

Lunar Orbital Platform-Gateway

will be an outpost orbiting the Moon that provides vital support for a sustainable, long-term human return to the lunar surface, as well as a staging point for deep space exploration. It is a critical component of NASA's Artemis, the program which will land the first woman and next man on the Moon. The Gateway is a vital part of NASA's deep space exploration plans, along with the Space Launch System (SLS) rocket, Orion spacecraft, and human landing system that will send astronauts to the Moon. Gaining new experiences on and around the Moon will prepare NASA to send the first humans to Mars in the coming years, and the Gateway will play a vital role in this process. It is a destination for astronaut expeditions and science investigations, as well as a port for deep space transportation such as landers en route to the lunar surface or spacecraft embarking to destinations beyond the Moon.

LUNAR ORBITAL PLATFORM GATEWAY

Today, men and women are headed back to the moon a half century after man first set foot on Earth's only natural satellite. And that's not only because 'it's there'—but, rather, because the Moon could become a permanent base for human life as well as a launching point for future missions to Mars.

THALES ALENIA SPACE'S CONTRIBUTION:

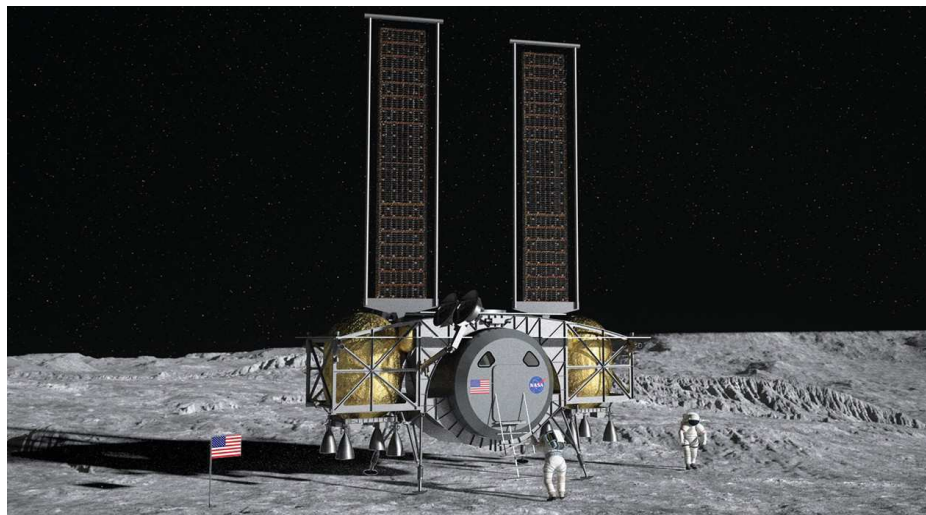
Thales Alenia Space is responsible of the development of two key modules for the upcoming Lunar Orbital Platform-Gateway (LOP-G):

I-HAB (International Habitat)

is a pressurized module to provide crew living quarters, plus docking points to supply interfaces and resources to vehicles in transit. Drawing on Thales Alenia Space's long-standing expertise in the development of habitable modules for the ISS, along with new technologies and processes, I-HAB will represent the transition

from the ISS to a new generation of space infrastructures for deep space exploration.

It will meet evolving requirements and performances for lighter structures and optimized micrometeorites protection system, evolved docking systems and hatches, enhanced functional and avionic architectures, more efficient thermal control system with deployable radiators to ensure full autonomous capability of heat rejection, innovative conditioning systems.



Built to experience for the first time long exposure in the deep space environment, offers the opportunity to test and prove potential design solutions for protection against cosmic radiations. Being unmanned for most of its time on orbit, it will also require dedicated solutions for the robotic operations, both on board and externally. One of the key evolving step with respect to the ISS will be focused on designing, with the support of virtual reality technique, more comfortable internal accommodations, with exploitation of modular and reconfigurable solutions to optimize room and comfort for the crew.

The module will be provided by Europe with contributions from the other space Agencies like environmental and life support system from JAXA, avionics and software parts from NASA and robotic components from CSA; the integration of all these elements in I-HAB will leverage on the large experience already acquired by Thales Alenia Space during the ISS Nodes 2 and 3 activities already developed in cooperation.



Thales Alenia Space in Italy is program prime contractor, with responsibility for overall program management, product assurance and safety, system engineering, functional design, all components concerning human factors, thermal and mechanical systems, the primary structure and production of hatches, and the assembly, integration and testing (AIT) phase. Thales Alenia Space in France is in charge of software and avionics subsystems.)

ESPRIT (European System Providing Refueling, Infrastructure and Telecommunications) consists in 2 two main elements:

HLCS (Halo Lunar Communication System) ensures the communications between the Gateway and the Moon. The launch is planned on 2024 with HALO, the first habitation and logistics module, supplied by the United States, and derived from the Cygnus resupply cargo, for which Thales Alenia Space provides its primary structure and micrometeoroid protection system.

ERM (ESPRIT Refueling Module) combines the refueling of the Gateway with a small pressurized module with windows.

ERM will provide active refueling of the Gateway with xenon and chemical propellants to extend its life time but also prepare for re-usable Lunar Lander or Deep Space Transport (to Mars). ERM's pressurized tunnel (delivery planned for 2026, with launch the following year) provides wide windows offering a 360° view on Space, Moon, Earth and on the Gateway and contains various logistics and other elements for the crew.

Thales Alenia Space in France is program prime contractor, with Thales Alenia Space in Italy in charge of the pressurized tunnel and windows. Thales Alenia Space in the UK will contribute to the chemical refueling system. Selected in open competition, Thales Alenia Space in Belgium will provide the HLCS electrical Interfaces units (Remote Interface & Distribution Unit – RIDU) and the radio frequency amplifiers (TWTAs), Thales Alenia Space in Spain the S-band communication transponder and Thales Alenia Space in Italy for the K-Band transceiver which is part of a new generation of Deep Space Transponders (IDST) and will ensure communications between the CISlunar base and the assets on the Moon.