**IAF Committee Briefs** 



Winter 2022

# **IAF SPACE EXPLORATION COMMITTEE (SEC)**

#### 1. Introduction/Summary

**Space exploration** has always been considered as the discovery and exploration of celestial structures in outer space by means of continuously evolving and growing space technology, the physical exploration of space being conducted both by unmanned robotic probes and human spaceflight.

Today space exploration is also targeting commercial use, the consequence being that newcomers are reaching the space arena, competition is becoming more aggressive and completely new scenarios are identified.

### 2. Highlights

To address all aspects of the space exploration areas of interest have been identified and assigned to each panel. These are the highlights derived from the sessions during the Paris IAC.

The Space Exploration Overview was extremely well attended with engaged audience members. Updates from the COSPAR Planetary Protection Committee were shared and the audience gained a good understanding of how data from recent missions to the Moon and Mars are informing the COSPAR guidelines. NASA, the International Space Exploration Coordination Group (ISECG) and the UAE shared the status of exploration plans.

The Human Exploration of Mars was very well attended with very interesting presentations. A large number of student presentations were made. Of particular interest to the audience were the results from the first 18 months of operation of NASA''s MOXIE Mars Oxygen generation payload and the implications of this technology to future human missions.

In the Mars Exploration we had the privilege of a

very elaborate keynote paper, jointly presented by major program leaders of ESA and NASA, about Mars Sample Return. MSR is definitively the major mission of this decade. This was complemented by thorough presentations of the Capture, Containment and Return System, and of the Sample Transfer Arm of MSR. We also benefited from several excellent presentations of the results of three ongoing missions: Mars Express, HOPE and INSIGHT. A set of talks was more oriented towards technology, in particular in the field of rover navigation, communications and heatshield.

The 1<sup>st</sup> session was extremely well attended with almost 300 people in the audience, twice as much as in the afternoon. Altogether, 17 presentations were given out of 20 that were expected at the conference. The total number of candidates abstracts for the Mars sessions was 61, with 10 assigned as IPs.

The session on Small Bodies Exploration was separated into a part A (Wednesday) and part B (Thursday). Part A was focusing on missions in operation and such in implementation. After the great success of the Hayabusa2 principal mission the plans for mission extension have been presented by Shota Kikuchi. The Psyche mission to an M-class asteroid. To be launched next year has been presented by David Seal. The JAXA Mars Moon eXploration (MMX) mission, to be launched in 2024 was represented by a mission overview (by the Program Manager, Yasuhiro Kawakatsu, as well as dedicated presentations on the CNES/DLR provided MMX Rover, the Raman Spectrometer RAX and the IR spectrometer MIRS. Part B covered aspects of asteroid mitigation (e.g. presentation by Dr. Patrick Michel on the Hera mission), an overview on the Janus mission by Dr. Dan Scheeres, as well as more general talks on technologies and mission concepts.

The Solar System Exploration including Oceans Worlds session was very well attended along the entire durations (up to 150 persons). Many student presentations were

1

made, some of them with a very high level of quality. At same time most of the presentations are still mission early studies or master thesis. The session needs to attract more space agencies to make visible planned operational missions in the area. As co-chairs we have an open action on this topic.

## 3. Future Outlook

Many amazing missions are about to be decided and the actual architecture of the ARTEMIS programme will have to be baselined. Moon and Mars exploration remain targets of many countries either in cooperation or as stand-alone (like the case of China) the important will be to federate the mission experience and results to allow for dynamic development of the whole space exploration.

### 4. Committee activities

The Space Exploration Committee has already very outstanding participation from Agencies, industries and research center, this allows for a very rich exchange on progresses and long term strategies exchange. Due to political reasons it is difficult to enlarge this to certain countries namely Russia and China. Despite that there are many requests for joining the committee and those are scrutinized by the actual members.

During the last meeting it was discussed to propose the IAF the possibility to consider a number of Plenaries/GNF, for the IAC 2023 in Baku, on the following themes: ARTEMIS, Jupiter exploration and HERA/DART mission. Members in charge of those task will come up with proposals.