Public release date: 29-Oct-2009

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American Institute of Aeronautics and Astronautics

Distinguished lecturers to speak at 48TH AIAA Aerospace Sciences Meeting and Exposition

October 28, 2009 – Reston, Va. – The American Institute of Aeronautics and Astronautics (AIAA) is pleased to announce that a series of distinguished lectures will be presented at the 48th AIAA Aerospace Sciences Meeting and Exposition, January 4□□, 2010, at the Orlando World Center Marriott, Orlando, Fla.

- Dr. Ian Poll, professor of aerospace engineering at Cranfield University, Bedfordshire, United Kingdom, will present the AIAA Dryden Lectureship in Research on Monday, January 4, at 5:30 p.m. The title of Dr. Poll's lecture is: "Potential for the Minimization of Aviation's Impact on the Environment." The Dryden Lectureship in Research honors Dr. Hugh L. Dryden, former director of the National Advisory Committee for Aeronautics, and a renowned proponent of the value of research programs to aerospace. Given annually, the lecture emphasizes the importance of basic research to the advancement of aeronautics and astronautics.

- Dr. N. Albert Moussa, president of BlazeTech Corporation, Cambridge, Mass., will present the SAE/AIAA William Littlewood Memorial Lecture on Tuesday, January 5, at 5:30 p.m. The title of Dr. Moussa's lecture is: "Aircraft Fire and Explosion Protection." The William Littlewood Memorial Lecture honors William Littlewood, the only person to be president of both AIAA and SAE, and a renowned contributor to the design of, and operational requirements for, civil transport aircraft. This biennial lecture is presented to advance air transport engineering and to recognize those who make contributions to that field.

- Col. Eileen M. Collins, United States Air Force, retired, a former NASA astronaut, will present the AIAA von Kármán Lectureship in Astronautics, on Wednesday, January 6, at 5:30 p.m. The title of Col. Collins' lecture is: "Human Spaceflight Success in Space Science and Human Exploration." The von Kármán Lectureship in Astronautics honors Theodore von Kármán, a world famous authority on aerospace sciences. The lectureship is given each year by an individual who has performed notably and distinguished himself or herself technically in the field of astronautics.

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For more information on the distinguished lectures, or on the AIAA Honors and Awards program, please contact Carol Stewart at carols@aiaa.org or 703.264.7623.

For more information on the 48th Aerospace Sciences Meeting, please contact Duane Hyland at duaneh@aiaa.org or 703.264.7558. Registration information can be found at www.aiaa.org/events/asm. Registration is free for credentialed members of the press.

AIAA is the world's largest technical society dedicated to the global aerospace profession. With more than 35,000 individual members worldwide, and 90 corporate members, AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense. For more information, visit http://www.aiaa.org/.

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Monday Morning / 04 January 2010

0800 - 1200 **NASA Aeronautics Research: Then and Now** **Crystal Ballroom J2**

Session Co-Chairs:
Dr. Jaiwon Shin, Associate Administrator, Aeronautics Research Mission Directorate (ARMD), NASA
Ms. Jean Wolfe, Deputy Director, Integrated Systems Research Program (ISRP), ARMD, NASA

0800-0900
X-15: To the Edge of Space
Joe Engle, Retired U.S. Air Force Major General, Former Space Shuttle Astronaut and X-15 Test Pilot

0900-0930
NASA Aeronautics Update
Dr. Jaiwon Shin, Associate Administrator, Aeronautics Research Mission Directorate NASA

0930-1000
Overview of NASA's Integrated Systems Research Program (ISRP)
Ms. Jean Wolfe, Deputy Director, Integrated Systems Research Program (ISRP), ARMD, NASA

1000-1030
Overview of NASA's Environmentally Responsible Aviation (ERA) Project
Dr. Fayette Collier, Project Manager, Environmentally Responsible Aviation (ERA) Project, NASA

1030-1100
NASA's Current Plans for ERA Airframe Technology
Anthony Washburn, Project Engineer (Acting), Airframe Technology Sub-Project for ERA, NASA

1100-1130
NASA's Current Plans for ERA Propulsion Technology
Dr. Jim Heidmann, Project Engineer (Acting), Propulsion Technology Sub-Project for ERA, NASA

1130-1200
NASA's Current Plans for ERA Vehicle Systems Integration
Steve Smith, Project Engineer (Acting), Vehicle Systems Integration Sub-Project for ERA, NASA

Monday Morning / 04 January 2010

Session 1-AA-1 **Airfoil & Airframe Noise** **Denver**

Chaired by: M. WANG, University of Notre Dame, Notre Dame, IN

0800 AIAA-2010-0006 Aeroacoustics of Turbulent Boundary-Layer Flow over Small Steps M. Ji, University of Notre Dame, Notre Dame, IN	0830 AIAA-2010-0007 Characteristics of Separated Flow Surface Pressure Fluctuations on an Axisymmetric Bump G. Byun, Virginia Polytechnic Institute and State University, Blacksburg, VA	0900 AIAA-2010-0008 The near field pressure of a small- scale rotor during hover. J. Stephenson, University of Texas, Austin, Austin, TX	0930 AIAA-2010-0010 Investigation of Near-Field Flow Unsteadiness Around a NACA0012 Wingtip Using Large-Eddy- Simulation Approach T. Imamura, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1000 AIAA-2010-0011 Flyover Noise Measurements of a Spiraling Noise Abatement Approach Procedure L. Bertsch, German Aerospace Center (DLR), Braunschweig, Germany	1030 AIAA-2010-0012 Vortex- Shedding Induced Trailing- Edge Acoustics U. Svennberg, Swedish Defence Research Agency, Stockholm, Sweden		

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Session 2-AA-2 — **Jet Noise Suppression I** — **Tampa**

Chaired by: M. SAMIMY, Ohio State University, Columbus, OH

0800	0830	0900	0930	1000	1030		
AIAA-2010-0013 Noise Control of High Reynolds Number Mach 1.3 Heated Jet Using Plasma Actuators M. Kearney-Fischer, Ohio State University, Columbus, OH	AIAA-2010-0014 Assessment of Noise Reduction Concepts for Fighter Aircraft Application in Simulated Forward Flight K. Viswanathan, The Boeing Company, Seattle, WA	AIAA-2010-0015 Development of Reduced- Order Models for Feedback Control of Axisymmetric Jets A. Sinha, Ohio State University, Columbus, OH	AIAA-2010-0016 Large- Scale Simulations of Acoustic Synthetic Jets M. Mankbadi, Embry-Riddle Aeronautical University, Daytona Beach, FL	AIAA-2010-0017 Jet Noise Suppression Using Ultrasonic Powered Resonance Tubes K. Chaudhari, Illinois Institute of Technology, Chicago, IL	AIAA-2010-0018 Unsteady Numerical Simulation of a Round Jet with Impinging Microjets for Noise Suppresion P. Lew, McGill University, Montréal, Canada		

Monday Morning / 04 January 2010

Session 3-AA-3 — **Turbomachinery, Core, and Combustion Noise** — **Washington**

Chaired by: J. MILES, NASA Glenn Research Center, Cleveland, OH

0800	0830	0900	0930	1000	1030		
AIAA-2010-0019 Separating Direct and Indirect Turbofan Engine Combustion Noise Using the Correlation Function J. Miles, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-0021 Gas Turbine Single Annular Combustor Sector: Combustion Dynamics J. Cai, University of Cincinnati, Cincinnati, OH	AIAA-2010-0022 Proper Orthogonal Decomposition and Fourier Analysis on the Energy Release Rate Dynamics F. Ichihashi, University of Cincinnati, Cincinnati, OH	AIAA-2010-0024 Numerical Analysis of Stability of Thermo-Acoustic Oscillation in a 2- D Closed Tube M. Ishigaki, Nagoya University, Nagoya, Japan	AIAA-2010-0026 Formulation of Combustion Acoustic Coupling using Multiple Time and Length Scales C. Balaji, Indian Institute of Technology, Madras, Chennai, India	AIAA-2010-0025 Modeling Nonlinear Thermoacoustic Instability in an Electrically Heated Rijke Tube S. Mariappan, Indian Institute of Technology, Madras, Chennai, India		

Monday Morning / 04 January 2010

Session 4-ABP-1 — **NPARC Alliance/Wind-US Code** — **Crystal Ballroom D**

Chaired by: A. CARY, The Boeing Company, St Louis, MO, and C. NELSON, Innovative Technology Applications Company, Lynnwood, WA

0800	0830	0900	0930	1000	1030		
AIAA-2010-0027 An Overview of the NPARC Alliance's Wind-US Flow Solver C. Nelson, Innovative Technology Applications Company, Lynnwood, WA	AIAA-2010-0028 Unstructured Grid Solution Accuracy and Mesh Dependency A. Cary, The Boeing Company, St. Louis, MO	AIAA-2010-0030 Finite Rate Chemistry Implementation and Validation for Unstructured Grids A. Dorgan, The Boeing Company, St. Louis, MO	AIAA-2010-0031 A Modular Conjugate Heat Transfer Capability for the Wind- US CFD Code E. Perrell, Embry-Riddle Aeronautical University, Daytona Beach, FL	AIAA-2010-0032 Modeling Vortex Generators in the Wind-US Code J. Dudek, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-0033 CFD Models of a Serpentine Inlet, Fan, and Nozzle R. Chima, NASA Glenn Research Center, Cleveland, OH		

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Monday Morning / 04 January 2010

Session 5-AFM-1 — **Aerodynamic Prediction Methods** — **Chicago**

Chaired by: P. WILLIAMS-HAYES, NASA Dryden Flight Research Center, Barstow, CA, and A. CRASSIDIS, Rochester Institute of Technology, Rochester, NY

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0034 Introducing a Combined Equation/Output Error Approach in Parameter Estimation E. Ozger, EADS Military Air Systems, Manching, Germany	AIAA-2010-0035 An Aeroelastic Flexible Wing Model for Aircraft Simulation S. Andrews, Cranfield University, Cranfield, Great Britain	AIAA-2010-0036 Modeling of Helicopter Self- Defense System J. Blaszczyk, Air Force Material Command, Warsaw, Poland	AIAA-2010-0037 Near Space Balloon Performance Predictions J. Conner, Oklahoma State University, Stillwater, OK	AIAA-2010-0039 A Newton Euler Approach to Modeling of a Quad- Rotor Autonomous Airship – Preliminary Results. Y. Bestaoui, Laboratoire IBISC CNRS Fre 3190 University of Evry, Evry, France	AIAA-2010-0040 A Lagrangian Approach to Modeling of an Airship with Wind and Varying Mass Effects Y. Bestaoui, University of Evry, Evry, France	AIAA-2010-0041 Model Structure Determination of an Ornithopter Aerodynamics Model from Flight Data J. Grauer, University of Maryland, College Park, MD	

Monday Morning / 04 January 2010

Session 6-AMT-1 — **Shear Stress Measurement Technology I** — **Crystal Ballroom J1**

Chaired by: T. LIU, Western Michigan University, Kalamazoo, MI, and M. BENNE, The Boeing Company, St Louis, MO

0800	0830	0900	0930	1000			
AIAA-2010-0042 Skin Friction Measurements Using Elastic Films (Invited) J. Crafton, Innovative Scientific Solutions, Inc., Dayton, OH	AIAA-2010-0043 Oil Film Interferometry in the Development of Long- Endurance Aircraft (Invited) A. Drake, Northrop Grumman Corporation, San Diego, CA	AIAA-2010-0044 Direct Measurement of Skin Friction in Complex Flows J. Schetz, Virginia Polytechnic Institute and State University, Blacksburg, VA	AIAA-2010-0045 Experimental Examination of Skin Friction Topology in Separated Flows (Invited) T. Liu, Western Michigan UNiversity, Kalamazoo, MI	AIAA-2010-0047 Effect of Dynamic Pressure on Direct Shear Stress Sensor Design V. Chandrasekharan, University of Florida, Gainesville, FL			

Monday Morning / 04 January 2010

Session 7-APA-1 — **Aerodynamic-Structural Dynamics Interaction** — **Grand Ballroom 9**

