German Aerospace Center (DLR)

Contributions to 6th EUCASS and to European Aerospace Research
DLR
German Aerospace Center

- Research Institution
- Space Agency
- Project Management Agency
Locations and employees

Approx. 8000 employees across 33 institutes and facilities at 16 sites.

**DLR Contributions @ EUCASS 2015**

- **A. Herbertz et al**
  Trajectory Optimization for a Low Cost Lunar Technology Demonstrator Mission

- **C. Bombardieri et al**
  Filling process in spacecraft feedlines

- **M. Börner et al**
  Laser Re-Ignition of a Cryogenic Multi-Injector Rocket Engine

- **J. Deeken et al**
  Axial Pressure and Wall Heat Flux Distribution of a Porous Injector Head (API)

- **M. Wohlhüter et al**
  Numerical Analysis of Methane/Oxygen Laser Ignition in a subscale Combustion Chamber
Combustion instabilities

PP and SM papers

S. Beinke et al
Modelling of a co-axial LOX/GH2 injection element under high frequency acoustic disturbances

S. Webster et al
Asymmetric frequency response of a LOX/H2-combustor in frequency ramping tests

S. Beinke et al
Project status of the HyEnD STERN hybrid sounding rocket project at Stuttgart University and DLR LA

Kobald et al
Development and test campaign of a 10000 N flight weight hybrid rocket engine

Petrarolo et al
Performance characterization regarding fuel composition and combustion stability of advanced hybrid rocket engines

Bouajila et al
Modelling of the mechanical behavior of a copper alloy using Chaboche model

Bouajila et al
Investigation of the influence of temperature and stress on the permeability of porous continuous fiber-reinforced composite materials through experiment and simulation
Numerical Simulation of hybrid rocket engine combustion chamber processes, aluminum particle combustion, and Green Propellants

S. May: CFD Simulation of Chemical Non-Equilibrium Reacting Flow within the AHRES Hybrid Rocket Engine; PP-Hybrid Prop Modeling

O. Božić: Modeling of the Transformation Kinetics of Small Metal Particles during Combustion inside the Chamber of Hybrid Rocket Engines; PP-Hybrid Prop Modeling

H. Ciezki et al: Influence of various aspects on the performance characteristics of gel propulsion systems
PP – Gelled Propellants

M. Negri: Replacement of Hydrazine: Overview and Very First Results of the EC-H2020 Project Rheform
PP – Green Propellants

G. Poppe: Optimization of Finocyl Grain Geometries of Solid Rocket Boosters
PP – Solid Propulsion I
Overview of EU FP7 research project THOR


- Thermal management concepts for highly loaded components of thermal protection systems
- Novel CMC materials and structures
- Experimental verification in high enthalpy ground test facilities
- Numerical verification by coupled simulations


- Characterization of high enthalpy argon flow states for ground based radio communication blackout experiments
- Experimental simulation of radio communication blackout in L2K facility
- Experimental verification of ExB Blackout Mitigation Scheme
A. Theiß and S. Hein: *Investigation on the wake flow instability behind isolated roughness elements on the forebody of a blunt generic re-entry capsule*
- Paper FP-514
  - Investigation on the laminar-turbulent boundary layer transition behind a roughness element on an Apollo-like capsule at hypersonic flow conditions

C. Schnepf, E. Schülein: *Wave drag reduction with a self-aligning aerodisk on a missile configuration*
- Paper FP-470
  - Experimental and numerical simulations show the potential of a self-aligning aerodisk to reduce the wave drag on a pitching missile also at high angle of attack.
DLR Contributions @ EUCASS 2015

FP7 funded project on advanced tank technologies for hypersonic aircraft

M. Sippel et al: Final Results of Advanced Cryo-Tanks Research Project CHATT; SM-427 paper

M. Stief, J. Gerstmann: EXPERIMENTAL AND NUMERICAL INVESTIGATION OF AXIAL AND LATERAL SLOSHING INSIDE A LARGE CYLINDRICAL TANK; PP - Upper Stages

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V. Clark: Modelling of Propellant Management Systems in Early-Phase Launcher Development; SI - Space Propulsion MDO

plus papers from partners
A. Hauschild: **Results of the GNSS Receiver Experiment OCAM-G on Ariane-5 flight VA 219**, session FD: FLIGHT DYNAMICS/GNC and AVIONICS for Aeronautic and Space Applications

- First flight of a GNSS receiver experiment on Ariane-5 launcher VA219 with ATV-5 on July 29, 2014, from Kourou into a LEO orbit
- Successful tracking of GPS, Galileo and GLONASS satellites
- Trajectory determination of the launcher’s upper stage from lift-off until ATV separation

V. Clark et al: **Process Chain Development for Iterative, Concurrent Design of Advanced Space Transportation Systems**; SI - Space Systems MDO
What about the Future?

- DLR is preparing system concepts and technologies for future European launch vehicles with special focus on RLV.
- By merging technologies from aviation and space, DLR is ready for cooperation with its European and international partners.