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09/04/2014

EINLADUNG

zu einem Vortrag im Rahmen des

Kolloquiums Thermo- und Fluidodynamik

Datum: Mittwoch, 7. Mai 2014
Zeit: 16:15 Uhr
Ort: Maschinenlaboratorium ETH Zürich
Hörsaal ML H 44
Referent: Cem Ozan Asma, PhD
Swiss Space Systems Holding SA - S3, Switzerland
Titel: Fluid Dynamics Applications in Space

This seminar aims at giving information on the potential fluid dynamics research areas in space environment and technologies.

Fluid dynamics is a discipline that is needed more and more in space applications, despite the generalized opinion of not needing this discipline in space due to the lack of fluids in space. There are well established applications of fluid dynamics in space such as

- Estimation of interaction of Earth's magnetic field with the solar storms (MHD - MagnetoHydroDynamics Equations)
- Sloshing problems in the pipes and tanks of satellites

However, fluid dynamics is needed more and more with the emerging field of nano-satellites at low Earth Orbits. The nano-satellites are mostly developed by universities and research organisations. They cost much less to develop (in terms of hardware cost, manpower and time) compared to industrial satellites and new innovative launching options start to become available for them. This makes the utilization of nano-satellites very suitable for scientific studies, R&D in micro-g environment and in-orbit technology demonstrations. The altitudes of 300 - 500 km are suitable for these nano-satellites which offer an ideal life time and economically suitable target. The main problem at these altitudes is the existence of a rarefied atmosphere, which can be very dynamic and difficult to model. Fluid dynamics studies are needed to understand the variations and mechanisms at these altitudes and the interaction between the satellites and the rarefied atmosphere. Furthermore, innovative engineering solutions are very welcome to make use of the existing atmosphere either to de-orbit the satellites or to stabilize them. Finally, the atmospheric entry of spacecraft is yet another field of study for fluid dynamics, which happens in conditions that are difficult to model and predict. Other than satellites, there is a potential interest on sub-orbital high-speed high-altitude transportation options (London-Sydney in 2 hours) that require the design of aerial vehicles that can fly through both rarefied and continuum regimes in a stable mode.

Host: Prof. P. Jenny

Gäste sind willkommen!