Chaired by: J. DESPIRITO, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, and K. STEWART, U.S. Air Force Research Laboratory, Eglin AFB, FL

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0049 Aero- elastic Analysis of Sensor Craft Configurations using AVUS and Nastran E. Alyanak, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	AIAA-2010-0050 Development of a Aerothermoelastic-Acoustics Simulation Capability of Flight Vehicles K. Gupta, NASA Dryden Flight Research Center, Edwards, CA	AIAA-2010-0052 ALE- Based FSI Simulation of Solid Propellant Rocket Interior S. Han, Seoul National University, Seoul, South Korea	AIAA-2010-0053 Detached Eddy Simulation of 3- D Wing Flutter with Fully Coupled Fluid- Structural Interaction X. Chen, University of Miami, Coral Gables, FL	AIAA-2010-0054 In- Flight Deployment Dynamics of Inflatable Wings L. Ben, Oklahoma State University, Stillwater, OK	AIAA-2010-0055 Flutter Analysis of Balloon- Based Operation Vehicle for Precooled Turbojet Engine Demonstration K. Miyaji, Yokohama National University, Yokohama, Japan	AIAA-2010-0056 New Aeroelastic Studies for a Morphing Wing S. Courchesne, ETS - LARCASE, Montréal, Canada	

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Session 8-APA-2 — Airfoil/Wing/Configuration Aerodynamics — Grand Ballroom 10

Chaired by: J. GUGLIELMO, The Boeing Company, Saint Peters, MO, and K. WAITHE, Gulffstream Aerospace Corporation, Savannah, GA

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0057 Aerodynamic Optimization and Evaluation of KC- 135R Winglets, Raked Wingtips, and a Wingspan Extension J. Halpert, U.S. Air Force Academy, Colorado Springs, CO	AIAA-2010-0058 Aerodynamics of Cambered Membrane Flapping Wings S. Shkarayev, University of Arizona, Tucson, AZ	AIAA-2010-0059 Detached- Eddy Simulation of a Double-Element Wing in Ground Effect J. Heyder-Bruckner, University of Southampton, Southampton, Great Britain	AIAA-2010-0060 Effect of Leading Edge Break Position on Performance of Double Delta Movable Tip Strakes V. Nikolic, Minnesota State University, Mankato, Mankato, MN	AIAA-2010-0061 Surface Launch Simulations of an Unmanned Aerial Vehicle Loaded with Jet-Assisted Takeoff Motors D. Gonzalez, Naval Surface Warfare Center, Indian Head, MD	AIAA-2010-0062 Passively Varying Pitch Propeller for Small UAS S. Heinzen, North Carolina State University, Raleigh, NC	AIAA-2010-0063 Preliminary Design Drag Calculation Using Advanced Paneling Schemes V. Ahuja, Auburn University, Auburn, AL	

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Session 9-APA-3 — Low Speed, Low Reynolds Number Aerodynamics — Grand Ballroom 11

Chaired by: F. COTON, University of Glasgow, Glasgow, Great Britain, and C. BRUNER, Sandia National Laboratories, Albuquerque, NM

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0065 How Motion Trajectory Affects the Energy Extraction Performance of an Oscillating Foil Q. Xiao, University of Strathclyde, Glasgow, Great Britain	AIAA-2010-0066 Flow Visualization and Force Measurement of an Insect- Based Flapping Wing J. Han, Korea Aerospace University, Goyang, South Korea	AIAA-2010-0067 Simulation of Insect-Sized Flapping- Wing Aerodynamics W. Yuan, National Research Council Canada, Ottawa, Canada	AIAA-2010-0068 Numerical Analysis of the Flow Around the SD 7003 Airfoil P. Catalano, Italian Aerospace Research Center (CIRA), Capua, Italy	AIAA-2010-0069 Gust Encounters in Rigid and Flexible Wing MAVs J. Jacob, Oklahoma State University, Stillwater, OK	AIAA-2010-0070 A Study of Trailing-Edge Scalloping on Flat-Plate Membrane Wing Performance T. Hicks, University of Alabama, Tuscaloosa, AL	AIAA-2010-0071 Effects of Ipsilateral Wing- Wing Interactions on Aerodynamic Performance of Flapping Wings H. Dong, Wright State University, Dayton, OH	

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Session 10-ASE-1 — Space Environment Ground Simulations and Testing — Atlanta

Chaired by: J. PREBOLA, Aerospace Testing Alliance, Arnold AFB, TN, and M. CHO, Kyushu Institute of Technology, Kitakyushu, Japan

0800	0830	0900	0930	1000			
AIAA-2010-0073 Explosion Damage Prediction of Advanced Space Structures Subject to Hypervelocity Impact M. Dal Santo, Royal Melbourne Institute of Technology, Melbourne, Australia	AIAA-2010-0074 Preliminary Experiments for Establishing An ESD Ground Testing Method of Solar Array K. Toyoda, Kyushu Institute of Technology, Kitakyushu, Japan	AIAA-2010-0075 Arcing on Solar Arrays at Extremely Low Temperatures B. Vayner, Ohio Aerospace Institute, Cleveland, OH	AIAA-2010-0076 Development of Electron- emitting Film for Spacecraft Charging Mitigation: Environment Exposure Tests A. Khan, Kyushu Institute of Technology, Kitakyushu, Japan	AIAA-2010-0077 New Space Weather Mitigation Capabilities W. Tobiska, Space Environment Technologies, Los Angeles, CA			

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Monday Morning / 04 January 2010

Session 11-EDU-1 — New Directions in Course Instruction — Crystal Ballroom Q

Chaired by: M. MAUGHMER, Pennsylvania State University, University Park, PA

0800 AIAA-2010-0079 Instruction in Experimental Methods: What Should We Be Teaching in Laboratory Courses? D. Bridges, Mississippi State University, Mississippi State, MS	0830 AIAA-2010-0080 The Beginner's Guide to Wind Tunnels with TunnelSim and TunnelSys T. Benson, NASA Glenn Research Center, Cleveland, OH	0900 AIAA-2010-0081 Proven Cost Savings by Using Modern Design of Experiments (MDOE) W. Line, DOES Institute, Winston-Salem, NC	0930 AIAA-2010-0082 An Aerodynamics Course Project to Illustrate Parasite Drag Coefficient Prediction E. Niemi, University of Massachusetts, Lowell, Lowell, MA	1000 AIAA-2010-0083 Incorporating Airworthiness into the Academic Curriculum S. Cook, North Carolina State University, Raleigh, NC	1030 AIAA-2010-0085 A Primer for University-Level Solid Rocket Motor Research and Development J. Dennis, Arizona State University, Tempe, AZ		

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Session 12-FD-1 — Active Flow Control I — Grand Ballroom 3

Chaired by: S. SIEGEL, U.S. Air Force Academy, Colorado Springs, CO, and H. FASEL, University of Arizona, Tucson, AZ

0800 AIAA-2010-0086 Hybrid Control of a Turret Wake, Part I: Aerodynamic Effects B. Vukasinovic, Georgia Institute of Technology, Atlanta, GA	0830 AIAA-2010-0087 Flow Control Effects on the Length Scales Over a Turret M. Andino, Syracuse University, Syracuse, NY	0900 AIAA-2010-0088 Experimental Study of an Inclined Jet- in-Cross- Flow Interacting with a Vortex Generator K. Zaman, NASA Glenn Research Center, Cleveland, OH	0930 AIAA-2010-0089 Effect of Sinusoidal Forcing on the Wake of a Circular Cylinder S. Bhattacharya, Auburn University, Auburn, AL	1000 AIAA-2010-0090 Numerical Simulations of Vortex Generating Jets on Low Pressure Turbine Blades C. Memory, The Ohio State University, Columbus, OH	1030 AIAA-2010-0091 Frequency Effect on Flow Field Behind an Oscillating Fence Submerged in Turbulent Boundary Layer M. Saini, University of Wyoming, Laramie, WY	1100 AIAA-2010-0092 Proportional Aerodynamic Control of a Swept Divergent Trailing Edge Wing Using Synthetic Jets J. Sefcovic, University of Wyoming, Laramie, WY	1130 AIAA-2010-0093 Analysis of Low Speed Flow over an Adaptive Airfoil with Oscillating Camber R. LeBeau, University of Kentucky, Lexington, KY

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Session 13-FD-2 — Droplet and Multi-Phase Flows — Grand Ballroom 12

Chaired by: R. SCHMIT, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

0800 AIAA-2010-0095 Modeling of the Internal Two- Phase Flow in a Gas- Centered Swirl Coaxial Fuel Injector N. Trask, University of Massachusetts, Amherst, MA	0830 AIAA-2010-0096 Simulation of Multiphase Blast- Structure Interaction via Coupled CFD and CSD Codes R. Lohner, George Mason University, Fairfax, VA	0900 AIAA-2010-0097 Simulation of Supercritical Ethylene Condensation Using Homogeneous Nucleation Theory J. Edwards, North Carolina State University, Raleigh, NC	0930 AIAA-2010-0098 Numerical Simulation of Two- Phase Flow Within an Aerated Liquid Injector D. Cassidy, North Carolina State University, Raleigh, NC	1000 AIAA-2010-0099 Turbulent Particulate Pressure for Two-Phase Flow Modeling C. Hug, EADS Astrium, Les Mureaux, France	1030 AIAA-2010-0100 Effects of Liquid and Surface Properties on Droplet- Film Collision K. Pan, National Taiwan University, Taipei, Taiwan (roc)		

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Monday Morning / 04 January 2010

Session 14-FD-3 — Innovative Measurement Technologies and Experimental Observations — Grand Ballroom 4

Chaired by: Z. MAHMUD, North Dakota State University, Fargo, ND, and L. UKEILEY, University of Florida, Shalimar, FL

0800	0830	0900	0930	1000	1030		
AIAA-2010-0102 Density Field Measurements of a Supersonic Impinging Jet with Microjet Control L. Venkatakrishnan, National Aerospace Laboratories, Bangalore, India	AIAA-2010-0103 Virtual Shock Shaping Using Microjet Arrays A. Botu, Florida A&M University-Florida State University, Tallahassee, FL	AIAA-2010-0104 Planar Imaging Measurements of Three Scalars in a Turbulent Jet C. Brownell, U.S. Naval Academy, Annapolis, MD	AIAA-2010-0105 Reynolds Stress and Turbulence Kinetic Energy Balances in Swirling Jets S. Toutiaei, University of Wyoming, Laramie, WY	AIAA-2010-0106 Modeling and Experimental Investigation of Synthetic Jets in Cross-flow X. Xia, University of Colorado, Boulder, Boulder, CO	AIAA-2010-0107 Surface Pressure Fluctuations Due to an Impinging Supersonic Underexpanded Jet B. Pundir, Florida Atlantic University, Boca Raton, FL		

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Session 15-FD-4 — Shock-Wave/Turbulence Interactions — Grand Ballroom 5

Chaired by: P. MARTIN, Princeton University, Princeton, NJ, and R. BALASUBRAMANIAN, ITT Industries, Seneca Falls, NY

0800	0830	0900	0930	1000	1030	1100	1130
AIAA-2010-0108 Low- Frequency Unsteadiness in the DNS of a Compression Ramp Shockwave and Turbulent Boundary Layer Interaction S. Priebe, Princeton University, Princeton, NJ	AIAA-2010-0109 Delayed- Detached-Eddy Simulation of Shock Wave/Turbulent Boundary Layer Interaction P. Coronado, University of Miami, Coral Gables, FL	AIAA-2010-0110 Large- Eddy Simulation of Turbulent Boundary Layer Interaction with an Oblique Shock Wave A. Jammalamadaka, Michigan State University, East Lansing, MI	AIAA-2010-0111 Simulation of Shock / Boundary Layer Interactions Using Improved LES/RANS Models D. Gieseking, North Carolina State University, Raleigh, NC	AIAA-2010-0112 Numerical Investigations of Shock- Turbulence Interaction in a Planar Mixing Layer Z. Li, Michigan State University, East Lansing, MI	AIAA-2010-0113 WITHDRAWN Large- Eddy Simulation of Shockwave/Isotropic Turbulence Interaction N. Grube, Princeton University, Princeton, NJ	AIAA-2010-0114 Numerical Simulation of Shock- Turbulence Interactions Using High-Order Shock- Fitting Algorithms P. Rawat, University of California, Los Angeles, Los Angeles, CA	AIAA-2010-0115 Validation of a Wall-Layer Model for a Shock- Wave/Boundary-Layer Interaction R. Bond, Sandia National Laboratories, Albuquerque, NM

