Date

**ANNEX II**

**Part II: Letter of Support**

The undersigned, ....., in my capacity as national representative to the Space configuration of the Horizon 2020 Programme Committee, support the participation of the experiment ..... to the "Call for Expression of Interest - In orbit Demonstration/ Validation (IOD/IOV) Experiments".

Date .....

Place .....

Signature .....