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# RAFTEA: A MISSION CONCEPT TO SUPPORT SPACE SUSTAINABILITY THROUGH IN-ORBIT REFUELLING IN LEO

**Abstract**

Orbit Fab is leading the way in building out an orbital architecture to enable commercial refuelling services for the future in-orbit economy, through the open licence refuelling interface, RAFTI. The UK subsidiary of the company, Orbit Fab Limited (OFL), is supporting global efforts by leading activities in future refuelling interface developments, as well as planning and leading refuelling missions which are complementary to US activities. With the support of the UK Space Agency, OFL has defined a mission concept, with a planned launch in the third quarter of 2026 to serve near-term LEO refuelling customers. The primary target of the mission is the UK-Active Debris removal (ADR) spacecraft, which will be equipped with a RAFTI fuelling port. The orbital operations include options for the expandability and reusability of the deployed servicer vehicle platform to go on to perform future services to commercial clients. The mission concept covers in detail how the first client (ADR vehicle) will be refuelled and the advantages of refuelling via Orbit Fab's service architecture compared with the cost of redeploying a new ADR vehicle. The benefits of refuelling and reusability are shown to be a key enabler to space sustainability initiatives such as ADR. The vehicle defined in the study is also planned to support near-term space logistics missions, serving the emergent in-space transportation ecosystem in LEO. The logistical support vehicles (propellant depots) for replenishing the refueller vehicle are also defined in the mission baseline CONOPs with options for deployment plans based on different customer scenarios. A full system concept of the refueller vehicle is described, along with the major development activities for key technologies and at system level to support the baseline launch date. The initial service deployed by the vehicle and future deployments of similar vehicles to build out a wider service is considered through an economic analysis to assess the business case as well as the overall benefits compared to a single-use model of client spacecraft missions. The path to full deployment of in-orbit commercial refuelling services based off the mission is defined in the context of global Orbit Fab efforts to build the in-space propellant supply chain.