

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

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SPACE RAPID TRANSIT - A TWO STAGE TO ORBIT FULLY REUSABLE LAUNCH VEHICLE

Abstract

Space Rapid Transit (SRT), is a horizontal-takeoff launch vehicle that will revolutionize both the space launch and flight transportation industries. To break the cycle of escalating space launch systems cost, it is necessary to consider concepts that are drastically different from current launch options. SRT is a fully reusable two stage to orbit vehicle. The Ferry Stage is powered by a dual fuel coaxial turboramjet. The turbofan stage uses jet fuel while the ramjet uses hydrogen. The Orbiter uses liquid hydrogen/liquid oxygen engines. Stage separation is at Mach 4+ at 30+ km. The full system, Ferry with reusable Orbiter upper stage, is expected to deliver payloads to low earth orbit for less than 150/lb. *The horizontal – takeoff design ensures successful rapid launch, recovery, and turnaround for the vehicle. Abort without the loss of vehicle and electric actuation and green fuel RCS systems further reduce operational costs.*

SRT provides a clear path for the development and implementation of advanced technologies. The technology is scalable from vehicles that can deliver 450 kg to the ISS to versions that could bring 6 or more crew members into orbit. The thermal protection system for the first stage would allow speeds in excess of Mach 10 allowing for introduction of scramjet engines as they become available. Ultimately it could become a single stage to orbit vehicle. SRT could also lead to hypersonic airliners and cargo aircraft as it would provide a platform for development of hypersonic aircraft and engines.

This paper presents the latest work on SRT including end-to-end simulation results, engine design, CFD studies and details of the layout of both the Ferry and Orbiter.