

LUNAR ORBITAL PLATFORM-GATEWAY

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The purpose of this paper is to review NASA's plans for building a cislunar space station in collaboration with the space agencies of other countries.

Apollo 17 mission to the Moon in 1972 was the last time when humans travelled beyond low Earth orbit. Obviously, now we need to move further in our journey to the stars. Lunar Orbital Platform-Gateway (LOP-G), formerly known as Deep Space Gateway, is the next step in space exploration.

According to the current concept, LOP-G consists of several modules (listed in launching order):

- 1) *Power and Propulsion Element (PPE)*, providing ion and chemical thrusters, as well as solar panels.
- 2) *Habitation module*, containing living quarters, navigation, thermal control and life support systems.
- 3) *European System Providing Refueling Infrastructure and Telecommunications (ESPRIT)*, equipped with Canadian-built robotic arm, small airlock for scientific experiments, and communication antennas.
- 4) *Russian Airlock Module*, allowing the crew to perform extravehicular activity (EVA) aimed at assembly and repair operations.

The components of LOP-G will be launched one-by-one during Exploration Missions 2-5 onboard Space Launch System (SLS) heavy-lift rocket. It is believed that the station assembly process will be accomplished by 2026. The Orion spaceship is going to be used for crew transportation purposes.

A study considering SLS rocket and Orion performances was carried out. After considering all the constraining factors, researchers have chosen so-called Near Rectilinear Halo Orbit (NRHO) for the future station. This orbit is a tradeoff between easy (in terms of Δv) access to the Moon's surface and to the Earth.

In conclusion, LOP-G offers a great opportunity to develop necessary technologies and learn to live and work in conditions when a quick return to Earth is not possible. Such experience would be useful for future missions to Mars and beyond.

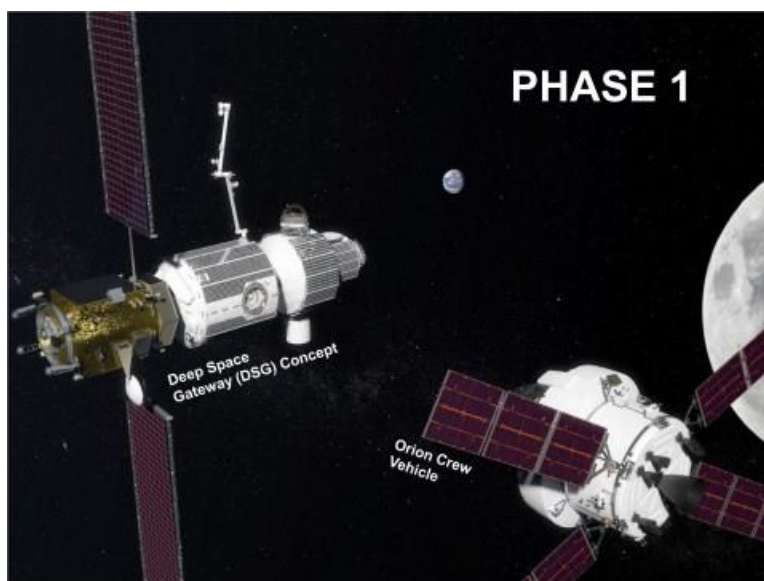


Figure 1. The artist's representation of Orion spaceship approaching Lunar Orbital Platform-Gateway

References:

1. https://invite.jsc.nasa.gov/presentations/D1_DSG%20perspective_Caram.pdf
2. <http://www.russianspaceweb.com/imp-ppb.html>
3. <http://www.russianspaceweb.com/imp-che.html>
4. <http://www.russianspaceweb.com/imp-icub.html>
5. <http://www.russianspaceweb.com/imp-shm.html>
6. https://www.youtube.com/watch?v=X5O77OV9_ek
7. <https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20150019648.pdf>