

#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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New technological developments
and innovations tested in orbit

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 satellite, if needed, 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 enables SMEs, research centres and large companies to bring innovations to the market in a reduced timeframe. It also provides students and European engineers with invaluable hands-on experience in real-world space programmes.

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

Global competitiveness of the European space sector: IOD/IOV allows innovations 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.

Development of new commercial entrants: IOD/IOV fosters the development of the New Space phenomenon in Europe, by progressively relying on solutions from new entrants active in satellite manufacturing and launch services 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 enables the development of skills and talents by providing European young 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 expression of interest for IOD/IOV experiments under Horizon 2020 attracted **50+ proposals** from various European SMEs, 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 first ever IOD/IOV dedicated mission, Syndeo, then launched in October 2023.

In spring 2022, a new call 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 EO, PNT, STM, Telecom, etc. Since March 2023, two parallel calls are open until 2026 to gather experiments that could be considered for “IOD/IOV Experiments needing aggregation” and “Ready to Fly IOD/IOV satellites.”

European Flight Ticket Initiative

On 23 January 2023, at the margins of the European Space Conference, European Commission and ESA officials announced the creation of a **pool of European launch service providers** that will participate in the European Flight Ticket Initiative. The initiative's objectives are to:

- Stimulate new European launcher systems and solutions through open competition for the procurement of launch services;
- Provide regular opportunities for **affordable and responsive** launch services for European “ready to fly” IOD/IOV satellites;
- Purvey regular, affordable and responsive launch opportunities for other EU IOD/IOV missions and possibly EU institutional missions.

The flight ticket initiative for IOD/IOV missions will use exclusively **European manufactured launchers** co-funded through the EU Horizon Europe programme and the ESA Boost! programme. Each launch service provider will receive a “frame” contract as part of the initiative. This will stimulate demand for European launch services by allowing selected companies to compete for missions in the EU's IOD/IOV programme.

The current pool of European launch service providers includes: Isar Aerospace (DE), Orbital Express (UK), PLD Space (ES), Rocket Factory Augsburg (DE), and Arianespace (FR).

Introducing the first IOD/IOV mission: Syndeo

Syndeo is aggregating seven IOD/IOV experiments in two satellites. Syndeo 1 will test a miniature star tracker for attitude determination, a high-accuracy attitude determination and control system, a CubeSat star tracker, and a novel radiation sensor. Syndeo 2 will test a SpacePix Radiation Monitor, a magnetic measurement system for LISA, and a plasma jet pack electric thruster.

**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**.

