



21. DGLR Fachsymposium der STAB

Hotel Best Western Plaza, Darmstadt, Am Kavalleriesand 6, 64295 Darmstadt
06.-07. November, 2018

Mit freundlichen Unterstützung von:



Wissenschaftsstadt
Darmstadt



AIRBUS



Programm für das 21. DGLR-Fachsymposium der STAB

06.-07. November, 2018

Hotel Best Western Plaza, Darmstadt, Am Kavalleriesand 6, 64295 Darmstadt

Montag, 05. November 2018

- ab 16:00 Uhr Registrierungsmöglichkeit
- ab 18:00 Uhr Reception

ab 7:30 *Registrierung im Foyer*

Dienstag, 06. November 2018

Saal „Bonn“

Saal „Hannover“

Saal „Würzburg“

8:45 – 9:00 Begrüßung

9:00 – 9:45 **Plenarvortrag 1 – Über die wachsende Bedeutung von CFD-Anwendungen in der Fahrzeugaerodynamik**
T. Schütz, BMW AG und Technische Universität Darmstadt (Chair: C. Tropea Technische Universität Darmstadt)

| | S1: Automotive Chair: T. Schütz | S2: Drehflügleraerodynamik, CFD Chair: A.D. Gardner | S3: Multidisziplinäre Optimierung und neue Konfigurationen, Chair: N. Gauger |
|---------------|---|---|--|
| 9:50 – 10:10 | Aerodynamic Characterization of a Compact Car Overtaking a Heavy Vehicle. H. Wilhelmi, C. Jessing, J. Bell, D. Heine, C. Wagner, J. Wiedemann | Dynamic Stall Computations of Double Swept Rotor Blades. K. Kaufmann, M.M. Müller, A.D. Gardner | Cybermatrix: A novel approach to computationally and collaboration-intensive MDO for transport aircraft design. C. Ilic, A. Merle, A. Ronzheimer, J. Jepsen, M. Schulze, M. Leitner, A. Schuster, M. Petsch, S. Gottfried |
| 10:10 – 10:30 | Efficient cooling of a generic car cabin by novel ventilation systems. T. Dehne, A. Westhoff | Propeller Blade Shape Optimization with a Hybrid BEMT/CFD Approach. A. Kümmel, M. Stuhlpfarrer, P. Pözlbauer, C. Breitsamter | Global Aerodynamic Design Optimization via Primal-Dual Aggregation Method. E. Özkaya, N. Gauger |
| 10:30 – 10:50 | Experimentelle und numerische Strömungsuntersuchung der Freistrahlenentwicklung bei Passagierausströmer in einer Fahrzeugkabine. S. Ullrich, R. Buder, N. Boughanmi, C. Wagner | Aerodynamic performance of two eVTOL concepts. G. Wilke | Accurate gradient computations for shape optimization via discrete adjoints in CFD-related multiphysics problems. O. Burghardt, N. Gauger |

