

Space Exploration

Eurospace views and concerns for H2020

Space exploration is part of human desire to understand our world. It is fully backed by a combination of scientific, technological, economic, political and societal motivations.

Considering that:

- Through the support of Member States, European Space industry has acquired leading & highly visible capabilities & technologies across Space Exploration.
- ESA has decided to move forward with the realisation of the MPCV (Multi Purpose Crew Vehicle) Service Module, as barter agreement with NASA. This move should positively position ESA for a long-term cooperation and future missions in human space exploration.
- ExoMars programme, the first European-led robotic mission to Mars, is now on track to meet all objectives of both the 2016 and 2018 missions, as international collaboration between ESA and Roscosmos.
- Investment on Exploration Technologies has a potential for providing technologies for innovative space exploitation and spin off to existing and emerging applications.

The Space industry suggests the following for improved sustainability of a European Exploration programme:

- Define clear objectives supported by roadmaps and programmes around which to consolidate and exploit the industrial base and its technologies, in order to maintain its level of excellence and benefit from its past investments.
- Ensure coherence of programmes between ESA, MS and the EU to maximize the benefit of technological investment, thereby taking into account that EU funding should be more focussed on technologies with strong potential for re-use. To be noted is the intimate link between technologies for exploration needs, science-driven missions and innovative commercial initiatives to be exploited.
- Encourage industries to use innovation, promote and de-risk new technologies via a range of methods for demonstration and TRL rising, including the use of dedicated in-orbit platforms, the ISS and other shared opportunities at appropriate cost levels. Low risk, low cost opportunities for maintaining the pace of technology maturation and growth in expertise are strongly welcomed.
- Position European industry as a mission leader, by ensuring autonomy and non-dependency on its partners for elements on the critical path. In case of collaboration, European industry should play a major role through a significant contribution of critical elements (Building Blocks), key capabilities and enabling technologies.

Exploration & Science

► **Improve the European capability to enable future exploitation of Space through innovative technologies**

European industry is in favour of a well-balanced funding between OBUCs and SRCs considering the important role of SRCs for competitiveness.

H2020 has to support research, innovation and developments starting at any TRL level from TRL1 (mostly OBUCs) up to TRL8 (mostly SRCs). Successful activities under OBUC shall continue in TRL development, supported by an SRC.

Innovative commercial utilisation of space needs technologies that are very similar to those needed for Exploration and Science. Moreover, new mission concepts for Navigation and Telecommunications may also take advantage from these technologies (i.e. fragmented spacecraft, servicing, space tug, etc.).

The following key topics are proposed to be included in the coordinated effort between the Agencies' programmes and H2020:

1. **In Orbit Demonstration** (IOD) missions including early utilisation of the ISS.
Industry proposes for the provision of IOD and IOV opportunities to be coordinated throughout all Space Calls with ESA and MS.
2. **Exploration & Science technologies**
 - New infrastructures (Habitats and regenerative life support)
 - Future Robotics (e.g. innovative mobility concepts, robotics for sample return missions, etc.), automation and multi-agent cooperation in synergy with innovative utilisation
 - Rendezvous and Docking for large assemblies, and Capture techniques
 - Planetary protection
 - Innovative energy production and management
 - Propulsion (e.g. high thrust electric propulsion, solar sails, e-sail, etc.)
 - Scientific instruments and cross-cutting enabling technologies that will prepare future space science and exploration missions (e.g. technologies to support missions in the inner and the outer solar system)
 - Analogue terrain studies & ground test environments
3. **Advanced Access to Space and Transportation technologies**
 - Alternative solutions for access to Space
 - Entry, Descent, precise landing and ascent technologies (e.g. advanced GNC, etc.)
 - Reusable launchers technologies (e.g. advanced GNC, Health Management, etc.)
4. **Innovative Commercial utilisation of space**
 - Innovative missions concepts for space commercial application (i.e. space depot, refuelling and servicing, fragmented spacecraft etc.), with spin-off toward "classical" Exploration.
 - Adaptation and development of platform technologies that can be used for both exploration missions and other applications (e.g. Multifunctional structures, Health management systems, etc.)
5. **Exploitation and dissemination of data** from scientific missions, ISS experiments and Exploration