

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems (4)

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CONCEPTS FOR LUNAR SPACE STATION FOR INTERPLANETARY MISSIONS

Abstract

Recent studies on Space transportation architectures and feasible mission concepts brings an idea to build a space transportation infrastructure which describes that utilizes propellant depot servicing platforms to support all foreseeable missions in the Earth-Moon vicinity and deep space out to Mars. The infrastructure utilizes current expendable launch vehicle (ELV) systems for all crew, cargo, and propellant launches to orbit. Propellant launches are made to a Low-Earth-Orbit (LEO) Depot and an Earth-Moon Lagrange Point 1 (L1) Depot to support new reusable in-space transportation vehicles. The LEO Depot supports missions to Geosynchronous Earth Orbit (GEO) for satellite servicing, and to L1 for L1 Depot missions. The L1 Depot supports Lunar, Earth-Sun L2 (ESL2), Asteroid, and Mars missions. These new reusable vehicle concepts include a Crew Transfer Vehicle (CTV) for crew transportation between the LEO Depot, L1 Depot and missions beyond L1; a new reusable Lunar Lander for crew transportation between the L1 Depot and the lunar surface; and a new reusable Deep Space Habitat (DSH) with a CTV to support crew missions from the L1 Depot to ESL2, Asteroids, and a Mars Orbital Depot. The potential benefits of this propellant depot infrastructure include competitive bidding for ELV flights and propellant services, Development of new reusable in-space vehicles, and development of a multiuse infrastructure that can support much future mission's needs