10:50 – 11:20

Kaffeepause

| | <i>Saal „Bonn“</i> | <i>Saal „Hannover“</i> | <i>Saal „Würzburg“</i> |
|---------------|---|--|---|
| | S4: Hochagile Konfigurationen Chair: C. Breitsamter | S5: Transition, Experiment 1 Chair: E. Krämer | S6: Fluid-/Thermodynamik, Experiment, Chair: C. Wagner |
| 11:20 – 11:40 | Vortex Flow Aerodynamic Challenges in the Design Space for Future Fighter Aircraft. A. Hitzel, A. Winkler, A. Hövelmann | Transition detection with differential infrared thermography on a pitching airfoil. C. Mertens, C. C. Wolf, A. D. Gardner | Time Response Calibration of Ultra-Fast Temperature Sensitive Paints for the Application in High Temperature Hypersonic Flows. J. Martinez Schramm |
| 11:40 – 12:00 | Analysis of Vortex Flow Phenomena on Generic Delta Wing Planforms at Subsonic Speeds. S. Pfnür, J. Pflüger, C. Breitsamter | Transition delay with cylindrical roughness elements in a laminar water channel. D.K. Puckert, U. Rist | Experimentelle Untersuchung der Geschwindigkeitsabhängigkeit des Stoff- und Wärmetransports in einer konvektiven Kanalströmung mit Phasenübergang. C. Brückner, A. Westhoff, C. Wagner |
| 12:00 – 12:20 | Analysis of Vortex Flow Phenomena on Generic Delta Wing Planforms at Transonic Speeds. A. Hövelmann, A. Winkler, S.M. Hitzel, M. Rein, K. Richter, M. Werner | Surface temperature effects on boundary-layer transition at various subsonic Mach numbers. M. Costantini, S. Risius, C. Klein | Comparison of two unstable flow states in turbulent mixed convection. K. Niehaus, M. Mommert, D. Schiepel, D. Schmeling, C. Wagner |
| 12:20 – 12:40 | Computational Aerodynamic Sensitivity Studies for Generic Delta Wing Planforms. A. Schütte, R. Nunes Marini | Laminar to Turbulent Transition at unsteady Inflow Conditions: Flight experiments under calm and moderately turbulent conditions. A. Guissart, T. Nemitz, C. Tropea | Experimental Investigation of Mixed Convection in Horizontal Channel Flow in Combination with Cylindrical Roughness Elements. E. Mäteling, J. Lemarechal, C. Klein, D. K. Puckert, U. Rist |
| 12:40 – 13:00 | Experimental aerodynamic high speed investigations using pressure-sensitive paint for Generic Delta Wing Planforms. U. Henne, D. Yorita, C. Klein | Laminar to turbulent transition at unsteady inflow conditions: Wind tunnel measurements at increased turbulence levels. J. Romblad, W. Würz, E. Krämer | Measurement of the Heat Flux during a Drop Impact onto a Hot Dry Solid Surface using Infrared Thermal Imaging. J.B. Schmidt, J. Breitenbach, I.V. Roisman and C.Tropea |

13:00 – 14:10

Mittagessen im Hotelrestaurant

Saal „Bonn“

Saal „Hannover“

Saal „Würzburg“

14:10 – 14:55 Plenarvortrag 2– Ein neuer Blick auf kohärente Strömungsbewegungen in turbulenten Grenzschichten
Christian Kähler, Universität der Bundeswehr, München (Chair: M. Klein, Universität der Bundeswehr, München)

| | S7: Experimentelle Aerodynamik 1 Chair: C. Kähler | S8: Laminarhaltung / Transition, Experiment 2 , Chair: U. Rist | S9: Numerische Simulation / RANS Modellierung 1 , Chair: S. Jakirlic |
|----------------------|--|--|--|
| 15:00 – 15:20 | Aerodynamic investigation of the free flapping flight of a Saker falcon. M. Heinold, C. Kähler | Visualization of near-wall structures of an isolated cylindrical roughness element in a laminar boundary layer without pressure gradient. J. Lemarcheal, E. Mäteling, C. Klein, D.K. Puckert, U. Rist | A new approach to RANS turbulence modeling based on Lie Symmetries. D. Klingenberg, M. Oberlack, D. Pluemacher |
| 15:20 – 15:40 | Experimental investigation of the influence of permeability on finite wing lift and drag. F. Wienke, A. Dillmann, M. Raffel | Investigations on a mechanism to induce free-stream turbulence in a water channel by controlled injection of air bubbles. M. Siring, D.K. Puckert, U. Rist | Aerodynamische Formoptimierung in der Fahrzeugaerodynamik unter Anwendung der Adjungiertenmethode mit adjungierter Turbulenz. M. Behnsch, T. Schütz, S. Jakirlic, C. Tropea |
| 15:40 – 16:00 | Measurements on an SD7003 wing subjected to highly turbulent flows behind one and combinations of two passive grids. S. Herbst, C. Kähler and R. Hain | Validierungsexperiment an einer passiven Absaugklappe für HLFC-Systeme. T. Kilian, U. Krause, S. Schaber, D. Neufeld | Assessment and modification of the γ-Re_{θ} transition model behavior outside the boundary layer. P. Ströer, C. Grabe, A. Krumbein |