Monday Morning / 04 January 2010

Session 16-FD-5 — Time Integration and Solution Methods — Boston

Chaired by: D. KNIGHT, Rutgers University, Piscataway, NJ, and L. FUCHS, Lund Universiy, Lund, Sweden

0800	0830	0900	0930	1000	1030	1100	1130
AIAA-2010-0116 A Parallel Newton-Krylov- Schur Flow Solver for the Navier-Stokes Equations Using the SBP- SAT Approach M. Osusky, University of Toronto, Toronto, Canada	AIAA-2010-0117 Implementation of a Robust Multigrid Algorithm in a Production- Level Overset CFD Solver S. Slimon, Electric Boat Corporation, Groton, CT	AIAA-2010-0118 Deflated Preconditioned Conjugate Gradient Solvers: Extensions and Improvements F. Mut, George Mason University, Fairfax, VA	AIAA-2010-0119 Computational Zone Adaptation Strategy for Unstructured Grid Users N. Fouladi, Sharif University of Technology, Tehran, Iran	AIAA-2010-0120 Time- Tensor for Rapid Convergence of CFD Solutions N. Domel, Lockheed Martin Corporation, Fort Worth, TX	AIAA-2010-0121 Spatially Non- Uniform Time- Step Adaptation for Functional Outputs in Unsteady Flow Problems K. Mani, University of Wyoming, Laramie, WY	AIAA-2010-0122 Re- evaluation of an Optimized Second Order Backward Difference (BDF2OPT) Scheme for Unsteady Flow Applications V. Vatsa, NASA Langley Research Center, Hampton, VA	AIAA-2010-0123 A Method To Accelerate LES Explicit Solvers Using Local Time-Stepping O. Esnault, French National Center for Scientific Research (CNRS), Châtenay-Malabry, France

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Monday Morning / 04 January 2010

Session 17-FD-6 — **Verification, Validation, and Uncertainty Quantification in CFD** — **Grand Ballroom 6**

Chaired by: C. ROY, Virginia Polytechnic Institute and State University, Blacksburg, VA, and W. OBERKAMPF, W L Oberkampf Consulting, Albuquerque, NM

0800	0900	0930	1030	1100	1130
AIAA-2010-0124 A Complete Framework for Verification, Validation, and Uncertainty Quantification in Scientific Computing (Invited) C. Roy, Virginia Polytechnic Institute and State University, Blacksburg, VA	AIAA-2010-0125 The AIAA Code Verification Project - Test cases for CFD Code Verification U. Ghia, University of Cincinnati, Cincinnati, OH	AIAA-2010-0126 Review of Discretization Error Estimators in Scientific Computing C. Roy, Virginia Polytechnic Institute and State University, Blacksburg, VA	AIAA-2010-0127 Comprehensive Code Verification for an Unstructured Finite Volume CFD Code S. Veluri, Virginia Polytechnic Institute and State University, Blacksburg, VA	AIAA-2010-0128 Error Estimation for High Speed Flows Using Continuous and Discrete Adjoints K. Duraisamy, Stanford University, Stanford, CA	AIAA-2010-0129 Non- Intrusive Polynomial Chaos Methods for Uncertainty Quantification in Fluid Dynamics S. Hosder, Missouri University of Science and Technology, Rolla, MO

Monday Morning / 04 January 2010

Session 18-GPSE-1 — **Space Agency Programs in Gravity-Dependent Research** — **Grand Ballroom 13**

Chaired by: F. KOHL and K. SACKSTEDER, NASA Glenn Research Center, Cleveland, OH

0800	0830	0900	0930	1000	1030	1100	
Oral Presentation Advanced Capabilities Division Program Status and Outlook B. Neumann, NASA Headquarters, Washington, DC	Oral Presentation NASA Innovative Partnership Program D. Comstock, NASA Headquarters, Washington, DC	Oral Presentation The ISS National Laboratory: The Intersection of Research and Exploration B. Carpenter, NASA Headquarters, Washington, DC	Oral Presentation CSA Research Programs M. Dejmek, Canadian Space Agency, St. Hubert, Canada	AIAA-2010-0134 Update of the German Microgravity Program in Physical Sciences R. Kuhl, German Aerospace Center (DLR), Bonn, Germany	Oral Presentation CNES Research Program B. Zappoli, French Space Agency (CNES), Toulouse, France	Oral Presentation ESA Research Program O. Minster, ESA, Noordwijk, The Netherlands	

Monday Morning / 04 January 2010

Session 19-GT-1 — **Future of Ground Testing** — **Crystal Ballroom G1**

Chaired by: F. STEINLE, and J. KEGELMAN, NASA Langley Research Center, Hampton, VA

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0138 A Historical Perspective of Design Requirements for AEDC's Propulsion Wind Tunnel and von Kármán Facilities. D. Hiebert, Arnold Engineering Development Center, Arnold AFB, TN	AIAA-2010-0139 Integrating Computational Science and Engineering To Re-Engineer the Aeronautical Development Process E. Kraft, Arnold Engineering Development Center, Arnold AFB, TN	AIAA-2010-0140 Technical Workforce Needs for a New National Trisonic Ground Test Capability J. Best, Arnold Engineering Development Center, Arnold AFB, TN	0930 AIAA-2010-0141 WITHDRAWN A New Wind Tunnel Operations Concept for Expected 2020 Technology F. Jackson, Arnold Engineering Development Center, Arnold AFB, TN	AIAA-2010-0142 Wind Tunnel Testing's Future: A Vision of the Next Generation of Wind Tunnel Test Requirements and Facilities M. Melanson, Lockheed Martin Aeronautics, Fort Worth, TX	AIAA-2010-0143 Langley Ground Facilities and Testing in the 21st Century D. Ambur, NASA Langley Research Center, Hampton, VA	AIAA-2010-0145 Industry Expectations for Aerodynamic Test Facility Capabilities to Support Future Development Programs – A User Perspective L. McGill, Raytheon Missile Systems, Tuscon, AZ	

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Session 20-GTE-1
0800 - 1200

Alternative Fuels - Government Funded Programs (Invited)

Grand Ballroom 14

Chaired by: B. SEKAR and J. DATKO, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

Conventional aviation fuels are derived from petroleum-based crude oils. Increasing energy demand, cost and environmental concerns increase the need to seek alternate transportation fuels from natural gas, coal and biomass to achieve the goal of energy independence from petroleum-based energy sources. There has been considerable interest in recent years for alterative aviation fuels produced from non-petroleum sources. New technologies are being developed and supported by the Government and private enterprise to replace petroleum-based aviation fuels in a cost effective way. For example, natural gas or coal-liquid can be converted into paraffinic synthetic fuels using the Fischer-Tropsch (FT) process. Similarly, selective cracking and isomerization processes are used to produce paraffinic aviation grade synthetic jet fuels from biodiesel. As the new form of alternative fuels enter the aviation industry, a series of new engine technologies are also under development to use these fuels with the aim of achieving improved combustion stability and efficiency, and reduced emissions. As a result, there is a greater need for a coordinated strategic effort between the Government and private institutions to develop affordable and cost effective technologies for practical aviation applications. Therefore, this special topic will address the Government programs for the alternate fuel development and the technical efforts that are being currently pursued.

Speakers:

William Harrison, U.S. Air Force: Air Force Alternative Fuels/Energy "Big Picture"

John Datko, U.S. Air Force Research Laboratory: Air Force Alternative Fuels Science & Technology Program

David Shifler, Office of Naval Research: US Navy Alternative Fuels/F-18 Flight Demonstration

Dan Bulzan, NASA Glenn Research Center: NASA Fundamental Aeronautics Research on Alternative Fuels

Donald Ferguson, U.S. Department of Energy/NETLFuel: Flexibility for Next Generation Combustion Applications

Jim Skaleky, Federal Aviation Administration: Federal Aviation Administration Continuous Lower Energy, Emissions and Noise (CLEEN) Technologies Development

Pat Muzzell, U.S. Army: Alternative Aviation Fuels and the Army

Monday Morning / 04 January 2010

Session 21-HAPB-1

Pulse Detonation Engines

Crystal Ballroom E

Chaired by: D. PAXSON, NASA Glenn Research Center, Cleveland, OH, and V. TANGIRALA, General Electric Company, Niskayuna, NY

0800 AIAA-2010-0146 Testing of a Continuous Detonation Wave Engine with Swirled Injection E. Braun, University of Texas, Arlington, Arlington, TX	0830 AIAA-2010-0147 Effects of a Catalyst Coating on a PDE Endothermic Fuel Heating System C. Stevens, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	0900 AIAA-2010-0148 Net Impulse Measurements of Pulse Detonation Tube by Using Fuel- Air Mixture S. Takeuchi, University of Tsukuba, Tsukuba, Japan	0930 AIAA-2010-0149 Unsteady Ejectors: The Effect of Driver Jet Mark- Space Ratio C. Ward, Cambridge University, Cambridge , Great Britain	1000 AIAA-2010-0150 Numerical Investigation of Pre- Detonators for Pulse Detonation Engines R. Fievisohn, U.S. Air Force Institue of Technology, Wright-Patterson AFB, OH	1030 AIAA-2010-0151 Unsteady Flame Speed Control and DDT Enhancement Using Fluidic Obstacles B. Knox, State University of New York, Buffalo, Buffalo, NY	1100 AIAA-2010-0152 Effect of Nozzle Shapes on the Performance of Continuously- Rotating Detonation Engine T. Yi, Institute of High Performance Computing, Singapore, Singapore	1130 AIAA-2010-0153 Numerical Analysis of Threshold of Limit Detonation in Rotating Detonation Engine T. Yamada, Aoyama Gakuin University, Sagamihara, Japan

Monday Morning / 04 January 2010

Session 22-HIS-1

History of Aviation

Crystal Ballroom P

Chaired by: S. EBERHARDT, The Boeing Company, Seattle, WA, and K. BURNS, Wyle Laboratories, San Diego, CA

0800 AIAA-2010-0154 Paleoaerodynamic Explorations Part I: Evolution of Biological and Technical Flight	0830 AIAA-2010-0155 Paleoaerodynamic Explorations Part II: Options for Future Technology Innovations	0900 AIAA-2010-0156 Gago Coutinho and the Aircraft Navigation F. Neves, University of Beira Interior , Covilhã,	0930 AIAA-2010-0157 The Centennial Events for 100 Years of Naval Aviation K. Burns, Wyle	1000 AIAA-2010-0158 To Boldly Go Where No Unmanned Aircraft Has Gone Before: A Half-Century of DARPA's Contributions to	1030 AIAA-2010-0159 Tracing the Growth of U.S. Navy Aviation M. Spearman, NASA Langley Research		

B. Kulfan, The Boeing Company, Seattle, WA	B. Kulfan, The Boeing Company, Seattle, WA	Portugal	Laboratories, San Diego, CA	Unmanned Aircraft M. Hirschberg, Centra Technology, Inc., Arlington, VA	Center, Hampton, VA		

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http://www.aiaa.org/agenda.cfm?lumeetingid=1812&dateget=all#session13018.

