Automotive Simulation World Congress 2013 (ASWC 2013)

Frankfurt am Main, Germany 29 - 30 October 2013

ISBN: 978-1-5108-4102-4

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2013) by ANSYS Inc. All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact ANSYS Inc. at the address below.

ANSYS Inc. Southpointe 2600 ANSYS Drive Canonsburg, PA 15317 USA

Phone: 844.Go.ANSYS 844.462.6797

Fax: 724.514.9494

www.ansys.com

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: 845-758-0400 Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

| Time | October 29, 2013 | | | | | | | |
|----------------------|---|--|---|---|---|--|--|--|
| 8:00 | Registration and Welcome Coffee | | | | | | | |
| 09:00 | WILL IN COLOR OF MOVEY | | | | | | | |
| 09:15 | Welcome and Introduction – Sandeep Sovani, ANSYS, Inc 1 Simulation-Driven Product Development in the Automotive Industry - Status & Progress – Swaminathan Subbiah, ANSYS, Inc 6 High-Performance CFD Analysis - Enabling Success at the Track – Alan Peasland, Red Bull Technology N/A | | | | | | | |
| 09:45 | High-Performance CFD Analysis - Enabling Success at the Track – Alan Peasland, Red Bull TechnologyN/A | | | | | | | |
| 10:15 | Wetcome and Introduction - Sandeep Sovani, ANSYS, Inc | | | | | | | |
| 10:45 | Break | Break | | | | | | |
| 11:15 | Empty Test Benches - A Discussion | on About the Five Dilemmas of Virt | ual Product Clearance – Christoph | Schöttl, MAN Truck & Bus, Müncl | nen 20 | | | |
| 11:45 | Model-Based Systems Engineering | : Bringing Safety-Critical Embedded | Software Together with Full Systems | Simulation – Eric Bantegnie, Ester | el Technologies 27 | | | |
| 12:15 | Diversity of Drivetrains and Fuels Define Combustion Engine Development – Roland Baar, Technische Universität Berlin 47 | | | | | | | |
| 12:45 | Lunch Break | | | | | | | |
| | Salon 10 | Salon 8 | Salon 7 | Salon 9 | Salon 6 | | | |
| Breakout Sessions | Engines | Powertrain | Body, Chassis & Interior | Aerodynamics & Underhood | Electrification, Electronics & Embedded Systems | | | |
| Chair- persons | Laz Foley, ANSYS, Inc., Lebanon | Wolfgang Bauer, ANSYS Ger- many, Otterfing | Pierre Louat, ANSYS France, Lyon | Matteo Aroni, ANSYS Italy, Milano | Alain Michel, ANSYS France, Montigny | | | |
| 14:00 | Simulation of In-Cylinder Flow Phenomena in Turbocharged Direct Injection Spark Ignition Engines D. Linse, BMW 61 | Throttle Valve for Switchable Water Pump Application - Focus on Calculation & Simula- tion Activities E. Dattoli, Pierburg Pump Technology France 235 | Optimisation of the Defroster Ducts of a Coach Bus B. Tavukçu, Anadolu Isuzu 396 | Numerical Computation of the Flow around a Racing Car B. Schoeneberg, CFX Berlin Software 541 | Total Battery Simulation S. Stanton, ANSYS, Inc 7: | | | |
| 14:30 | Cooling 760 Horses - Fluid- Structure-Interaction Simula- tions of Water-Cooled Diesel Cylinder Heads 74 W. Haslinger, ANSYS Germany | Modelling of the Fuel Supply Module and its Components O. Kurenkov, Continental Automotive 246 | Sunburned Products: Nu- merical Aging Caused by Sun Exposition A. Müller, HTCO N/A | ANSYS Solutions in Competition: Formula Student T. Grundmann, ANSYS Germany 554 | Active Force Feedback Pedal - The Smart Way to Save Fuel J. Heydenreich, PhilonNet 749 | | | |
