

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

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SPACELINER ROCKET-POWERED HIGH-SPEED PASSENGER TRANSPORTATION CONCEPT  
EVOLVING IN FAST20XX

**Abstract**

A strategic vision has been proposed by DLR in 2005 [1] which ultimately has the potential to enable sustainable low-cost space transportation to orbit and while at the same time revolutionizing ultra-long distance travel between different points on earth. By strongly surging the number of launches per year manufacturing and operating cost of launcher hardware should dramatically shrink. Ultra fast transportation, much faster than supersonic and even potential hypersonic airplanes, is definitely a fundamental new application for launch vehicles. Such a new kind of ‘space tourism’ based on a two-stage reusable launch vehicle (RLV) has been proposed by DLR under the name **SpaceLiner**.

Early technical feasibility analyses of DLR indicate that a vertically launched rocket powered two-stage space vehicle is able to transport about 50 passengers over distances of up to 17000 km in about 1.5 hours and 100 passengers over 8800 km in 1 hour. Technical data of this configuration including its innovative cooling concept has been published in reference 2.

The revolutionary ultrafast transport SpaceLiner is now under investigation in the EU-funded study FAST20XX (**F**uture high-**A**ltitude high-**S**peed **T**ransport **20XX**) set off in December 2009. This multinational and multi disciplinary program will mature required technologies and should evolve and consolidate the SpaceLiner vehicle.

The paper describes the latest progress of the configuration:

- Vehicle trade-off studies (choice of propellant RP vs. LH2, staging (e.g. challenges of single stage concepts for shorter distances))
- Adaptation of the configurations to different missions with limited number of different vehicle types
- Pre-development of a passenger rescue capsule
- Aerodynamic shape refinement
- Resizing and optimisation of the passenger stage including establishing a preliminary structural concept

1. Sippel, M., Klevanski, J., Steelant, J.: Comparative Study on Options for High-Speed Intercontinental Passenger Transports: Air-Breathing- vs. Rocket-Propelled, IAC-05-D2.4.09, October 2005

2. Sippel, M., van Foreest, A.: Latest Progress in Research on the SpaceLiner High-Speed Passenger Transportation Concept, IAC-07-D2.7.07, September 2007