Monday Morning / 04 January 2010

Session 23-MVC-1 — **CFD Meshing** — **Crystal Ballroom L**

Chaired by: A. SHIH, University of Alabama, Birmingham, Birmingham, AL, and A. IANNETTI, NASA Glenn Research Center, Cleveland, OK

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0161 A Surface Remeshing Approach R. Aubry, Barcelona Supercomputing Center, Barcelona, Spain	AIAA-2010-0162 Generation of Conjugate Meshes for Complex Geometries for Coupled Multi-Physics Simulations W. Dawes, Cambridge University, Cambridge, Great Britain	AIAA-2010-0163 Automatic Mesh Generation of Hybrid Mesh on Valves in Multiple Positions in Feedline Systems D. Ross, University of Alabama, Birmingham, Birmingham, AL	AIAA-2010-0164 A Classical Elasticity-Based Mesh Update Method for Moving and Deforming Meshes R. Smith, Naval Surface Warfare Center, Panama City, FL	AIAA-2010-0165 Explicit and Robust Inverse Distance Weighting Mesh Deformation for CFD J. Witteveen, Center for Turbulence Research Stanford University, Stanford, CA	AIAA-2010-0166 Image- Based Computational Modeling of Complex Organisms and Biological Structures S. Dillard, University of Iowa, Iowa City, IA	AIAA-2010-0167 An Improvement to Patched Grid with the High- Order Conservative Remapping Method Y. Zhang, Tsinghua University, Beijing, China (prc)	

Monday Morning / 04 January 2010

Session 25-NSC-1 — **AIAA Foundation Masters** — **Crystal Ballroom A**

Chaired by: R. GREENWOOD, U.S. Air Force Academy, Colorado Springs, CO

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0173 Experimental Methods for Impact of Composite Materials B. Gulker, Michigan State University, Lansing, MI	AIAA-2010-0174 The Implicit Function Theorem with Applications in Dynamics and Control M. Harris, Texas A&M University, College Station, TX	AIAA-2010-0175 Flight Testing of a Prototype LOX/Propylene Upper Stage Engine D. Verma, California State University, , Long Beach, CA	AIAA-2010-0176 A "Free" Approach to Computational Aeroelasticity G. Romanelli, Department of Aerospace Engineering , Milan, Italy	AIAA-2010-0177 Behavior of Magnetorheological Fluid Composites Employing Carrier Fluids Certified for Landing Gear Use L. Ahure, Smart Structures Laboratory, Alfred Gessow Rotorcraft Center, University of Maryland, College Park, MD	AIAA-2010-0178 Characteristics of Metal Combustion Obtained from Constant Volume Explosion Experiments P. Santhanam, New Jersey Institute of Technology, Newark, NJ	AIAA-2010-0179 Unscented Kalman Filter for Thermal Parameter Identification M. Hazard, North Carolina State University, Charlotte, NC	

Monday Morning / 04 January 2010

Session 26-NSC-2 — **AIAA Foundation Team** — **Crystal Ballroom B**

Chaired by: C. TWOMEY-LAMB, MIT Lincoln Lab, Lexington, MA

0800	0830	0900	0930	1000			
AIAA-2010-0180 Design, Fabrication, and Testing of a Surveillance/Attack UAV K. Albarado, Auburn University, Auburn, AL	AIAA-2010-0181 High Performance Computing Implementation on a Risk Assessment Code J. Ocampo, University of Texas, San Antonio, San Antonio, TX	AIAA-2010-0182 FalconSAT- 3 and the Space Environment S. Gay, U.S. Air Force Academy, Colorado Springs, CO	AIAA-2010-0183 Design of a N20/HTPB Hybrid Rocket Motor Utilizing a Toroidal Aerospike Nozzle J. Dennis, Arizona State University, Tempe, AZ	AIAA-2010-0184 Design and Construction of All- Composite UAVs Utilizing a Modified VARTM Process R. Vocke, University of Maryland, College Park, MD			

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Monday Morning / 04 January 2010

Session 27-NSC-3 — **AIAA Foundation Undergraduate** — **Crystal Ballroom C**

Chaired by: A. MITCHELL, U.S. Air Force, Arlington, VA

0800	0830	0900	0930	1000	1030	1100	
AIAA-2010-0186 Fatigue Testing of Pneumatic Artificial Muscle Actuators M. Gentry, University of Maryland, College Park, MD	AIAA-2010-0187 Application of Proportional- Integral-Derivative Control to a Supersonic Wind Tunnel K. Busa, Syracuse University, Syracuse, NY	AIAA-2010-0188 A Factorial Design Experiment to Analyze the Optical Strain Response of a Luminescent Photoelastic Coating D. Gerber, University of Alabama, Tuscaloosa, AL	AIAA-2010-0190 Fatigue Study of a Nanocomposite Laminate J. Wilkerson, Texas A&M University, Department of Aerospace Engineering, College Station, TX	AIAA-2010-0191 Aerodynamic Investigation of NASA Crew Exploration Vehicle Forward Bay Cover Separation Characteristics B. Henicke, U.S. Air Force Academy, Colorado Springs, CO	AIAA-2010-0192 Bubble Behavior in Nucleate Boiling Experiment Aboard the Space Shuttle J. Koeln, Utah State University, Logan, UT	AIAA-2010-1599 Water Vapor Absorption Spectroscopy in a Simulated Helicopter Exhaust Using Vertical-Cavity Surface- Emitting Lasers L. Huynh, University of New South Wales, Canberra, Australia	

Monday Morning / 04 January 2010

Session 28-PC-1 — **Diagnostics and Measurements in Combustion Systems** — **Crystal Ballroom F**

Chaired by: R. PITZ, Vanderbilt University, Nashville, TN, and Y. IKEDA, Imagineering, Inc., Kobe, Japan

0800	0830	0900	0930	1000	1030		
AIAA-2010-0193 Static Stability Margin Sensing in a Lean Direct Injection (LDI) Turbine Engine Combustor R. Bompelly, Guggenheim School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-0194 Spray Structure of Aerated Liquid Jets Using Double- View Digital Holography K. Sallam, Oklahoma State University, Stillwater, OK	AIAA-2010-0196 A Second- Generation Aerosol Shock Tube for Combustion Research D. Haylett, Mechanical Engineering Departmennt, Stanford University, Stanford, CA	AIAA-2010-0197 Measurement of Extinction Limits and OH Radicals for Trimethybenzene and n-Propylbenzene Diffusion Flames S. Won, Princeton University, Princeton, NJ	AIAA-2010-0198 Mulit- Species Measurements Behind Reflected Shock Waves in Hydrocarbons Using Laser Absorption D. Davidson, Stanford University, Stanford, CA	AIAA-2010-0200 Numerical and Experimental Evaluation of the Optical Connectivity Technique for Measurement of Liquid Breakup Length in Atomizers G. Charalampous, Imperial College London, London, Great Britain		

Monday Morning / 04 January 2010

Session 29-PC-2 — **Large Eddy Simulation for Combustion Applications** — **New Orleans**

Chaired by: J. OEFELEIN, Sandia National Laboratories, Livermore, CA, and E. MASTORAKOS, University of Cambridge, Cambridge, Great Britain

0800	0830	0900	0930	1000	1030	1100	1130
AIAA-2010-0201 Unsteady Flame Embedding (UFE) Subgrid Model for Turbulent Premixed Combustion Simulations H. El-Asrag, Massachusetts Institute of Technology, Cambridge, MA	AIAA-2010-0202 Large Eddy Simulations of Supersonic Turbulent Reacting Flows A. Banaeizadeh, Michigan State University, East Lansing, MI	AIAA-2010-0203 Large Eddy Simulation of Supersonic Combustion Using Direct Quadrature Method of Moments P. Donde, University of Texas, Austin, Austin, TX	AIAA-2010-0204 On Experimental Data for Validation of Large-Eddy Simulation of Evaporating Droplets in a Mxing Layer S. Radhakrishnan, Jet Propulsion Laboratory, Pasadena, CA	AIAA-2010-0205 A Filtered Tabulated Chemistry Model for Large Eddy Simulation of Reactive Flows P. Auzillon, École Centrale Paris, Chatenay Malabry, France	AIAA-2010-0206 Large Eddy Simulations of Temporal Mixing Layers Under Supercritical Thermodynamic Conditions: O2/H2 E. Taskinoglu, Jet Propulsion Laboratory, Pasadena, CA	AIAA-2010-0207 The LES- ODT Model for Turbulent Premixed Flames T. Echekki, Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC	AIAA-2010-0208 Large Eddy Simulation of LOX/GH2 Shear-Coaxial Jet Flame at Supercritical Pressure S. Matsuyama, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan

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Session 30-PC-3 — **Liquid Injection and Atomization** — **Los Angeles**

Chaired by: E. GUTMARK, University of Cincinnati, Cincinnati, OH, and A. AGRAWAL, University of Alabama, Tuscaloosa, AL

0800 AIAA-2010-0209 Operation and Control of a Pulsejet with High Pressure Liquid Fuel Injection A. Naples, Innovative Scientific Solutions, Inc., Dayton, OH	0830 AIAA-2010-0210 Towards an Efficient, High- Fidelity Methodology for Liquid Jet Atomization Computations X. Li, United Technologies Research Center, East Hartford, CT	0900 AIAA-2010-0212 Parametric Study of Primary Breakup of Turbulent Liquid Jets in Crossflow: Role of Weber number M. Pai, Stanford University, Stanford, CA	0930 AIAA-2010-0213 Fully- coupled Multiphysics Model to Simulate an Electrostatic Micropump B. Spatafore, University of Colorado, Boulder, Boulder, CO	1000 AIAA-2010-0214 Liquid Fuel Jet in Crossflow –Trajectory Correlations based on the Column Breakup Point Y. Gopala, Georgia Institute of Technology, Atlanta, GA	1030 AIAA-2010-0215 On the Modeling of a Spray Impinging on a Surface A. Silva, University of Beira Interior, Covilhã, Portugal	1100 AIAA-2010-0216 Effect of Fuel Injection Location on Combustion Instability in a Dump Combustor R. Desai, Indian Institute of Technology, Madras, Ahmedabad, India	

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Session 31-PC-4 — **Turbulent Flames I** — **Miami**

Chaired by: M. SMOOKE, Yale University, New Haven, CT, and C. BROPHY, Naval Postgraduate School, Monterey, CA

0800 AIAA-2010-0217 Numerical Simulation of Autoignition of a Diluted Hydrogen Plume in Co-Flowing Turbulent Hot Air S. Kerkemeier, Swiss Federal Institute of Technology, Zurich, Switzerland	0830 AIAA-2010-0218 Direct Numerical Simulation of Non-Premixed Flame Extinction by Water Spray P. Arias, Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI	0900 AIAA-2010-0220 Transitional Blowoff Behavior of Wake-Stabilized Flames in Vitiated Flow S. Tuttle, University of Connecticut, Storrs, CT	0930 AIAA-2010-0222 Characterization and Sensitivity Analysis of a Turbulent Diffusion Flame in Diluted Hot Coflow Y. See, University of Michigan, Ann Arbor, MI	1000 AIAA-2010-0223 Numerical simulation of a gas jet diffusion flame in a venturicascade burner and experimental validation A. Qubbaj, University of Texas, Pan-American, Edinburg, TX			

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Session 32-PDL-1 — **Magnetohydrodynamic Numerical Simulations** — **New York**

Chaired by: J. SHANG and H. YAN, Wright State University, Dayton, OH

0800 AIAA-2010-0225 Non- Equilibrium Ionized Flow Simulations Within Strong Electro-Magnetic Fields R. MacCormack, Stanford University, Stanford, CA	0830 AIAA-2010-0227 Numerical Study of Magnetoaerodynamic Flow Around a Hemisphere N. Bisek, University of Michigan, Ann Arbor, MI	0900 AIAA-2010-0229 Low Rem 3- D MHD Hypersonic Equilibrium Flow Using High- Order WENO Schemes J. Lee, University of Miami, Coral Gables, FL	0930 AIAA-2010-0230 Numerical Parameter Study of Low Electric Power Segmented Arc Heaters J. Lee, University of Stuttgart, Stuttgart, Germany	1000 AIAA-2010-0231 Simulation Studies of Alternating- Current Microdischarges for Microthruster Applications H. Sitaraman, University of Texas, Austin, Austin, TX	1030 AIAA-2010-0232 The Effect of MHD Energy Bypass on Specific Thrust for Supersonic Turbojet Engine T. Benyo, NASA Glenn Research Center, Cleveland, OH		

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Session 33-TP-1 — **Non-Equilibrium Radiation** — **Crystal Ballroom M**

