

EUROPEAN OPERATIONS FRAMEWORK

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Abstract: The European Operations Framework within the HORIZON 2020 Program activity PERASPERA-X collaborates with relevant stakeholders worldwide, manages community efforts on behalf of the European Union, and provides recommendations towards governments, agencies and industry ensuring a strong market position for European Players acting in the areas of On-Orbit and In-Space Services.

Keywords: HORIZON, PERASPERA-X, On-Orbit Services

1 Introduction

The European Operations Framework activity (EOF) is implemented within the PERASPERA-X project as part of the EC Strategic Research Cluster (SRC) Space Robotics Technologies and runs continuously throughout the overall project duration (2019-2023) [1]. A continuation of the EOF is intended and under definition within the Horizon Europe Work Programme 2023-2024.

1.1 Status and embedding

United States of America

In recent years, relevant developments and business ideas on OOS have almost exclusively been driven by the US, which has led initiatives like CONFERS (initially funded by DARPA) with the aim to better plan, address and harmonize the different aspects of OOS [2]. European industries, research institutions and space agencies have undertaken significant R&D on OOS, but without a comparable coordination and harmonization among the different actors and activities. In view of the US CONFERS, a closer coordination among the European actors is urgently needed. In fact, although some individual European companies are members of CONFERS, there is a concrete possibility that future technical and operational standards for OOS activities could be based essentially on US developments: value creation would be generated starting only from the US reference scenario and losing the European contributes. The future outcome of the CONFERS initiative will therefore not necessarily reflect the interests of Europe.

Japan

Additionally, Japan is working on a comprehensive study report on On-Orbit Servicing. The activities are led by the National Space Policy Secretariat of the Cabinet Office. The starting point for the development of specific regulatory approaches for OOS is the thought, that a servicing mission might be either beneficial (=mission successful) or irresponsible (=mission unsuccessful, client/servicer potentially damaged/destroyed). According to the Outer Space Treaty, Article VI, States Parties shall bear responsibility for activities by non-governmental entities. Therefore, for Japan, assuring safe and peaceful execution of OOS is an international responsibility and should be under governmental supervision. The Japanese Government is working to announce specific regulatory conditions for OOS, to inform UNOOSA of the Japanese approach and to actively pursue international cooperation on this matter. The “Supplementary Requirements for a license to perform OOS” are already available, complementing the “General Requirements for a license to operate a satellite”. A sound regulatory scheme is deemed a major step towards successful development of a commercial OOS market. The collaboration with international partners on OOS regulations is highly demanded by Japan [3].

United Kingdom

Within Europe, the UK is aiming for a lead position following their recent Space Strategy. Actions are now pursued under the umbrella term “proximity missions”. The UK aims to grasp the opportunities of a future space economy and this includes satellite life-extension as well as debris removal [4]. As for CONFERS and Japan, international collaboration is deemed crucial by the UK.

1.2 Impact

The direct effects of the EOF on the European landscape, both for national and ESA/EU programs, could be the avoidance of the expected fallout and/or duplication in public investments for OOS and related fields, of a further fall back in international competitiveness and a push for commercial market development in Europe. Potential generators of market opportunities include as example new modular, composable and recyclable design approaches for OOS topics fostering a circular economy, as mentioned in the Strategic Research and Innovation Agenda (SRIA) of the EU Commission for future technological developments in the frame of the Horizon Europe Program [5]. It is evident that a European strategic alignment, appropriate national regulatory frameworks and a leadership role in global standards developments are vital for the success of all European OOS activities.

It is relevant to highlight that close cooperation between US, Europe and other major players such as Japan and UK may also contribute to and foster collaboration on wider topics such as Space Traffic Management.

1.3 Conclusions and future work

In order to achieve a coordinated position of the European stakeholders, PERASPERA introduced the EOF as part of its work on Space Robotics Technologies. A main EOF

activity is to generate guidelines & principles for OOS missions and commercial OOS activities, providing recommendations to all, especially European stakeholders.

Particularly when it comes to commercial OOS, suitable regulatory frameworks must also deal with space debris, protection of the space environment and long-term space sustainability. Therefore, the H2020 SRC and their follow-on activities under Horizon Europe aim at the introduction of sustainable and economically viable future space infrastructure: a paradigm shift from conventional concepts towards more adaptive and intelligent solutions, opening up new business opportunities in space. These solutions include but are not limited to, as examples, the removal of space debris, the active de-orbiting of satellites at end-of-life, or life-time extension by refueling, repair or replacements.

Space robotics, automation and AI have been identified by European actors as strategic elements for improving sustainable and economically future space infrastructure as their applications in on-orbit servicing. The direct positive effect is the improvement of European competitiveness in these key areas. At the same time, parallel to the development and maturation of technology, the generation of regulations and standards should proceed. Overall, the aim is maximizing the impact European investments and to effectively support successful commercial OOS exploitation.

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