| 15:00 | Numerical Simulation of the Biofuel Blend Engine In- Cylinder Combustion Process N. Bellato, Magneti Marelli Powertrain N/A | Fluent Thermal and Fluidic Modelling to Robustify and Optimize the Design of Power Electronics Modules Carried on El. Vehicles I. Mohand-Kaci, Renault N/A | Use of the Discrete Ordinate Model for Temperature Calculation in Light Systems at Volkswagen M. Kleimeyer, Volkswagen408 | A Revolution in Solar Vehicle Design R. Stephens, Cambridge University 568 | Structural Integrity Assessment of a Li-Ion Battery Pack using Simulations S. Kottalgi, ANSYS India 767 | | | |
| 15:30 | Break | | | | | | | |
| Breakout Sessions | Engines | Powertrain | Body, Chassis & Interior | Aerodynamics & Underhood | Electrification, Electronics & Embedded Systems | | | |
| Chair- persons | Martin Kunz, ANSYS Germany, Otterfing | Frank Kaufmann, ANSYS Germany, Darmstadt | Jacques Depont, ANSYS France, Lyon | Anders Jonson, ANSYS Sweden, Goteborg | Gerd Prillwitz, ANSYS Germany, Otterfing | | | |
| 16:00 | ANSYS FLUENT Use of GPUs for Automotive CFD Applications S. Posey, NVIDIA90 | Development of SCR Exhaust Aftertreatment Mixing System with CFD C. Chauvin, Donaldson Europe 258 | Design and Analysis Tools for Complex Composite Ap- plications in the Automotive Industry N/A T. Hirche, ANSYS Switzerland | Advanced Mesh Morphing for Automotive Applications using RBF Morph M. Biancolini, University of Rome 586 | Collaborative Co-Simulation Cloud for Functional Mockup Design Assessments M. Nagasawa, Cybernet Systems 780 | | | |
| 16:30 | Diesel Particulate Filter Simulations in Exhaust After-Treatment R. Reinelt, ANSYS Germany 107 | Multiphase CFD Simulation of Urea Injection on Off-Road Vehicles as Part of a Tier-4 B Aftertreatment System and Validation of Optimised Mixer Performance F. Grassi, Officine Metallurgiche Cornaglia N/A | Heat-Up Simulation of Car Bodies in Paint Shop Ovens Ch. Knüsel, Dürr Systems 424 | Advanced Mesh Morphing Applications in Motorsport S. Invernizzi, Dallara Engineering N/A | FEA-Based Efficiency Map Generation of Different Electr Traction Machines O. Winter, AIT Austrian Insti- tute of Technology N/A | | | |
| 17:00 | Efficient Product Development using ANSYS Software L. Berger, CFD Schuck Ingenieurgesellschaft 123 | Aero-Thermal Modelling of High Pressure Hydrogen Stor- age Systems for Automotive Applications A. Mack-Gardner, Adam Opel N/A | Quality meets Efficiency - Developing Best Practice Guidelines for Cooling Applications in Automotive Manufacturing Tool Design M.Lanfrit, ANSYS Germany. 433 | Aerodynamics of Trucks – From CFD to Full Scale Prototypes M. Karlsson, Linköping University N/A | Multiphysics Power Connector Simulations M. Hanke, CADFEM 787 | | | |
| 17:30 | Design Optimisation using Adjoint Solver and Mesh Mor- phing & Optimisation N. Kulkarni, Intelligent Energy N/A | Acoustic Transmission Loss Prediction for Muffler Performance Improvement S. Kottalgi, ANSYS India 268 | Shock-Absorber: A Study on the Dynamic Performance of a Solenoid Hydraulic Valve for Automotive Semi-Active Suspensions Coupling ANSYS Fluent with Lumped Parameter Modelling M. Pelosi, Öhlins Racing 451 | Numerical Study of Aerody- namic Characteristics of Sports Car with Movable Flaps and Deformable Airbags J. Piechna, Warsaw University of Technology 608 | Design of a FSPM Bridged Motor Rotor using ANSYS Simulation Tools X. Wu, TriVista Engineering 797 | | | |