Chaired by: B. DROLEN, and C. WANG, University of Florida, Gainesville, FL

0800 AIAA-2010-0234 k- Distributions for Gas Mixtures in Hypersonic Nonequilibrium Flows A. Bansal, Pennsylvania State University , State College, PA	0830 AIAA-2010-0235 Comparative Analysis of Two- Temperature vs. Multi- Species, Multi-Temperature Modeling in Nonequilibrium Radiating Shock Layers C. Martin, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	0900 AIAA-2010-0236 Role of Viscous Effects on NEQAIR Prediction of EAST Measurements E. McCorkle, North Carolina State University, Raleigh, NC	0930 AIAA-2010-0237 Analysis of Shock Layer Radiation in Vacuum-Ultraviolet Region for HAYABUSA Return Conditions G. Yamada, Univeristy of Tokyo, Kashiwa, Japan	1000 AIAA-2010-0238 The Influence of Turbulent Fluctuations on the Radiation Intensity Emitted from the Core Region of Exhaust Plumes D. Blunck, Purdue University, West Lafayette, IN	1030 AIAA-2010-0239 Uncertainty Quantification of Radiative Heat Flux Modeling for Titan Atmospheric Entry S. Ghaffari, Stanford University, Stanford, CA		

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Session 34-TP-2 — **Orbiter Entry Aerothermo Flight Experiments: Recent Flight Testing** — **Crystal Ballroom N**

Chaired by: T. HORVATH, NASA Langley Research Center, Hampton, VA, and C. CAMPBELL, NASA Johnson Space Center, Houston, TX

0800 AIAA-2010-0240 Boundary Layer Transition Flight Experiment Overview and In Situ Measurements B. Anderson, NASA Johnson Space Center, Houston, TX	0830 AIAA-2010-0241 The Hythirm Project: Flight Thermography of the Space Shuttle During Hypersonic Re-Entry T. Horvath, NASA Langley Research Center, Hampton, VA	0900 AIAA-2010-0242 Design and Implementation of the Boundary Layer Transition Flight Experiment on Space Shuttle Discovery T. Spanos, United Space Alliance, Cape Canaveral, FL	0930 AIAA-2010-0243 Cast Glance Near Infrared Imaging Observations of the Space Shuttle During Hypersonic Re- entry S. Tack, Naval Air Systems Command, Pt. Mugu, CA	1000 AIAA-2010-0244 HYTHIRM Radiance Modeling and Image Analyses in Support of STS- 119 and STS- 125 and STS- 128 Space Shuttle Hypersonic Re-Entries D. Gibson, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1030 AIAA-2010-0245 Application of a Near Infrared Imaging System for Thermographic Imaging of the Space Shuttle during Hypersonic Re-Entry J. Zalameda, NASA Langley Research Center, Hampton, VA	1100 AIAA-2010-0246 Orbiter Boundary Layer Transition Prediction Tool Enhancements S. Berry, NASA Langley Research Center, Hampton, VA	1130 AIAA-2010-0247 Roles of Engineering Correlations in Hypersonic Entry Boundary Layer Transition Prediction C. Campbell, NASA Johnson Space Center, Houston, TX

Monday Morning / 04 January 2010

Session 35-WE-1 — **Wind Turbine Control Algorithms** — **Crystal Ballroom G2**

Chaired by: M. LACKNER, University of Massachusetts, Amherst, Amherst, MA, and A. WRIGHT, National Renewable Energy Laboratory, Golden, CO

0800 AIAA-2010-0248 Adaptive Disturbance Tracking Control for Large Horizontal Axis Wind Turbines in Variable Speed Region II Operation M. Balas, Univeristy of Wyoming, Laramie, WY	0830 AIAA-2010-0249 Modified Adaptive Control for Region 3 Operation in the Presence of Wind Turbine Structural Modes S. Frost, NASA Ames Research Center, Moffett Field, CA	0900 AIAA-2010-0250 Combining Standard Feedback Controllers with Feedforward Blade Pitch Control for Load Mitigation in Wind Turbines F. Dunne, University of Colorado, Boulder, Boulder, CO	0930 AIAA-2010-0251 Blade Pitch Control with Preview Wind Measurements J. Laks, University of Colorado, Boulder, Boulder, CO	1000 AIAA-2010-0252 Testing Further Controls to Mitigate Loads in the Controls Advanced Research Turbine A. Wright, National Renewable Energy Laboratory, Golden, CO	1030 AIAA-2010-0253 Impact of Higher Fidelity Models on Active Aerodynamic Load Control For Fatigue Damage Reduction B. Resor, Sandia National Laboratories, Albuquerque, NM	1100 AIAA-2010-0254 Active Aerodynamic Blade Distributed Flap Control Design Proceedure for Load Reduction on the UPWIND 5MW Wind Turbine D. Wilson, Sandia National Laboratories, Albuquerque, NM	1130 AIAA-2010-1600 A Study of Dynamic Coupling and Composite Load Control for Wind Turbines J. Lazaro, University of Auckland, Auckland, New Zealand

Monday Morning / 04 January 2010

Session 36-WIG-1 / PDL-2 — **Joint PDL/WIG/FD/TP Plasma Actuator Session I** — **Grand Ballroom 1**

Chaired by: O. AZAROVA, Russian Academy of Sciences, Moscow, Russia, and G. ELLIOTT, University of Illinois, Urbana-Champaign, Urbana, IL

0800 AIAA-2010-0256 Electrode Polarity Effects in Surface Plasma Discharges for Supersonic Flow Control Applications: a Computational Study S. Mahadevan, University of Texas, Austin, Austin, TX	0830 AIAA-2010-0257 Electrodynamic Control of Shock Interactions in a 25/55 Biconic Model in Hypersonic Flow K. Wasai, Tokai University, Hiratsuka, Japan	0900 AIAA-2010-0259 High- Power Filamentary Pulse Discharge in Supersonic Flow S. Leonov, Russian Academy of Sciences, Moscow, Russia	0930 AIAA-2010-0260 Active Steering of Shock Waves in Compression Ramp by Nonuniform Plasma S. Leonov, Russian Academy of Sciences, Moscow, Russia				

Monday Morning / 04 January 2010

Session 37-WIG-2 / PDL-3 — **Plasma-Assisted Combustion I** — **Grand Ballroom 2**

Chaired by: C. CARTER, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and V. SHIBKOV, Moscow State University, Moscow, Russia

0800 AIAA-2010-0263 Plasma- Assisted Flame Holding in Subsonic and Supersonic Flows W. Kim, Stanford University, Stanford, CA	0900 AIAA-2010-0264 Gradient Mechanism of Detonation Initiation for PDE Applications A. Rakitin, NEQLab Research BV, Delft, The Netherlands	0930 AIAA-2010-0265 Internal and External Ignition Under Condition of Combined Discharge V. Shibkov, Moscow State University, Moscow, Russia	1000 AIAA-2010-0266 Cavity Ignition and Flameholding of Ethylene- Air and Hydrogen- Air Flows by a Repetitively Pulsed Nanosecond Discharge1 A. Dutta, Ohio State University, Columbus, OH	1030 AIAA-2010-0267 Stable plasma formation in non uniform flow of Propane - air mixture: Propagation and transition to explosion S. Kamenschikov, Moscow State University, Moscow, Russia	1100 AIAA-2010-0268 Millisecond Pulse Current- Voltage Induced Perturbations of a Premixed Propane/Air Flame J. Schmidt, Spectral Energies, LLC, Dayton, OH	1130 AIAA-2010-0269 Non- Selfmaintained Gas Discharge for Plasma Impact on Gas Flammable Mixtures V. Bychkov, Russian Academy of Sciences, Moscow, Russia

Monday Morning / 04 January 2010

Session 246-TES-4 — **Combustion I** — **Crystal Ballroom K**

Chaired by: H. MONGIA, Purdue University, West Lafayette, IN, and N. SYRED, Cardiff University, Cardiff, Great Britain

0900 AIAA-2010-1353 Investigation of Non-Premixed and Premixed Distributed Combustion for GT Application V. Arghode, University of Maryland, College Park, MD	0930 AIAA-2010-1354 Combustion Properties of Turbulent Canola Methyl Ester and Diesel Flames N. Dhamale, University of Oklahoma, Norman, OK	1000 AIAA-2010-1355 Implementation of Novel Error Propagation Based Reduction Approach in H2S/O2 Reaction Mechanism H. Selim, University of Maryland , College Park, MD	1030 AIAA-2010-1356 Numerical Simulations of the Thermal Stage in Claus Process: Equilibrium and Kinetic Investigation N. Al Amoodi, University of Maryland, College Park,, MD	1100 AIAA-2010-1357 Ignition of Methane-Hydrogen Mixtures at High Pressure B. Adhikary, University of Illinois, Chicago, Chicago, IL		

Monday Afternoon / 04 January 2010

1300 - 1400 | **New Horizons Forum Keynote Address** | **Crystal Ballroom H**

Distinguished Speaker: **Henry P. "Hank" Krakowski**, Chief Operating Officer, Federal Aviation Administration, Air Traffic Organization

21st Century Air Transportation Management – Where Are We Headed?

Monday Afternoon / 04 January 2010

1400 - 1630 | **New Horizons Forum Panel Discussion - Future of the Airspace: Issues and Solutions for NextGen and Beyond …** | **Crystal Ballroom J2**

The panel will discuss a variety of topics that are shaping access to the civil airspace, including the expectations for NextGen as an enabler, the new found urgency for change in airspace management, the evolving role of automation and its impact on the human controller; unmanned air systems and airspace access, expectations for flight safety in the 21st century, and more.

Moderator:
Victoria Cox,Senior Vice President for NextGen and Operations Planning, Air Traffic Organization, Federal Aviation Administration, Washington D.C

Panelists:

- **David W. Vos**, Senior Director, Rockwell Collins Control Technologies, Warrenton, VA
- **Gerald F. "Fred" Pease Jr.**, SES, Director of Air Operations and Executive Director of the Department of Defense Policy Board on Federal Aviation, Deputy Chief of Staff for Operations, Plans and Requirements, Headquarters U.S. Air Force, Washington, D.C
- **Steve J. Vail**, Senior Advisor, Global Air Traffic Operations, FedEx, Memphis TN
- **Bruce Landsberg**, President, Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation, Frederick, MD

Monday Afternoon / 04 January 2010

Session 38-AA-4 | **Jet Noise I** | **Washington**

Chaired by: D. MCLAUGHLIN, Pennsylvania State University, University Park, PA

1400 AIAA-2010-0270 Supersonic Jet Noise Prediction Using Non-Eddy Viscosity- Type LES Models N. Dittakavi, Advanced Dynamics, Inc., Lexington, KY	1430 AIAA-2010-0271 Large- Eddy Simulations of Perfectly- Expanded Supersonic Jets: Quality Assessment and Validation S. Mendez, Stanford University, Stanford, CA	1500 AIAA-2010-0272 Numerical Simulation of Axisymmetric Jet Screech Tones Using a General Purpose Finite-Volume CFD Code K. Kurbatskii, ANSYS, Inc., Lebanon, NH	1530 AIAA-2010-0273 Noise and Flowfield Characteristics of a Supersonic Jet Impinging on a Porous Surface A. Wiley, Florida A&M University-Florida State University, Tallahassee, FL	1600 AIAA-2010-0275 Numerical Simulation of Broadband Shock-Associated Noise from A Circular Supersonic Jet J. Gao, Beihang University, Beijing, China (prc)			

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Monday Afternoon / 04 January 2010

Session 39-ABP-2 — **Engine Systems and Optimization** — **Crystal Ballroom D**

Chaired by: H. REEVE, United Technologies Research Center, East Hartford, CT, and C. CHUCK, The Boeing Company, Mercer Island, WA

