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LUNAR GATEWAY ESPRIT FEATURES, STATUS AND OUTLOOK

Abstract

This paper provides an overview and status of the project ESPRIT, one of the European Space Agency's contributions to the international partnership for the Lunar Gateway led by NASA. The name of the project stands for "European System Providing Refueling Infrastructure and Telecommunication" and is currently under development. The refuelling and infrastructure and the telecommunication functions will be provided by two separate elements that will reach Gateway at different times: the HALO -Lunar Communication System (HLCS), to be installed externally on the NASA HALO module, and the European Refueling Module (ERM) - an inhabitable space for astronauts with cargo space and propellant tanks to store and supply Gateway with propellant.

The HLCS communication system will provide radio links with satellites, rovers and human landers en route to and from the lunar surface, and with spacecraft around the Gateway. It has two independent antennas that can track and maintain communications with multiple targets simultaneously. Although other communications links to the lunar surface will be available, HLCS is currently the only system that provides high data rate communications that enable high-definition video transmission with the outpost throughout the Gateway orbit. HLCS is scheduled for launch in late 2025.

The ESPRIT refuelling module ERM is part of Gateway's core structure and has four main functions: Transporting cargo to the station, providing stowage space after docking with Gateway, supplying fuel to Gateway's propulsion system (NASA's Gateway Power and Propulsion Element), and provide a view of space and the Moon through its windows. ERM is scheduled for launch in late 2028.

This paper explains the key features of the two elements, the current state of development and the future important steps in their development and deployment.