| Time | October 30, 2013 | | | | | | | |
|----------------------|---|---|---|---|---|--|--|--|
| 8:00 | Registration and Welcome Coffee | | | | | | | |
| | Salon 10 | Salon 8 | Salon 7 | Salon 9 | Salon 6 | | | |
| Breakout Sessions | Engines | Powertrain | Body, Chassis & Interior | Aerodynamics & Underhood | Electrification, Electronics & Embedded Systems | | | |
| Chair- persons | Tammo Grundmann, ANSYS Germany, Otterfing | Marco Lanfrit, ANSYS Germany, Darmstadt | Laurent Chignier, ANSYS France, Lyon | Frederic Meslay, ANSYS France, Montegny | Leon Voss, ANSYS Germany, Hannover | | | |
| 8:30 | Validation and Verification of ANSYS Internal Combustion Engine Software M. Kuntz, ANSYS Germany 129 | CFD-Based Evaluation of an Automotive Exhaust System, R. Löffler, ANSYS Germany 286 | Significance of Simulation in the Journey of Tire from Rub- ber to Road C. Patil, ANSYS India 465 | The Design of Formula SAE Car Body Aerodynamics Using ANSYS Fluent Optimisation Tools M. Gugala, Queen Mary University of London 623 | From Radar Traps to Naviga- tion Systems - How Simula- tions Can Help Reduce Cost and Improve Efficiency S. Muff, ANSYS Germany 8 | | | |
| 9:00 | Diesel Engine Combustion Modelling with Fluent and Tabkin F. Tap, Dacolt N/A | Numerical Simulation of Jet Noise of Automotive Exhaust Systems using Scale-Resolving Turbulence Models and an Acoustic Analogy J. Hillenbrand, BMW 297 | High Frequency Structural Vibrations on ANSYS Meshes - The DEA Tool for Modelling Vibrations and Acoustics in Automotive Engineering Structures G. Tanner, The University Nottingham 481 | Continuous Improvements on the Wheel Hub of a Formula Student Race Car H. Rönnebeck, Hochschule Amberg-Weiden 641 | Integrated Carbon Fiber Antennas for Vehicular Communication C. Römelsberger, CADFEM 838 | | | |
| 9:30 | Lagrangian Spark-Ignition Model Incorporating Chemical Kinetics for Turbo-Charged Direct-Injection SI Engines L. Schäfer, BMW 153 | Air-Cooling System Study of the FP7 EUNICE In-Wheel Drive Concept using CFD M. Rudolph, AIT Austrian Institute of Technology | Fracture Mechanical Approach for Fatigue of Adhesive Joints S. Vervoort, Hottinger Baldwin Meßtechnik 491 | Aerodynamic Design of an Active Rim for the EUNICE In- Wheel Electrical Drive Concept A. Zanon, AIT Austrian Insti- tute of Technology N/A | Microwave Measurement Portable Laboratories P. Gareau, Microwave Vision | | | |
| 10:00 | Scale-Resolving Simulation of In-Cylinder Flow of an IC-Engine and Comparison to Experimental Data S. Buhl, TU Bergakademie Freiberg 162 | An Automated Routine for Postprocessing and Report Generation in CFD-Post F. Hahn, MANN+HUMMEL 315 | Modelling Aspects of Fatigue Analyses of Rubber Compo- nents M. Alvelid, Alvelid Engineering N/A | The Benefit of SpaceClaim for Ansys Users M. Hübner, SpaceClaim 648 | Signal, power integrity and EMI analysis of a high voltage lithium battery charger for fu electric vehicle P. Montanari, Meta System. 8 | | | |
| 10:30 | Break | | | | | | | |
| Breakout Sessions | Engines | Powertrain | Body, Chassis & Interior | Aerodynamics & Underhood | Electrification, Electronics & Embedded Systems | | | |
| Chair- persons | Karl Kühlert, ANSYS Inc, Lebanon | Frank Kaufmann, ANSYS Germany, Darmstadt | Thomas Lehnhäuser, ANSYS Germany, Darmstadt | Marco Oswald, ANSYS Germany, Darmstadt | Simon Muff, ANSYS Germany, Otterfing | | | |
