

#EUSpaceResearch

# IN-ORBIT DEMONSTRATION AND VALIDATION (IOD/IOV)

NEW TECHNOLOGICAL  
DEVELOPMENTS  
AND INNOVATIONS  
TESTED IN ORBIT



Horizon Europe,  
a programme of the  
European Union



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## An EU R&I initiative to gain flight heritage

Testing in real conditions is the true training ground to validate concepts, innovative technologies and performances and accelerate their entry into the market. However, in-orbit testing is a costly and complex endeavour resulting in the infamous “valley of death” for many innovative companies. Therefore, regular and affordable flight opportunities to validate space technologies are necessary to ensure international competitiveness and innovation of EU space technologies. This is **why the European Commission introduced the IOD/IOV initiative** under Horizon, the Union framework programme for Research and Innovation, to provide recurrent, accessible and sustainable IOD/IOV service in the EU. This will accelerate innovation and facilitate the commercialisation of EU space technologies, enhancing the global competitiveness of the EU space industry.

## Skills and innovative technologies

for a competitive EU Space

The In-Orbit Demonstration and Validation service enables **new technologies to be tested in orbit** by providing aggregation on spacecraft, if needed, and launch services and operations. Experiments from all space domains are welcome, from Earth Observation, telecommunications and satellite navigation to Space Traffic Management, space science and others. The IOD/IOV initiative thus enables SMEs, researchers and large companies to bring new technologies to the market in a reduced timeframe. It also provides students and European engineers with invaluable hands-on experience in real-world space programmes.



### Boosting innovative R&I

100+ applications received under the already published calls



### Shaping solutions

Evidencing the capability of European space research and industry



### Supporting EU objectives

- Maintaining Europe's place as a global space leader
- Ensuring EU non-dependence
- Providing hands-on opportunities for the European Higher Education system
- Supporting new entrants in satellites and launchers

The IOD/IOV European initiative has several **expected benefits**:

**The global competitiveness of the European space sector:** IOD/IOV allows technologies to be effectively tested in orbit while reducing the time it would otherwise take to bring them to market. In doing so, the IOD/IOV initiative contributes to space entrepreneurship alongside the CASSINI initiative.

**Enable the development of new commercial entrants:** IOD/IOV supports the development of the New Space phenomenon in Europe, by progressively relying on technology from SMEs and start-ups active in satellite manufacturing and micro launchers in the EU.

**EU non-dependence:** IOD/IOV supports EU non-dependence by providing a cost-effective service based on EU solutions both for the spacecraft and for the launch services.

**A European Higher Education system:** IOD/IOV aims to provide a generation of European engineers with hands-on experience in real-world space programmes.

## From experiment selection to space:

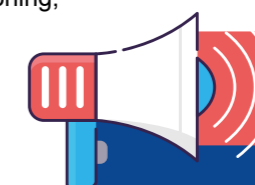
The first results of the initiative

The first call for expressing interest in IOD/IOV experiments was kicked-off in April 2018 under Horizon 2020. It attracted **50+ proposals** from various European entities, from SMEs to large companies, universities and research organisations. Successful applications relate to technology innovation for EO, PNT, SatCom and space science. In September 2020, the first selected IOD/IOV experiment, UPMSat-2, was successfully launched onboard the Vega SSMS. The remaining experiments will be launched in the upcoming years.

In spring 2022, a new call for expression of interest was published, kicking off the next phase of IOD/IOV services under Horizon Europe. This time again, **50+ applications** were received from the space community in various domains, including Earth Observation, Positioning, Navigation and Timing, Space Traffic Management, Telecommunications, etc.

## Introducing the first IOD/IOV project: UPMSat-2

As the first beneficiary of the IOD/IOV initiative, the Universidad Politécnica de Madrid (UPM) designed and built a 50-kg microsatellite (**UPMSat-2**) that carried six new payloads developed by industry, space agencies and research centres into orbit in 2020. The experiments included new technology for positioning satellite antennas, thermal microswitches, simplified solar sensors and radiation monitors that can observe how space radiation affects onboard computer memory. Improving knowledge in all these domains is helping scientists and engineers design and build more efficient, robust satellites and may also provide solutions to problems that we face here on Earth.



**Be part of the  
EU-funded space R&I**

Horizon Europe is the EU's key funding programme for research and innovation, with a budget of around €95 billion over 2021-2027, of which close to €1.6 billion is dedicated to space research. The space R&I is managed by the **Health and Digital Executive Agency (HaDEA)**, the **EU Agency for the Space Programme (EUSPA)**, the **European Space Agency (ESA)** and the **European Commission** itself. Most calls are also published on the **EC Funding and Tenders participant portal**.