1400	1430	1500	1530				
AIAA-2010-0276 The Potential and Challenge of TurboElectric Propulsion for Subsonic Transport Aircraft A. Gibson, Empirical Systems Aerospace, Pismo Beach, CA	AIAA-2010-0277 Near Stall Flow Analysis in the Transonic Fan of the RTA Propulsion System C. Hah, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-0278 Statistical, Modular Systems Integration Using Combined Energy & Exergy Concepts J. Doty, University of Dayton, Dayton, OH	AIAA-2010-0279 Mission Performance Comparisons of Subsonic Airliners with Current and Future Propulsion Technologies B. Schiltgen, Empirical Systems Aerospace, Pismo Beach, CA				

Monday Afternoon / 04 January 2010

Session 40-AD-1 — **Subsonic Aircraft Design** — **Crystal Ballroom K**

Chaired by: D. LEVY, Cessna Aircraft Company, Wichita, KS, and E. CRAMER, The Boeing Company, Seattle, WA

1400	1430	1500	1530	1600			
AIAA-2010-0281 A Tradeoff Analysis of Future Small Aircraft Capacity from a Point- to- Point Operation Perspective J. Lewe, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-0282 Assessing New Aircraft and Technology Impacts on Fleet- Wide Environmental Metrics including Future Scenarios J. Zhao, Purdue University, West Lafayette, IN	AIAA-2010-0283 A Design Methodology for Lifelong Aircraft Evolution D. Lim, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-0284 Non- Symmetrical General Aviation Aircraft and its Flight Control Law Design Using CEASIOM Software A. Khrabrov, TsAGI, Moscow, Russia	AIAA-2010-0285 Parameter Estimation of Fundamental Technical Aircraft Information Applied to Aircraft Performance M. Vallone, California Polytechnic State University, San Luis Obispo, CA			

Monday Afternoon / 04 January 2010

Session 41-AD-2 — **U.S. Air Force INVENT Program** — **Crystal Ballroom L**

Chaired by: W. MASON, Virginia Polytechnic Institute and State University, Blacksburg, VA, and T. TAKAHASHI, Northrop Grumman Corporation, El Segundo, CA

1400	1430	1500	1530	1600	1630		
AIAA-2010-0287 INVENT Modeling, Simulation, Analysis and Optimization E. Walters, PCKA, West Lafayette, IN	AIAA-2010-0288 Thermal Analysis of an Integrated Aircraft Model M. Bodie, PCKA, Wright-Patterson AFB, OH	AIAA-2010-0289 Non- Equilibrium Thermodynamic Issues Related to On- Demand Systems M. von Spakovsky, Virginia Polytechnic Institute and State University, Blacksburg, VA	AIAA-2010-0290 Dynamic Heat Generation Modeling of High Performance Electromechanical Actuator D. Woodburn, Unviersity of Central Florida, Orlando, FL	AIAA-2010-0291 Simulation of Emerging Heat Exchanger Technologies for Progressive Aerospace Platforms A. Heltzel, PCKA, Austin, TX	AIAA-2010-0292 Stochastical Mathematics for Engineering Applications J. Doty, Engineering Management & Systems, University of Dayton, Dayton, OH		

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http://www.aiaa.org/agenda.cfm?lumeetingid=1812&dateget=all#session12687.

Monday Afternoon / 04 January 2010

Session 42-AFM-2 — **Flight Dynamics and Flying Qualities** — **Chicago**

Chaired by: K. SHWEYK, The Boeing Company, Huntington Beach, CA, and A. CRASSIDIS, Rochester Institute of Technology, Rochester, NY

1400 AIAA-2010-0293 Stability and Performance of a Light Unmanned Airplane in Ground Effect P. Boschetti, Simón Bolívar University, Naiguatá, Venezuela	1430 AIAA-2010-0295 Developmental Flight Testing of the SPAARO UAV M. Cotting, Virginia Polytechnic Institute and State University, Blacksburg, VA	1500 AIAA-2010-0297 Review of Pilot Modelling Techniques M. Lone, Cranfield University, Cranfield, Great Britain	1530 AIAA-2010-0298 Evaluation of the Flying Qualities of a Half- Scale Unmanned Airplane via Flight Simulation P. González, National Polytechnic Research University of the Armed Forces , Caracas, Venezuela				

Monday Afternoon / 04 January 2010

Session 43-AMT-2 — **Spectroscopic and Scattering Techniques** — **Miami**

Chaired by: T. ROSSMANN, and S. ZAIDI, Princeton University, Princeton, NJ

1400 AIAA-2010-0299 Tunable Diode Laser Absorption Technique Development for Determination of Spatially Resolved Water Concentration and Temperature E. Bryner, University of Virginia, Charlottesville, VA	1430 AIAA-2010-0300 Quantitative Laser-Induced Incandescence Measurements of Soot in Turbulent Pool Fires S. Kearney, Sandia National Laboratories, Albuquerque, NM	1500 AIAA-2010-0301 Fiber- Based Measurement of Bow-Shock Spectra for Reentry Flight Testing T. Schott, NASA Langley Research Center, Hampton, VA, VA	1530 AIAA-2010-0302 Accuracy, Precision, and Scatter in TDLAS Measurements M. Brown, Innovative Scientific Solutions, Inc., Dayton, OH	1600 AIAA-2010-0303 Mass Flux Sensing via Tunable Diode Laser Absorption of Water Vapor L. Chang, Stanford University, Stanford, CA	1630 AIAA-2010-0304 Hypersonic Flows Probing with a Compact Absorption Spectrometer Monitoring CO2 at 2.7µm R. Vallon, ONERA, Palaiseau, France		

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Session 44-AMT-3 — **Surface Measurement Techniques I** — **Crystal Ballroom J1**

Chaired by: V. CHANDRASEKHARAN, University of Florida, Gainesville, FL, and S. OLCMEN, University of Alabama, Tuscaloosa, AL

1400 AIAA-2010-0305 Measurement of Fluctuating Wall Pressures Beneath a Supersonic Turbulent Boundary Layer S. Beresh, Sandia National Laboratories, Albuquerque, NM	1430 AIAA-2010-0306 MEMS Pressure Sensor Array for Aeroacoustic Analysis of the Turbulent Boundary Layer J. Krause, Tufts University, Medford, MA	1500 AIAA-2010-0307 Unsteady PSP Technique for Measuring Naturally-Disturbed Periodic Phenomena D. Yorita, Tohoku University, Sendai, Japan	1530 AIAA-2010-0309 Determination of Transfer Function of Pressure- Sensitive Paint C. Klein, German Aerospace Center (DLR), Göttingen, Germany	1600 AIAA-2010-0310 Measurement of hypersonic high-enthalpy boundary layer transition on a 7º cone model H. Tanno, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan			

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http://www.aiaa.org/agenda.cfm?lumeetingid=1812&dateget=all#session12767.

Monday Afternoon / 04 January 2010

Session 45-APA-4 — Applied CFD in Engineering — Grand Ballroom 9

Chaired by: J. MARTEL, Jacobs Engineering, Eglin AFB, FL, and S. LEDOUX, The Boeing Company, Everett, WA

1400 AIAA-2010-0311 Process Improvement Through Tool Integration In Aero- Mechanical Design C. Briggs, ATA Engineering, San Diego, CA	1430 AIAA-2010-0312 Rotor Wake Modeling with a Coupled Eulerian and Vortex Particle Method C. Stone, Intelligent Light, East Rutherford, NJ	1500 AIAA-2010-0313 Computational Study of Aircraft Forebody Impact on Aerodynamic Forces Experienced During Pilot Ejection C. Tyler, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 AIAA-2010-0315 Loss Coefficient Estimation in a Controlled Diffusion Cascade Using Large Eddy Simulation A. McMullan, Loughborough University, Loughborough, Great Britain	1600 AIAA-2010-0316 Development of a Quadtree Based Agglomeration Method for a Multigrid Viscous Flow Solver on Unstructured Grids E. Mahmutyazicioglu, TUBITAK-SAGE, Ankara, Turkey			

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Session 46-APA-5 — Unsteady Aerodynamics I — Grand Ballroom 10

Chaired by: J. GEORGE, Innovative Aerospace Solutions, Downey, CA, and W. TOLEDO, Army Research Development Engineering Center, Picatinny, NJ

1400 AIAA-2010-0317 Measurements of the Steady Skin Friction and Cross- Flow Separation Location on an Ellipsoidal Model in Yaw or Pitch over a Range of Roll Angles J. DeMoss, Virginia Polytechnic Institute and State University, Blacksburg, VA	1430 AIAA-2010-0318 Aerodynamics of an Oscillating Wing in Ground Effect J. Molina, University of Southampton, Southampton, Great Britain	1500 AIAA-2010-0319 Unsteady Force and Moment Measurements on a Non- Body of Revolution Vehicle Undergoing Oscillatory Roll S. Tanious, Virginia Polytechnic Institute and State University, Blacksburg, VA	1530 AIAA-2010-0320 Experimental Study on Dynamic Instability of Re- Entry Capsule-Shaped Body using Pressure- Sensitive Paint D. Sugimoto, Tohoku University, Sendai, Japan	1600 AIAA-2010-0321 Vortex Structure Around Heaving Elastic Airfoils and Characteristics of Dynamic Thrust T. Kurinami, Kyushu Institute of Technology, Iizuka, Japan	1630 AIAA-2010-0322 Unsteady Aerodynamics of Deformable Thin Airfoils W. Walker, Virginia Polytechnic Institute and State University, Blacksburg, VA		

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Session 47-APA-6 — Vortical/Vortex Flows — Grand Ballroom 11

Chaired by: C. SHENG, University of Toledo, Toledo, OH, and R. TRAMEL, Kratos/Digital Fusion Solutions, Inc., Huntsville, AL

1400 AIAA-2010-0323 Effects of Leading- Edge Radius on Aerodynamic Characteristics of 50º Delta Wings N. Verhaagen, Delft University of Technology, Delft, The Netherlands	1430 AIAA-2010-0324 A Method and Applications for Tracking Airplane Trailing Wakes Y. Yadlin, The Boeing Company, Huntington Beach, CA	1500 AIAA-2010-0325 Wind Tunnel Effects on Wingtip Vortices P. Durbin, Iowa State University, Ames, IA	1530 AIAA-2010-0326 Experimental Studies on Co- Axial Vortex Loops R. Mariani, University of Manchester, Manchester, Great Britain	1600 AIAA-2010-0327 Unsteady Computations of a Ground Vortex R. Nunes, University of Beira Interior, Covilhã, Portugal	1630 AIAA-2010-0328 Comparison of Predictive Capabilities of DES and RANS Simulations of the Separated Flow Around a Circular Cylinder M. Xia, Northwestern Polytechnical University, Xi'an, China (prc)		

Monday Afternoon / 04 January 2010

Session 48-ASE-2 — **Space Flight Results and Lessons Learned** — **Atlanta**

Chaired by: S. LAI, U.S. Air Force Research Laboratory, Hanscom AFB, MA, and D. FERGUSON, NASA Marshall Space Flight Center, Huntsville, AL

1400	1430	1500	1530				
AIAA-2010-0329 In- Situ O/N2 Ratios from the AFRL Mass Spectrometer on the TacSat- 2 Satellite J. Wise, U.S. Air Force Research Laboratory, Hanscom AFB, MA	AIAA-2010-0332 The Effects of Eclipse-Exit Weather and Magnetic Latitude on ISS Rapid- Charging Events D. Ferguson, Air Force Research Laboratory/Space Vehicles Directorate, Kirtland Air Force Base, NM	AIAA-2010-0333 Natural Environment and Aerospace Vehicles: Some Lessons Learned W. Vaughan, University of Alabama, Huntsville, Huntsville, AL	AIAA-2010-1602 Flashover Plasma Characteristics on 5m2 Solar Array Panels in a Simulated Plasma Environment of Geostationary Orbit and Low Earth Orbit T. Okumura, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan				

Monday Afternoon / 04 January 2010

Session 49-ECS-1 — **Modeling the Performance of Energetic Materials** — **Crystal Ballroom C**

