Paper ID: 78884
oral

IAF SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)
Emerging Space Ventures, including Space Logistics and Space Safety for Sustainability (2-D2.9)

Author: Mr. Arturs Jasjukevics
ArianeGroup, Germany

OPALS ADVANCED KICK STAGE AND SPACE LOGISTICS VEHICLE ARCHITECTURE AND INNOVATIVE TECHNOLOGIES

Abstract

In the frame of ESA FLPP project "LunaNova", a concept of an advanced, high performance kick stage and space logistics vehicle has been developed, named OPALS. The kick stage is capable of to-orbit services for the Earth and Lunar orbits, as well as exploration missions. As a space logistics vehicle, it is capable of in-space services such as Active Debris Removal, Tugging, Communications relay and other services as growth potential, including refuelling. The vehicle architecture is based on the additively manufactured, load carrying toroidal tank. It allows a low profile and a compact subsystems arrangement. OPALS is equipped with a "green" version of BERTA engine, running on High Test Peroxide and Kerosene, as opposed to a classical MMH/MON combination of the baseline BERTA. The vehicle has relatively low pressure propellant tanks, enabled by an autogenous propulsion subsystem with gas generator and turbopump. Unlike most launcher kick stages, OPALS is intended for a lifetime duration in space of up to 1 year. The vehicle AOCS features 16 thrusters, including higher thrust engines for in-orbit servicing, allowing a full 6-DoF control, necessary for in-orbit servicing manoeuvres. The vehicle can include several RdV and docking equipment available as kits, when demanded by mission requirements. The paper will focus on the system architecture, critical innovative technologies and manufacturing processes, as well as possible combinations of use cases.