

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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EVOLUTION OF THE SPACELINER TOWARDS A REUSABLE TSTO-LAUNCHER

Abstract

Since a couple of years the DLR launcher systems analysis division is investigating a visionary and extremely fast passenger transportation concept based on rocket propulsion which will seamlessly span the boundaries between aviation and spaceflight in the future [1, 2, 3]. The fully reusable concept consists of two vertically launched winged stages in parallel arrangement. Work on the SpaceLiner has been supported by four different EU-funded studies, internal DLR funding, and contributions of several European partners.

The key premise behind the original concept inception is that the SpaceLiner ultimately has the potential to enable sustainable low-cost space transportation to orbit while at the same time revolutionizing ultra-long distance travel between different points on Earth. The space transportation role of the SpaceLiner concept as a TSTO-launcher is now, for the first time, addressed in technical detail. Different mission options to LEO and beyond are traded and necessary modifications of the passenger stage to an unmanned cargo-carrier are investigated and described in this paper.

Meanwhile, technical progress of the SpaceLiner ultra-high-speed passenger transport is ongoing at Phase A conceptual design level. Iterative sizings of all major subcomponents in nominal and off-nominal flight conditions have been performed. Potential intercontinental flight routes, taking into account range-safety and sonic boom constraints as well as good reachability from major business centers, are evaluated and flight guidance schemes are established. Alternative passenger cabin and rescue capsule options with innovative morphing shapes were also investigated.

The operational and business concept of the SpaceLiner is under definition. The project is on a structured development path and as one key initial step a Mission Definition Review is planned to be concluded in the first half of 2016.

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