

STS103 - MULTIFUNCTIONAL MOVEABLES FOR HIGH-ASPECT RATIO LAMINAR WING

2200 STS SESSIONS

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ABSTRACT

Two aerodynamic technology streams promise a break-through in minimizing the energy consumption of flight: laminar wing technology and the significant increase of the aspect ratio of the wing. Both technologies require a significant change of the architecture of wing moveables for high-lift and flight control. At the leading edge, slats are no longer compatible with laminar wing technology, and classical flaps are no longer sufficient to provide sufficient load and deformation control due to the high slenderness and limited space for actuation. The aim of the proposed session is to collect contributions from aerodynamics, aeroelastics and systems - as e.g. represented by the German Federal Aviation Research Programme projects ULTIMATE and MUVE - to the solution of the specific topics of integrating novel controls into high-aspect ratio laminar wings by simulating aerodynamics, aeroelastics and system behaviors.

Contributions:

- “Challenges of High-Lift System Integration into Laminar Wings – a Review,” (keynote) [Jochen Wild](#), DLR Institute of Aerodynamics and Flow Technology & Bernhard Schlipf, Airbus Operations, Germany
- “Aerodynamic Aspects of Krüger Flap Operations,” [Apurva Hasabnis](#) & Jochen Wild, DLR Institute of Aerodynamics and Flow Technology, Germany
- “Pretension Control Architecture for raised Krueger Flaps on Laminar Airfoils,” [Marcel Thevagt](#), Konstantin Krall, Ole Krawehl & Frank Thielecke, TU Hamburg, Germany
- “Multi-Fidelity Gust Loads Analyses of High Aspect Ratio Jet Transport with Laminar Wings,” Markus Ritter, [Huitae Hwang](#) & Michael Fehrs, DLR Institute of Aeroelastics, Germany
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- **“Flight Simulator Investigation of Static Load Alleviation for Transport Aircraft,”**
Wilhelm Unkelbach & Flávio J. Silvestre, TU Berlin, Flight Mechanics, Flight Control and Aeroelasticity, Germany
- **“Aerodynamic Design of an HLFC Wing for a Long-Range Transport Aircraft,”**
Damla San, Samarth Kakkar, André Bauknecht. TU Braunschweig, Institute of Fluid Mechanics & Marco Hillebrand, Thorsten Lutz, Uni Stuttgart, Germany
- **“Design and Optimisation of a Multifunctional Leading–Edge System: Aerostructural Layout for Combined High Lift, Load Alleviation and Hybrid Laminar Flow Control,”** Tristan Brack, Damla San, Matthias Haupt, André Bauknecht & Sebastian Heimbs, TU Braunschweig, Institute of Aircraft Design and Lightweight Structures, Germany