IAF Committee Briefs



July 2021

IAF SPACE TRANSPORTATION COMMITTEE

1. Introduction/Summary

This report presents the first Spring brief report of the Space Transportation committee in the new IAF format.

2. Latest Developments

ITALIAN COMPANY BUYS TEN MORE UKRAINIAN ROCKET ENGINES FOR ESA'S VEGA LAUNCH VEHICLE

Yuzhnoye State Design Office, Yuzhmash Production Association, and AVIO S.p.A (Italy) have agreed upon the purchase of 10 more Ukrainian rocket engines for the Vega launch vehicle.

For reference: The lightweight launch vehicle Vega is the joint project of the European Space Agency and the Italian Space Agency. Yuzhnoye SDO and Yuzhmash PA have been cooperating with Italian AVIO S.p.A under the Vega program since 2004. For these years, more than 20 main engine assemblies have been manufactured and delivered to AVIO S.p.A, and the latest delivery was at the beginning of 2021.



Artist's rendering of Vega-C on the launch pad.

NORWEGIAN MICROLAUNCHER SPACEPORT CON-STRUCTION READY TO BEGIN

The construction of the spaceport for micro launchers in Andøya, Norway is about to start. The preliminary design phases have been completed for the main systems, including the launch pads and the launch control system. Andøya Space Orbital has also signed firm contracts with two German launch providers – ISAR Aerospace and RFA. The final approval from the Norwegian government to start construction is expected before the summer. The licensing process has also started.

ESA BOOST PROGRAM

Recent good news on the launcher front from the UK is the ESA funding under the Boost! Program to fund two UK-based launchers through Skyrora and Orbex (in partnership with Deimos, etc.). ESA awarded contracts to Orbex and to Skyrora, with the plan for both companies to begin launch services for ESA in 2022.

AIMING TOWARDS MORE EFFICIENT SPACE LAUNCHES

In research news, the EC H2020 ITN (European Commission funding through Horizon 2020 Program for an Innovative Training Network) ASCenSion (Advancing Space Access Capabilities - Reusability and Multiple Satellite Injection) kicked-off at the start of this year (Feb 2021).

The push for space exploration and communications has resulted in costly missions, added space debris, and issues of safe disposal on re-entry. The ASCenSIon project is focused on multiple payloads in orbits, reuse of propulsion systems, and ecologic and economic sustainability. It will examine technologies both in simulations and test runs to assess the durability

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of propulsion systems and will develop systems for monitoring orbit and landing conditions for multiple launches. This will require advanced models in thermodynamics and aerodynamics tested against cold-flow and hot fire techniques, wireless sensor networks, and reliable guidance, navigation and control systems (GNC) to ensure feasibility and application, changing the profile of space launches.

ITALIAN SUBORBITAL SPACEFLIGHT ACTIVITIES

Italy has been very active in pursuing the initiative of access to space through the outfitting of a suborbital spaceflight capability in the Italian territory. Besides the achievement of capturing commercial market segments like space tourism, microgravity science, and astronauts/ pilots training, such an initiative is expected to engage the participation of the long tradition Italian industry in aerospace in the development of new technologies. A national Spaceport location has been officially designated by the Italian Ministry of Infrastructures and Transportation in the airport of Grottaglie in the Region of Puglia, Southeast Italy. Activities are ongoing, handled by the Italian Civil Aviation Authority (ENAC) and supported by industry, in particular ALTEC, to establish a regulatory regime that allows execution of suborbital flights in Italy and the Spaceport regulation in the first issue has been released.

JAXA INNOVATIVE FUTURE TRANSPORT SYSTEMS PRO-GRAM

In May 2021, JAXA initiated the RFI for the Innovative Future Transport Systems Program. This is a new framework for utilizing technologies previously outside the space sector to realize next-generation, reusable, low-cost space transportation systems.

ARTEMIS I UPDATE

With the delivery of the Core Stage of the Space Launch System rocket to the Kennedy Space Center in April 2021, all the hardware for the Artemis I flight has been delivered and is ready for integration. The fueling of the Orion spacecraft's Service Module has been completed and the solid rocket booster stacking has been completed on the Mobile Launcher within the Vehicle Assembly Building. Artemis I, planned for late 2021, will be the first integrated flight test of NASA's Deep Space Exploration Systems.

In parallel, the European Service Module of the Artemis I mission has been fully loaded with propellant as well as pressurized up to the operating pressure and therefore prepared for the mission by end of this year.



The core stage for the first flight of NASA's Space Launch System rocket is seen in the test stand during a second hot fire test at NASA's Stennis Space Center. The four RS-25 engines fired for 8 minutes during the test and generated 1.6 million pounds of thrust.

3. Breakthroughs

NASA, along with Maxar Technologies and Busek Co., successfully completed the first ground test of the 6-kW solar electric propulsion subsystem destined for the Gateway Power and Propulsion Element (PPE). Several of these 6-kW thrusters will later be combined with other higher-power thrusters to complete the PPE's 50kW electric propulsion system. This system will make the Gateway the most powerful electric propulsion spacecraft ever flown, and it will manoeuvre Gateway around the Moon, opening more of the lunar surface for human exploration than ever before.

4. Action plan for the year

The main important action for the IAF Space Transportation committee in 2021 focuses on the improvement of the committee membership diversity. It is needed that more female professionals, young professionals as well as professionals from Africa, Arabia, South and Middle America, Australia and Oceania are joining the committee.

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