Chaired by: J. BAGLINI, Exodynamics Technology, Inc., Phoenix, AZ

1400	1430	1500	1530				
AIAA-2010-0334 Modeling the Pyrotechnically- Induced Dissociation of Nitrous Oxide in Closed Vessels K. Rink, University of Idaho, Moscow, ID	AIAA-2010-0335 Preliminary Investigation of SPLA/RD- 1333 Lead Azide Thermal Decomposition Kinetics H. Lee, Scot Incorporated, Downers Grove, IL	AIAA-2010-0336 Atomistic Simulation of the Aluminum Nanoparticle Oxidation Mechanism B. Henz, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD	AIAA-2010-0337 Instrumented Burn Tube: Experimental Observations and Analysis of Data C. Yarrington, Los Alamos National Laboratory, Los Alamos, NM				

Monday Afternoon / 04 January 2010

Session 50-FD-7 — **Best Practice for the Industrial Application of Large Eddy Simulation (Invited)** — **New Orleans**

Chaired by: P. TUCKER, Whittle Laboratory, Cambridge, Great Britain, and J. DEBONIS, NASA Glenn Research Center, Cleveland, OH

1400	1430	1500	1530	1600	1630		
Oral Presentation Status of Application of LES for Gas Turbine Analyses and Future Needs J. Coupland, Rolls-Royce, Derby, Great Britain	Oral Presentation Best Practice for Industrial LES- Lessons from the Past and Future Possibilities A. Hutton, ERCOFTAC, Brussels, Belgium	Oral Presentation On Application of Large Eddy Simulations for Gas Turbine Combustion System S. Hsieh, General Electric Company, Cincinnati, OH	Oral Presentation What Lessons Can Be Learned from LES Error-Landscapes? J. Meyers, Catholic University Leuven, Leuven, Belgium	Oral Presentation Towards Improved Understanding of Airframe Noise Sources Using Detached Eddy Simulation R. Langtry, The Boeing Company , Seattle, WA	AIAA-2010-0343 Application of LES Methods to Military Aircraft Flow Problems B. Smith, Lockheed Martin Corporation, Fort Worth, TX		

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Session 51-FD-8 — Circulation Control Research and Applications — Boston

Chaired by: M. ROGERS, NASA Ames Research Center, Moffett Field, CA, and R. WAHLS, NASA Langley Research Center, Hampton, VA

1400	1430	1500	1530	1600	1630		
AIAA-2010-0344 NASA High- Reynolds Number Circulation Control Research - Overview of CFD and Planned Experiments (Invited) W. Milholen, NASA Langley Research Center, Hampton, VA	AIAA-2010-0345 Recent Experimental Development of Circulation Control Airfoils and Pneumatic Powered- Lift Systems R. Englar, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-0346 An Experimental Investigation of Unsteady and Steady Circulation Control for an Elliptical Airfoil A. Jones, University of Florida, Gainesville, FL	AIAA-2010-0347 Calculation of the Turbulence Characteristics of Flow Around a Circulation Control Airfoil Using LES (Invited Paper) T. Nishino, NASA Ames Research Center, Moffett Field, CA	AIAA-2010-0348 Overview of Recent Circulation Control Modeling Activities at Cal Poly D. Marshall, California Polytechnic State University, San Luis Obispo, CA	AIAA-2010-0349 Enabling Speed Agility for the Air Force C. Zeune, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH		

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Session 52-FD-9 — Compressible Turbulence — Grand Ballroom 3

Chaired by: G. BLAISDELL, Purdue University, West Lafayette, IN, and W. KIM, Pratt & Whitney, A United Technologies Company, East Hartford, CT

1400	1430	1500	1530	1600	1630		
AIAA-2010-0350 Decay of Compressible Homogeneous Turbulence with Multi-Temperature Non-Equilibrium W. Liao, Old Dominion University, Norfolk, VA	AIAA-2010-0351 Detonation Turbulence Interaction L. Massa, University of Texas, Arlington, Arlington, TX	AIAA-2010-0352 Numerical Simulation of Multicomponent Shock Accelerated Flows and Mixing using Localized Artificial Diffusivity Method S. Shankar, Stanford University, Stanford, CA	AIAA-2010-0353 Direct numerical simulation of hypersonic turbulent boundary layers with varying freestream Mach number L. Duan, Princeton University, Princeton, NJ	AIAA-2010-0354 Study of Emission Turbulence- Radiation Interaction in Hypersonic Boundary layers L. Duan, Princeton University, Princeton, NJ	AIAA-2010-0355 DNS of a Spatially Evolving Transitional/Turbulent Boundary Layer at M=2.0 Y. Tokura, Hiroshima University, Hiroshima, Japan		

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Session 53-FD-10 — Feedback Flow Control — Grand Ballroom 4

Chaired by: J. SEIDEL, U.S. Air Force Academy, Colorado Springs, CO, and F. CANNELLE, Northrop Grumman Corporation, El Segundo, CA

1400	1430	1500	1530	1600	1630		
AIAA-2010-0356 Feedback Flow Control of a Shear Layer for Aero- Optic Applications J. Seidel, U.S. Air Force Academy, Colorado Springs, CO	AIAA-2010-0357 Feedback Control of High- Lift State for A Low- Aspect- Ratio Wing K. Taira, Princeton University, Princeton, NJ	AIAA-2010-0358 Closed- Loop Control of a Wing in an Unsteady Flow D. Williams, Illinois Institute of Technology, Chicago, IL	AIAA-2010-0359 A Temporal Proper Orthogonal Decomposition (TPOD) Method for Closed-Loop Flow Control S. Gordeyev, University of Notre Dame, Notre Dame, IN	AIAA-2010-0360 Feedback Flow Control for a Pitching Turret (Part I) T. Vaithianathan, Clear Science Corporation, Harford, NY	AIAA-2010-0361 Feedback Flow Control for a Pitching Turret (Part II) R. Wallace, Syracuse University, Syracuse, NY		

Monday Afternoon / 04 January 2010

Session 54-FD-11 — **High Order Methods I** — **Grand Ballroom 5**

Chaired by: C. RUMSEY, NASA Langley Research Center, Hampton, VA, and N. DOMEL, Lockheed Martin Corporation, Aledo, TX

1400 AIAA-2010-0362 A Hybridizable Discontinuous Galerkin Method for the Incompressible Navier-Stokes Equations N. Nguyen, Massachusetts Institute of Technology, Cambridge, MA	1430 AIAA-2010-0363 A Hybridizable Discontinuous Galerkin Method for the Compressible Euler and Navier- Stokes Equations J. Peraire, Massachusetts Institute of Technology, Cambridge, MA	1500 AIAA-2010-0364 A Reconstructed Discontinuous Galerkin Method for the Compressible Navier-Stokes Equations on Arbitrary Grids H. Luo, North Carolina State University, Raleigh, NC	1530 AIAA-2010-0365 Automated Quadrature-Free Discontinuous Galerkin Method with a Tailored Recovery Formulation M. Galbraith, University of Cincinnati, Cincinnati, OH	1600 AIAA-2010-0366 A Parallel Reconstructed Discontinuous Galerkin Method for Compressible Flows on Arbitrary Grids H. Luo, North Carolina State University, Raleigh, NC	1630 AIAA-2010-0367 Unsteady Discrete Adjoint Formulation for High- order Discontinuous Galerkin Discretizations in Time-dependent Flow Problems L. Wang, University of Tennessee, Chattanooga , Chattanooga, TN		

Monday Afternoon / 04 January 2010

Session 55-FD-12 — **Injection/Mixing Flows for Combustion** — **Crystal Ballroom F**

Chaired by: D. CULLEY and N. GEORGIADIS, NASA Glenn Research Center, Cleveland, OH

1400 AIAA-2010-0368 Effect of Cup Length on Film Profiles in Gas-Centered Swirl- Coaxial Injectors S. Schumaker, U.S. Air Force Research Laboratory, Edwards AFB, CA	1430 AIAA-2010-0370 LES/RANS Simulation of a Supersonic Reacting Wall Jet J. Edwards, North Carolina State University, Raleigh, NC	1500 AIAA-2010-0371 Contrast Between Steady and Time-Averaged Unsteady Combustion Simulations C. Lian, Purdue University, West Lafayette , IN	1530 AIAA-2010-0372 A Ghost Fluid, Level Set Approach for Modeling Electrohydrodynamic Atomization B. Van Poppel, University of Colorado, Boulder, Boulder, CO				

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Session 56-FD-13 — **Instability and Transition: Effects of Roughness** — **Tampa**

Chaired by: G. DALE, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and A. DRAKE, Northrop Grumman Corporation, El Segundo, CA

1400 AIAA-2010-0373 An Approach to Measuring Step Excrescence Effects in the Presence of a Pressure Gradient A. Bender, Northrop Grumman Corporation, El Segundo, CA	1430 AIAA-2010-0374 Hot- Wire Measurements of the Influence of Surface Steps on Transition in Favorable Pressure Gradient Boundary Layers S. Gerashchenko, California Institute of Technology, Pasadena, CA	1500 AIAA-2010-0375 Step Excrescence Effects for Manufacturing Tolerances on Laminar Flow Wings A. Drake, Northrop Grumman Corporation, El Segundo, CA	1530 AIAA-2010-0376 Effect of Three-Dimensional Surface Perturbations on Boundary Layer Transitional Characteristics J. Early, Queen's University Belfast, Belfast, Northern Ireland	1600 AIAA-2010-0377 Direct Numerical Simulation of Distributed Roughness on a Swept Wing Leading Edge D. Rizzetta, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1630 AIAA-2010-0378 Excitation of Crossflow Instabilities in a Swept Wing Boundary Layer M. Carpenter, NASA Langley Research Center, Hampton, VA		

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Session 57-FD-14 — **Joseph A. Schetz Invited Session: Celebrating 45 Years of Graduate Education** — **Grand Ballroom 2**

Chaired by: W. PULLIAM, Defense Advanced Research Projects Agency, Arlington, VA, and S. MAGILL, Talon Aircraft Holding GmbH, Myrtle Beach, SC

1400	1430	1500	1530	1600			
AIAA-2010-0379 Studies of Diamond-Shaped Injectors in a Supersonic Flow (Invited Presentation) R. Srinivasan, Ramgen Power Systems, Bellevue, WA	AIAA-2010-0380 Injectant Molecular Weight Effects in Injectors for Circular Scramjet Combustors C. Rock, Virginia Polytechnic Institute and State University, Blacksburg, VA	AIAA-2010-0382 Study of Bow- Shock Wave Unsteadiness in Hypervelocity Flow from Reservoir Fluctuations E. Marineau, CUBRC, Buffalo, NY	AIAA-2010-0383 Adaptivity and Uncertainty: Towards Rigorous Veri cation and Validation of Flow Simulations D. Pelletier, École Polytechnique de Montréal , Montréal, Canada	AIAA-2010-0384 Fabri Choking in a Two-Dimensional Reacting Flow Mixer- Ejector D. DeTurris, California Polytechnic State University, San Luis Obispo, CA			

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Session 58-FD-15 — **Pitching and Plunging Wing Aerodynamics** — **Crystal Ballroom B**

Chaired by: M. OL, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and H. DONG, Wright State University, Dayton, OH

1400	1430	1500	1530	1600	1630		
AIAA-2010-0385 Computation and Experiments on a Low Aspect Ratio Pitching Flat Plate Y. Lian, University of Louisville, Louisville, KY	AIAA-2010-0386 Lift Enhancement of a Rectangular Wing Undergoing a Small Amplitude Plunging Motion D. Calderon, University of Bath, Bath, Great Britain	AIAA-2010-0387 Low Reynolds Number Unsteady Aerodynamic over a Pitching-Plunging Flat Plate A. Hart, University of Florida, Shalimar, FL	AIAA-2010-0388 Experimental Study of Governing Parameters in Pitching and Plunging Airfoil at Low Reynolds Number Y. Baik, University of Michigan, Ann Arbor, MI	AIAA-2010-0389 Effect of Aspect Ratio on Rigid Lifting Flat Plates in Pitch- Plunge Motion at Low Reynolds Numbers J. Rausch, University of Michigan, Ann Arbor, MI	AIAA-2010-0390 Vortex Mode Bifurcation and Lift Force of a Plunging Airfoil at Low Reynolds Numbers D. Cleaver, University of Bath, Bath, Great Britain		

