

Fluids and Space Engineering Seminar

Wednesday, November 7, 2018

ZARM II, Room 1730

The DLR STERN programme and ZARM's contribution ZEpHyR 1 and ZEpHyR 2

M.Sc. Maximilian Ruhe

M.Sc. Tim Schwentek

Universität Bremen, ZARM - Zentrum für angewandte Raumfahrttechnologie und Mikrogravitation



ZEpHyR 1 on the MAN launcher in Sweden

The STERN programme (**Studentische Experimental-Raketen**) of the German space agency (DLR) offers German universities and their students the possibility to design, build and launch sounding rockets. The main goal of this programme is the education of students to prepare them for future employments in the space industry by giving students the opportunity to run through a complete project cycle by space industries standards. Each rocket will be launched from ESRANGE (European Space and Sounding Rocket Range), which is located in the very north of Sweden.

Since 2012 the ZARM is also involved in the DLR STERN programme as a part of the University of Bremen. ZARM's contribution is the **ZARM Experimental Hybrid Rocket (ZEpHyR)**.

Its rocket motor utilises paraffin wax (candle wax) as fuel and liquid oxygen as oxidiser. In April 2016 ZEpHyR 1 was successfully launched from ESRANGE in Sweden. The hybrid rocket had a thrust of nearly 2000 newtons and weighed 80 kilograms including 9 kilograms of paraffin. It reached an altitude of about 1500 metres and proved the functionality of the propulsion and the subsystems. The entire rocket was built by students of the University of Bremen.

Since October 2017 the development of ZEpHyR 2 is in progress. The new hybrid powered sounding rocket will have a diameter of about 0.24 metres and a length of about 6 metres. The motor will have a thrust of about 6500 newtons to reach an estimated altitude of 25 - 35 kilometres. The launch is scheduled for summer 2020.