16:00 – 16:20 Kaffeepause

| | <i>Saal „Bonn“</i> | <i>Saal „Hannover“</i> | <i>Saal „Würzburg“</i> |
|----------------------|--|--|--|
| | S10: Experimentelle Aerodynamik 2 Chair: S. Scharnowski | S11: Grenzschichtsbeeinflussung / Transition, Numerik, Chair: U. Rist | S12: Numerische Simulation / RANS Modellierung 2, Chair: B. Eisfeld |
| 16:20 – 16:40 | Unsteady multi-hole probe measurements of the near wake of a circular cylinder at sub-critical Reynolds numbers. F. Heckmeier, D. Iglesias, C. Breitsamter | Laminar to turbulent transition at unsteady inflow conditions: Direct numerical simulations with small scale free-stream turbulence. D. Ohno, U. Rist | Validation of a New Near-Wall Reynolds Stress Model for Aeronautical Applications. A.C. Botelho e Souza, R. Radespiel |
| 16:40 – 17:00 | The Reynolds-number effect on the steady and unsteady aerodynamic loading on smooth and slightly-rough square-section cylinders with rounded corners. N. van Hinsberg | Kann das homogene Ausblasen die aerodynamische Effizienz eines Flügelprofils erhöhen? M. Reder, A. Stroh, D. Gatti | Modification of the SSG/LRR-ω RSM for turbulent boundary layers at adverse pressure gradient with separation using the new DLR VicToria experiment. T. Knopp, M. Novara, D. Schanz, R. Geisler, F. Philipp, A. Schröder, C. Willert, M. Schroll |
| 17:00 – 17:20 | Schwingungs- und Dämpfungsanalyse von Stingkonfigurationen zur Messung von instationären aerodynamischen Kraftantworten. M. Müller, K. Ehrenfried, J. Bell, C. Wagner | Stability of Rotating Cylindrical Roughness Element in Boundary Layer. Y. Wu, U. Rist | New Extensions of an Eddy Viscosity Turbulence Model for Vortical Flows. G. Subbian, R. Radespiel |
| 17:20 – 17:40 | Investigation of 3D Coherent Structures in Turbulent Boundary Layers at High Reynolds Numbers using MultiPulse – STB. C. Voß, R. Geisler, M. Novara, A. Schröder, M. Rütten, F. Philipp | Modellierung einer Grenzschicht-absaugung mittels Effusion-Mass-Flux-Randbedingung im DLR TAU-Code. M. Fehrs | Capability of RANS Simulations to Reproduce Flat Plate Boundary Layer Interaction with Suction and Oscillatory Blowing. J. Ullah, N. Shay, A. Seifert, T. Lutz, E. Krämer |
| 17:40 – 18:00 | Experimental and numerical investigation of 3-D corner separation in a channel flow with adverse pressure gradient. J. Klinner, M. Schroll, C. Morsbach, F. Möller, C. Willert | Acoustic Control of the laminar Boundary Layer Separation on a circular Cylinder - Sensitivity Analysis and Optimization. M. Lemke, Citro, V. | A scale-resolving elliptic-relaxation-based eddy-viscosity model: development and validation. B. Krumbein, R. Maduta, S. Jakirlic |
| 19:00 – 22:00 | Symposiums Dinner Hotel Best Western Plaza, Darmstadt | | |

