

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion System (1) (1)

Author: Mr. Tobias Traudt
DLR (German Aerospace Center), Germany

Dr. Günther Waxenegger-Wilfing
Germany

Mr. Robson dos Santos Hahn
Germany

Mr. Bernd Wagner
Germany

Dr. Jan Deeken
Germany

AN OVERVIEW ON THE TURBOPUMP ROADMAP FOR THE LUMEN DEMONSTRATOR
ENGINE AND ON THE NEW TURBINE TEST FACILITY**Abstract**

The Liquid upper stage demonstrator engine (LUMEN) to be built at the German Aerospace Center will use the expander bleed cycle. The propellants for LUMEN will be liquid oxygen (LOX) and liquid methane (LCH₄). The demonstrator will provide a test bed for future component development as well as to enhance the understanding of the operation of the complete cycle. One major topic in LUMEN is the turbopumps which will have to provide the propellants at the correct pressures and mass flows. LUMEN is designed to use two turbopumps with a focus to future hardware changes. For this reason the turbopumps will be built in a modular way, making it possible to easily change the pump assembly, the turbine assembly, the seals or the whole bearing and shaft assembly, etc.. In this paper we will show the Roadmap of the LUMEN Turbopumps. Starting from the first design we will highlight the possibilities for research on future turbopumps and turbopump components. Part of the roadmap is the erection of a dedicated turbine test stand at the DLR. The turbine test stand will have two functionalities. It will make it possible to test stator-rotor cascades for easy aerodynamic testing of the profiles and it will incorporate a test position for turbine assemblies with a brake to measure for example the power being generated. The specifications of the turbine test stand will be presented in detail. The turbine test stand will be suitable for turbines of rocket engines in the 75kN class.