

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Space Exploration Overview (1)

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SYNTHESIS OF THE PLANETARY EXPLORATION - HORIZON 2061 - FORESIGHT EXERCISE

Abstract

The "Planetary Exploration, Horizon 2061" long-term community foresight exercise has been proposed by the Air and Space Academy and led by scientists, engineers and technology experts heavily involved in planetary sciences and in the exploration of the Solar System. This foresight exercise has been elaborated over 3 workshops held in 2016 in Bern, in 2018 in Lausanne and in 2019 in Toulouse. It has been opened to all scientists, engineers, technicians, journalists, industry and space agencies, students and people interested in the future of planetary exploration and the space adventure. The ultimate objective of this sequence of workshops is to develop a long-term picture of the four pillars of planetary exploration:

1. the major scientific questions; 2. the different types of relevant space missions; 3. the key required technologies; 4. the needs in terms of supporting infrastructures and services.

The year 2061 corresponds to the return of Halley's comet into the inner Solar System, the centennial of the first human space flight, and President Kennedy's Moon initiative. It symbolizes the intention to encompass both robotic and human exploration in the same perspective. In the early workshops, planetary scientists were invited to formulate the most important scientific questions that need to be addressed and solved to make progress in our understanding of Planetary Systems, a new class of astrophysical objects which are ubiquitous in our Galactic neighborhood but can be explored in-situ only in our Solar System! These science questions have been formulated independently of the a priori technical possibilities to address them. Subsequently, engineers and technology experts have been invited to contribute to the exercise to seek for innovative technical solutions that will make it possible to fly the challenging space missions needed.

We will give an overview of Horizon 2061 results. The talk will give a particular focus on pillars 2 and 3, elaborating the major future planetary exploration missions that have been formulated, and their translation into technology requirements. Acknowledgements: The authors of this abstract would like to express their sincere thanks to all the participants to the different Horizon 2061 meetings, whose inputs and ideas are the basis for this report. All their names can be found here:

http://horizon2061.cnrs.fr/wp-content/uploads/2020/02/H2061_participants_list19-02-2020.xlsx