Mittwoch, 07. November 2018

| <i>Saal „Bonn“</i> | | <i>Saal „Hannover“</i> | | <i>Saal „Würzburg“</i> | |
|--|--|--|--|--|--|
| S13: Windenergie / Wirbelinteraktionen Chair: B.G. van der Wall | | S14: Aeroakustik / Experiment/ Analytik Chair: M. Mößner | | S15: Transportflightvehicles / neue Konfigurationen, Chair: E. Krämer | |
| 8:30 – 8:50 | Preliminary performance assessment of a twin-rotor horizontal axis wind turbine using fast aerodynamic methods. B. Michels | Aeroacoustic Assessment of Wind Turbine Blade Tips. M. Herr, C. Appel, B. Faßmann, C.-H. Rohardt, K. Rohde-Brandenburger, J. Pereira Gomes | | Unsteady wake and tailplane loads of the Common Research Model in low speed stall. A. Waldmann, R. Konrath, T. Lutz, E. Krämer | |
| 8:50 – 9:10 | Potential hazards of wind turbine wake vortices for ultra-light sports rotorcraft. B.G. van der Wall | Aufbau eines CROR-Modells mit aeroakustischer Untersuchung bei verschiedenen Drehzahlen und Anstellwinkeln. C. Stanger, M. Kessler, E. Krämer | | Aerodynamische Interaktion von Propeller und Flügel hinsichtlich Einbauwirkungsgrad. N. Herzog, A. Reeh | |
| 9:10 – 9:30 | Experimentelle und numerische Untersuchung der Interaktion von Wirbelschleppen mit Hausdächern. A. Uhl, S. Braun, E. Stumpf | Sound generation in a boundary layer flow - an analytical approach. Y. Zhang, M. Oberlack | | Analyse und Optimierung der aerodynamischen Kennwerte von Flügeln und Leitwerken eines Verbundhubschraubers mit Boxwing. P. Kunze | |
| 9:35 – 10:20 Plenarvortrag 3 – Trends in turbulence modelling of industrial flows F. Menter, ANSYS Germany GmbH, Otterfing (Chair: S. Jakirlic, Technische Universität, Darmstadt) | | | | | |

10:20 – 10:50 Kaffeepause

| | <i>Saal „Bonn“</i> | <i>Saal „Hannover“</i> | <i>Saal „Würzburg“</i> |
|----------------------|--|---|--|
| | S16: Strömungskontrolle, Experiment Chair: M. Kloker | S17: Aerodynamik and Aeroakustik / Numerik, Chair: M. Mößner | S18: Numerische Simulationen / Verfahren, Chair: M. Oberlack |
| 10:50 – 11:10 | Magnus Effect for bodies of revolution with canted fins. A. Mielke, D. Klatt, C. Mundt | Emulation of Sound Pressure Level Spectra based on Numerical Data. B. Faßmann, M. Herr, R. Ewert, J. Delfs | Analysis of the Effects of MARME Treatment on Respiratory Flow. M. Waldmann, A. Lintermann, Y. J. Choi, W. Schröder |
| 11:10 – 11:30 | Influence of jet spacing and injection pressure on separation control with air-jet vortex generators. R. Hinke, A.-M. Schreyer | Influence of flow on noise shielding. J. Delfs | Modeling nonlinear fluid mechanics by artificial neural networks. S. Herzog, C. Wagner |
| 11:30 – 11:50 | Experimental investigation of the delay of step-induced transition by means of suction. B. Dimond, M. Costantini, S. Risius, C. Klein, M. Rein | Prediction of Trailing-Edge Noise for Separated Turbulent Boundary Layers. A. Suryadi | High-order numerical methods for fluid simulation with dynamic interfaces. F. Kummer, D. Krause, M. Smuda |
| 11:50 – 12:10 | Experimental control of crossflow-dominated transition using 2-d AC-DBD plasma actuators. M.T. Hehner, S. Yadala, J. Serpieri, M.J. Kloker, M. Kotsonis | Progress in helicopter noise prediction. M. Keßler | Multidisziplinäre Böensimulation zur Lastabminderung, Steuerflächenanalyse. A.-R. Hübner, L. Reimer |
| 12:10 – 12:30 | Delaying the Leading-Edge Vortex Detachment on an Unsteady Airfoil by Plasma Actuation at Topologically Critical Locations. J. Kissing, C. Tropea | Computational study using DDES with higher order scheme modeling to predict Darrieus VAWT Noise Mechanisms. A. Dessoky, G. Bangga, T. Lutz, E. Krämer | Randbedingungen-basierte Wirklinienmethode zur Simulation aerodynamischer Wechselwirkungen an Flächenendpropellern. M. Schollenberger, T. Lutz, E. Krämer |
| 12:30 – 12:50 | | Scrutinizing Conventional and Eddy-resolving Unsteady RANS Approaches in Computing the Flow and Aeroacoustics around a Tandem Cylinder. F. Köhler, R. Maduta, B. Krumbein, S. Jakirlic | Progress in the CFD-based Multidisciplinary Simulation Environment FlowSimulator Towards a Virtual Flight Testing Capability of Aircraft. L. Reimer, R. Heinrich, M. Ritter |

