

Commercial Lunar Exploration Program “HAKUTO-R” Reveals Final Design and Plan for ‘Mission 1’ Lunar Lander

Lander planned to undergo assembly and integration in 2021, and launch in 2022

TOKYO – July 30, 2020 – Today, lunar services company, ispace, revealed the final design of its lunar lander that will be used in the first mission of the company’s “HAKUTO-R” program, a multinational commercial lunar exploration program.

This occurred as HAKUTO-R’s ‘Mission 1’ reached the final hardware design phase, known as the Critical Design Review (CDR). The HAKUTO-R program also released an [infographic](#) and [short video](#) explaining the lander’s complete design in detail.

Assembly of the lander will begin in Japan in 2021 at a JAL Engineering Co., Ltd. facility in Narita, Japan. Final assembly, integration, and testing (AIT) activities for the lander will be carried out by ArianeGroup GmbH at its facilities in Lampoldhausen, Germany. After assembly and final testing in Germany, the lander will be delivered to Cape Canaveral in the United States for its launch.

The target launch date of 2021, announced in September 2018 following the Preliminary Design Review (PDR) phase, has been adjusted to 2022¹ in response to technical issues which arose in recent months. The new target launch date was chosen in order to ensure higher reliability for HAKUTO-R customers and overall mission success. The lander is still planned to launch on SpaceX’s Falcon 9 rocket.

Original design

With its legs extended, the HAKUTO-R lander stands at 2.3 m (7.5 ft) tall and 2.6 m (8.5 ft) wide, and it weighs about 340 kg (750 lbs.) dry mass—more compact and with a lower center of gravity than the Preliminary Design revealed in September 2018. In order to minimize propellant consumption, the lander will take a 3-month low-energy trajectory to the Moon. As such, the size of fuel tank was also reduced in size. The target payload capacity of 30kg² remained unchanged in the final design.

In addition to supporting the assembly of the lander, ArianeGroup GmbH is supplying the two independent propulsion systems: the main propulsion system (equipped with an apogee engine and bi-propellant thrusters) and a Reaction Control System (RCS) consisting of Hydrazine thrusters. Both propulsion systems are equipped with ArianeGroup components such as valves, pipes and fittings.

¹ Planned launch schedule as of July 2020.

² Total estimated payload capacity as of July 2020, a portion of which is planned to be sold to ispace customers.

Increasing interest in lunar exploration

As momentum from the public sector and private sector around commercial lunar exploration continues to build worldwide, ispace aims to normalize lunar exploration and nudge the industry closer to becoming a mainstream business.

“The same way boats, trains, cars and planes have enabled giant leaps in exploration and advancements in civilization,” said Takeshi Hakamada, Founder & CEO of ispace, “the commercial lunar lander is the next form of transport that will propel human development.”

As such, the company is using HAKUTO-R as a platform—through efforts such as the newly released [infographic](#) and [video](#)—to build awareness among the business community and general public on the mechanics of this new type of commercial space vehicle and its role in unlocking an entirely new market.

ispace, inc. (<https://ispace-inc.com/>)

ispace is a lunar exploration company with over 100 staff and offices in Japan, Europe and the United States. Founded in 2010, ispace managed Team HAKUTO, one of the 5 finalists in the Google Lunar XPRIZE competition. In 2017, the company raised nearly \$95 million (USD) in Series A funding. In 2018, ispace joined a team led by Draper which was selected by NASA to compete in its Commercial Lunar Payload Services (CLPS) Program. In 2019, ispace Europe was selected by ESA to be part of the Science Team for PROSPECT, a program which seeks to extract water on the Moon.

HAKUTO-R (<https://ispace-inc.com/hakuto-r/>)

HAKUTO-R is a multinational commercial lunar exploration program operated by ispace. It includes ispace’s first two lunar missions: Mission 1, a soft lunar landing planned to launch in 2022³, and Mission 2, a lunar landing and deployment of a rover planned to launch in 2023³. For both missions, the HAKUTO-R lander is planned to launch on SpaceX’s Falcon 9 rocket. The program aspires to lay the groundwork for high-frequency lunar transportation. Partners of HAKUTO-R include Japan Airlines, Suzuki Motors, Citizen Watch, Mitsui Sumitomo Insurance, NGK Spark Plug, Takasago Thermal Engineering, and Sumitomo Corporation.

ArianeGroup (www.ariane.group)

ArianeGroup develops and supplies innovative and competitive solutions for civil and military space launchers, with expertise in all aspects of state-of-the-art propulsion technologies. ArianeGroup is lead contractor for Europe’s Ariane 5 and Ariane 6 launcher families, responsible for both design and the entire production chain, up to and including marketing by its Arianespace subsidiary, as well as for the missiles of the French oceanic deterrent force. ArianeGroup and its subsidiaries enjoy a global reputation as specialists in the field of equipment and propulsion for space applications, while their expertise also benefits other industrial sectors. The group is a joint venture equally owned by Airbus and Safran, and employs approximately 9,000 highly qualified staff in France and Germany. Its 2019 revenues amounted to 3.1 billion Euros.

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³ Planned launch schedule as of July 2020.