| 11:00 | Design Chain Simulation Sup- ports SME Competitiveness: A Case of Piston Rod L. Bellati, Fonderie Abor 176 | Simulation-Driven Design of EGR Coolers P. Mandloi, ANSYS India 333 | Vehicle Brake Squeal: Morphing Allows a Robust Solution S. Weiland, TRW Automotive N/A | Parameter-Free CFD Optimisation with Adjoint Methods for Automotive O. Zühlke, ANSYS Germany652 | Towards Virtual Prototyp- ing: Integrated Simulation of Software and Physics C. Schrader, Esterel Techno- logies 858 | | | |
| 11:30 | Quality Assurance & Best Practice Development for Internal Combustion Engine Flow Simulations W. Bauer, ANSYS Germany 188 | Leveraging SGI's UV and VizServer Platform to Enable Multiple CAE Users to Run ANSYS Software with Remote Visualization in a Data Center T. DeVarco, SGI 356 | Suitable Simulation Tools for the Development of a CFRP Sports Car M. Hörmann, CADFEM 499 | Numerical Aerodynamic Inves- tigations of the DrivAer Car Model using ANSYS Fluent A. Joshi, TATA Consultancy Services | Effective Automotive System Design and Validation Throug the Adoption of Standardised Modelling Interfaces and Mod els Such as the VDA FAT-AK30 Library 867 G.Prillwitz, ANSYS, Germany | | | |
| 12:00 | BLDC Motor for Automotive Cooling Fan Assembly: Heat Sink Optimisation D. Parodi, Johnson Electric 205 | A Complete Loop of Numerical Analyses about a Variable Oil Pump R. Maccherini, Pierburg Pump Technology N/A | CAE-based Robustness Evalua- tion using ANSYS and optiSLang for Automotive Applications J. Will, Dynardo N/A | DrivAer - Aerodynamic Investigations for a New Realistic Generic Car Model using ANSYS CFD 689 T. Frank, ANSYS Germany | High-Performance Computing for a Full Vehicle Electro- Magnetic Simulation A. Michel, ANSYS France 892 | | | |
| 12:30 | Advanced Simulation of Filter Elements - A Practitioner's View on the Evolution from GAMBIT TO ANSYS Workbench 14.5 E. Nißler, MANN+HUMMEL . 225 | Faster Simulations using Smart Initial Solutions G.Endicott, Honda Research Institute EU 384 | CAE Process and Crash Simulation of Fiber-Reinforced Composite Vessels M. Chatiri, CADFEM 523 | The Influence of Mesh Characteristics on CFD Simulations for Automotive Applications V. Skaperdas, BETA CAE Systems 710 | Modelling Inhomogeneous He Generation for Lithium-Ion Battery Cells 907 L. Kostetzer, CADFEM | | | |
| 3:00 | Lunch Break | | | | | | | |
| 4:00 | The Future of Integrated Simulat | tion: Where We Come From, Where | We Have To Go – Peter Pirro, Joh | n Deere 918 | G (| | | |
| 14:30 | Cycle-to-Cycle Variations in IC Engines: Is LES an Academic Tool Only or Can It Solve Technical Problems? – Christian Hasse, TU Bergakademie Freiberg | | | | | | | |
| 15:00 | Cycle-to-Cycle Variations in IC Engines: Is LES an Academic Tool Only or Can It Solve Technical Problems? – Christian Hasse, TU Bergakademie Freiberg Break System Simulation of a Hybrid Electric Vehicle – Scott Stanton, ANSYS, Inc 939 Intel and the Future of HPC for Robust Design Simulations – Stephen Wheat, Intel, Phoenix N/A Award Ceremony & Farewell – Georg Scheuerer, ANSYS Germany 952 | | | | | | | |
| 15:30 | System Simulation of a Hybrid Electric Vehicle – Scott Stanton, ANSYS, Inc 939 | | | | | | | |
| L6:00 | Intel and the Future of HPC for Robust Design Simulations – Stephen Wheat, Intel, Phoenix N/A | | | | | | | |
| 16:30 | Award Ceremony & Farewell – Georg Scheuerer, ANSYS Germany 952 | | | | | | | |
| | End S | | | | | | | |

ADDITIONAL PAPERS

| Model Order Reduction for Electronics Cooling - Case Study of Lear Power Inverter Model | 959 |
|---|-----|
| R. Rai, A. Shah, X. Hu | |
| Challenges in the Simulation of Fluid-Structure Interactions in Turbochargers | 969 |
| N. Lachanmaiar, T. Sailar, O. Hausnar, M. Avila | |