12:50 – 14:00

Mittagessen im Hotelrestaurant

Saal „Bonn“

Saal „Hannover“

Saal „Würzburg“

14:00 – 14:45 Plenarvortrag 4– Numerical Investigation of Aeroacoustic and Aeroelastic Phenomena on a Helicopter Using Higher-Order Methods, Ulrich Schäferlein, Universität Stuttgart, Gewinner STAB Forschungspreis 2018
(Chair: G. Heller, Airbus Operations GmbH, Bremen)

S19: Technische Strömungen

Chair: C. Wagner

S20: Aerolastik / Strukturdynamik,

Chair: C. Breitsamter

S21: Numerische Simulation /

Wirbelauflösende Modelle, Chair: T. Knopp

14:50 – 15:10

Einfluss der Außenströmung auf eine Dual-Bell Raketendüse im Bodenmodus im Transchall. I. Bolgar, S. Scharnowski, C. Kähler

Experimental investigation of the unsteady aerodynamics of an oscillating S809 aerofoil at various reduced frequencies and high Reynolds numbers. N. van Hinsberg

Modelling of heat transfer in combustion-chamber boundary layers under supercritical pressure with Large-Eddy Simulations. R. Olmeda, C. Stemmer

15:10 – 15:30

Towards Aerodynamically Optimized Freight Wagons: Experimental Studies on Container Designs and Wagon Under-Body. E. Öngüner, A. Henning, U. Fey, C. Wagner

Sensitivity of Single Degree of Freedom Limit Cycle Flutter of a Laminar Airfoil and Resulting Uncertainties of the Transonic Dip. M. Braune, A. Hebler

Characterization of Off-Surface Separation Caused by Adverse Pressure Gradient in a Turbulent Wake. M. Burnazzi, T. Knopp, M.Kh. Strelets, M.L. Shur, A.K. Travin

15:30 – 15:50

Experimental study of turbulent mixed convection in a generic aircraft cabin under high-pressure conditions. A. Westhoff, C. Wagner

CFD-based Aeroelastic Analysis of NLF Wings. S. Helm, M. Fehrs, J. Nitzsche

Numerical Simulation of Laminar Separation on an Airfoil in Small-Scale Freestream Turbulence. E. Tangermann, M. Klein

15:50 – 16:10

Dynamische Systemmodellierung von Turbomaschinen mithilfe der Bond-Graph-Theorie. J. Göing, A. Kellersmann, C. Bode, J. Friedrichs

Reduced-Order Modeling of Transonic Buffet Aerodynamics. M. Winter, C. Breitsamter

Turbulent inflow generation by resolvent mode forcing. B. Selent, O. Schmidt, U. Rist

ab 16:10

Closing, „Farewell coffee“