

BUSINESS INNOVATION SYMPOSIUM (E6)

New space industry segments, firms, actor groups, and multiple programs: innovation, entrepreneurship & investment at the mesoscopic level of analysis (2)

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CHALLENGES AND OPPORTUNITIES OF INTERNATIONAL COLLABORATION IN LAUNCH
VEHICLE DEVELOPMENT PROGRAMS

Abstract

Rocketplane Global, LLC (RGL) is continuing its preliminary engineering and development effort for its Mach 12 spaceplane design, based on a 20 year legacy of systems engineering for a variety of high Mach suborbital spaceplanes. The Rocketplane XS-1 spaceplane is a winged horizontal takeoff and landing configuration using military turbofans for takeoff and landing and a LOX / kerosene rocket engine for the main propulsion on the zoom climb to a Mach 12 140km apogee. Once the rocket engine shuts down and the vehicle is on a ballistic coast the payload bay doors are opened and the satellite payload and upper stage stack are released in a gentle exo-atmospheric mechanical separation. The upper stage is then ignited, taking the payload on its insertion trajectory. The spaceplane closes the payload bay doors and orients for reentry. Once the vehicle has completed the reentry deceleration maneuver and is in a subsonic glide the jet engines are restarted for a powered landing – either at the original spaceport or at a downrange recovery runway. A key enabling technology for this system is the use of a KDC-10 tanker aircraft to transfer the majority of the propellant load to the spaceplane once the vehicle is in the air and flying at normal subsonic jet speed. The tanker carries the 64,000 kg of LOX plus additional kerosene to replace the fuel used by the turbofans during takeoff and the tanking maneuver.

RGL has been pursuing its development and funding strategy with international partners and investors for the last few years. A regional launch operations strategy is part of this plan, with potential spaceports in Europe and Asia planned to serve these regional markets. Recently, RGL has undertaken an investment and strategic partnership relationship with a private Chinese aerospace company. China HEAD Aerospace Technology Co. is now investing in RGL and will be a minority shareholder. HEAD will also become a strategic manufacturing supplier for the expendable upper stage of the RGL launch system using its Netherlands subsidiary company as the assembly and integration contractor. A Chinese main rocket engine is also being evaluated. An American prime launch system developer using a Chinese contractor presents major challenges under the US ITAR, EAR and CFIUS regulations. This paper will describe the strategies and procedures used by RGL and HEAD to obtain the necessary US and Chinese legal and regulatory approvals to implement their strategic partnership.