Monday Afternoon / 04 January 2010

Session 59-GPSE-2 — **NASA ISS Research Program Overviews** — **Grand Ballroom 6**

Chaired by: S. TSE, Rutgers University, Piscataway, NJ, and F. KOHL, NASA Glenn Research Center, Cleveland, OH

1400	1430	1500	1530	1600	1630		
Oral Presentation Science on the International Space Station in the Final Year of Assembly J. Robinson, NASA Johnson Space Center, Houston, TX	Oral Presentation ISS Research in Fluid Physics and Transport: Status, Recent Results and Future Plans B. Motil, NASA Glenn Research Center, Cleveland, OH	Oral Presentation Microgravity Combustion and Reacting Systems: Status, Recent Results, Plans, and Applications to Exploration Systems D. Urban, NASA Glenn Research Center, Cleveland, OH	Oral Presentation US Materials Science on ISS: Status and Plans F. Szofran, NASA Marshall Space Flight Center, Huntsville, AL	Oral Presentation Fundamental Space Biology: Past, Present, and Future S. Sun, NASA Ames Research Center, Moffet Field, CA	Oral Presentation Status on Current Spaceflight and Ground-Based NASA Plant Studies H. Levine, NASA Kennedy Space Center, Cape Canaveral, FL		

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Monday Afternoon / 04 January 2010

Session 60-GT-2 — **Aerodynamic Ground Testing** — **Crystal Ballroom G1**

Chaired by: R. WHITE, ViGYAN Inc, Hampton, VA, and T. WAYMAN, Gulfstream Aerospace Corporation, Richmond Hill, GA

1400	1430	1500	1530	1600	1630		
AIAA-2010-0397 Aerodynamics of Vertical- Axis Wind Turbines: Assessment of Accepted Wind Tunnel Blockage Practice I. Ross, University of Dayton, Dayton, OH	AIAA-2010-0398 Influence of Wing Elasticity on Dynamic Derivatives of Transport Aircraft T. Loeser, DNW, Braunschweig, Germany	AIAA-2010-0399 Boundary Layer Trips for Low Reynolds Number Wind Tunnel Tests A. Rona, University of Leicester, Leicester, Great Britain	AIAA-2010-0400 Unstable at All Speeds: Flight Testing the 1903 Wright Flyer Reproduction in 2003 N. Crabill, ViGYAN, Inc., Hampton, VA	Oral Presentation Transonic Tunnel Comparison Test S. Helland, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-0401 WITHDRAWN Exploring the Effects of Freestream Turbulence on Sphere Drag Transition C. Lamb, Massachusetts Institute of Technology, Arlington, MA		

Monday Afternoon / 04 January 2010

Session 61-GTE-2 — **Gas Turbine Engines - Turbines I** — **Grand Ballroom 13**

Chaired by: I. HALLIWELL, Avetec, Springfield, OH, and R. GAETA, Georgia Institute of Technology, Smyrna, GA

1400	1430	1500	1530	1600			
AIAA-2010-0403 Prediction of Heat Transfer Characteristics of Turbine Rotor Pedestal Arrays T. Barber, University of Connecticut, Storrs, CT	AIAA-2010-0404 Prediction of Adiabatic Effectiveness of Various Cratered Film Hole Configurations: Sensitivity Analysis for the Rectangle Shaped Mask N. Tran, University of Central Florida, Orlando, FL	AIAA-2010-0405 Numerical and Experimental Study of Trenched Film Hole Cooling for a Realistic Cascade in an Annular Endwall, Phase1: Test Rig Construction and Preliminary Data C. Nguyen, University of Central Florida, Orlando, FL	AIAA-2010-0406 Effect of Hole Shape on Blade Cooling Effectiveness J. Yao, Kingston University, London, Great Britain	AIAA-2010-0408 Effects of Incidence Angle on the Performance of Lightly Loaded Turbine Guide Vanes F. Ames, University of North Dakota, Grand Forks, ND			

Monday Afternoon / 04 January 2010

Session 62-GTE-3 — **Pressure-Gain Combustion for the Gas Turbine (Invited)** — **Grand Ballroom 14**

1400 - 1700

There has been significant recent progress in developing non-steady pressure-gain combustors to enable engines to reduce fuel consumption and boost performance significantly. The theoretical potential of constant-volume combustion has led to investigation of various devices that approach this ideal, such as pulse detonation engines, wave rotors, and pulse combustors. This session aims to provide an overview of the advantages and challenges of these combustors, and the needed research to make them successful in gas turbine and aircraft engine core applications.

Panelists:

Dr. Razi Nalim, Purdue University, Indianapolis, IN - co-chair

Dr. Daniel Paxson, NASA Glenn Research Center, Cleveland, OH: "Background, Motivation, History, Performance Metrics, Scope" - co-chair

Dr. Peter Strakey, DoE National Energy Technology Laboratory, Morgantown, WV: "Pressure-Gain Combustion for Power Generation Gas Turbines, Activities at NETL"

Dr. Robert Miller, University of Cambridge, United Kingdom: "Pressure-Gain Combustion for Aircraft Gas Turbines, Activities in the UK and Europe"

Dr. Philip Snyder, Rolls Royce Liberty Works, Indianapolis, IN: "Wave Rotor Combustion, Activities at Rolls Royce/IUPUI/Purdue and ABB"

Dr. K. Kailasanath, Naval Research Laboratory, Washington, DC: "Detonation Engine Progress Review, and Application to Gas Turbines and Propulsion"

Monday Afternoon / 04 January 2010

Session 63-HAPB-2 — **Ramjet/Scramjet Simulation with URANS/LES/DES I** — **Grand Ballroom 12**

Chaired by: B. SEKAR, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and D. KIRK, Florida Institute of Technology, Melbourne, FL

1400	1430	1500	1530	1600			
AIAA-2010-0409 Ignition Transient in an Ethylene Fueled Scramjet Engine with Air Throttling Part I: Non-Reacting flow Development and Mixing V. Yang, Pennsylvania State University, State College, PA	AIAA-2010-0410 Ignition Transient in an Ethylene Fueled Scramjet Engine with Air Throttling Part II: Ignition and Flame Development V. Yang, Pennsylvania State University, State College, PA	AIAA-2010-0411 Supersonic Combustor Fuel Injection Simulations Using a Hybrid RANS/LES Approach D. Peterson, University of Minnesota, Minneapolis, MN	AIAA-2010-0412 Three Dimensional Analysis of a Fully Coupled Hypersonic Air-breathing Inlet-Combustor Flowpath F. Malo-Molina, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	AIAA-2010-0414 Large- Eddy Simulation of Cavity Flame- Holding in a Mach 2.5 Cross Flow J. Choi, Georgia Institute of Technology, Atlanta, GA			

Monday Afternoon / 04 January 2010

Session 64-IS-1 — **Intelligent Flight Planning and Guidance** — **Crystal Ballroom Q**

Chaired by: L. LONG, Pennsylvania State University, University Park, PA, and E. ATKINS, University of Michigan, Ann Arbor, MI

1400	1430	1500	1530	1600			
AIAA-2010-0415 3- D Flight Plan for an Autonomous Aircraft Y. Bestaoui, University of Evry, Evry, France	AIAA-2010-0416 Trim State Discovery for an Adaptive Flight Planner G. Yi, Harbin Institute of Technology, Harbin, China (prc)	AIAA-2010-0417 Effectiveness of 2D Path Planning in Real Time using Fuzzy Logic C. Sabo, University of Cincinnati, Cincinnati, OH	AIAA-2010-0418 Dynamic Flight Plan Design for UAS Remote Sensing Applications M. Sole, Technical University of Catalonia, Barcelona, Spain	AIAA-2010-0420 Synergistic Computing: Combining CFD and Neural Networks for Maneuvering Simulation W. Faller, Applied Simulation Technologies, Cocoa Beach, FL			

Monday Afternoon / 04 January 2010

Session 65-PC-5 — **Drops and Sprays I** — **Los Angeles**

Chaired by: J. GREENBERG, Technion--Israel Institute of Technology, Haifa, Israel, and P. LE CLERCQ, German Aerospace Center (DLR), Stuttgart, Germany

1400	1430	1500	1530	1600			
AIAA-2010-0421 Droplet Burning of JP-8/Silica Gels R. Arnold, Purdue University, West Lafayette, IN	AIAA-2010-0422 Comparison of Monomethylhydrazine/ Hydroxypropylcellulose and Hydrocarbon/Silica Gels R. Arnold, Purdue University, West Lafayette, IN	AIAA-2010-1595 Design and testing of a porous injector head for transpiration cooled combustion chambers J. Deeken, German Aerospace Center (DLR), Lampoldshausen, Germany	AIAA-2010-0425 Edge Flames with a Fuel Spray and Reactants Having Different Diffusivities J. Greenberg, Technion--Israel Institute of Technology, Haifa, Israel	AIAA-2010-0426 Decomposition and Ignition Characteristics of Liquid GAP R. Kaya, Nihon University, Funabashi, Japan			

Monday Afternoon / 04 January 2010

Session 66-PC-6 — Turbulent Flames II — New York

Chaired by: H. IM, University of Michigan, Ann Arbor, MI, and C. CADOU, University of Maryland, College Park, MD

1400 AIAA-2010-0428 The Effects of Varied Octane Rating on a Small Spark Ignition Internal Combustion Engine C. Wilson, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	1430 AIAA-2010-0429 Simulations of the Chemical Transformations In a Jet Engine Exhaust Plume A. Garmory, University of Cambridge, Cambridge, Great Britain	1500 AIAA-2010-0430 WITHDRAWN A Study of Lean Direct-Injection Flames Under Pressurized Conditions R. Villalva Gomez, University of Cincinnati, Cincinnati, OH	1530 AIAA-2010-0431 Swirling Flame Dynamics and Describing Function P. Palies, École Centrale Paris, Chatenay-Malabry, France				

Monday Afternoon / 04 January 2010

Session 67-PDL-4 — Aero-Optics — Crystal Ballroom E

Chaired by: D. CARROLL, CU Aerospace, Champaign, IL, and J. HORKOVICH, Raytheon Company, Tucson, AZ

1400 AIAA-2010-0433 High Fidelity Aero-Optical Analysis M. White, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1430 AIAA-2010-0434 Aero- Optical Measurements in a Heated, Subsonic, Turbulent Boundary Layer J. Cress, University of Notre Dame, Notre Dame, IN	1500 AIAA-2010-0435 Aero- Optic Effects of a Wing Tip Vortex C. Porter, University of Notre Dame, Notre Dame, IN	1530 AIAA-2010-0436 Use of Plasma Actuators to Force Shear Layer Instabilities K. Schjodt, U.S. Air Force Academy, Colorado Springs, CO	1600 AIAA-2010-0437 Aerodynamic Design of an Aircraft- Mounted Pod for Improved Aero-Optic Performance M. Rennie, University of Notre Dame, Notre Dame, IN	1630 AIAA-2010-0438 Hybrid Flow Control of a Turret Wake, Part II: Aero- Optical Effects S. Gordeyev, University of Notre Dame, Notre Dame, IN		

Monday Afternoon / 04 January 2010

Session 68-SAT-1 — Society and Aerospace Sciences — Denver

Chaired by: S. O'BRIEN, Embry-Riddle Aeronautical University, Daytona Beach, FL, and J. CHRISTIAN, University of Texas, Austin, Austin, TX

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Monday Afternoon / 04 January 2010

Session 279-TES-6 — **Numerical Simulation I** — **Crystal Ballroom A**

Chaired by: C. MOEN, Sandia National Laboratories, Livermore, CA, and F. JABERI, Michigan State University, East Lansing, MI

1400 AIAA-2010-1553 A WENO- Z Based Eulerian- Lagrangian Code for Simulation of Shocked Flows Laden with Evaporating Droplets. J. Meijerink, San Diego State University, San Diego, CA	1430 AIAA-2010-1554 Modeling of Flow Regimes and Thermal Patterns Interactions in Complex Applications E. Khalil, Cairo University, Cairo, Egypt	1500 AIAA-2010-1555 AFTC: A Computer Code for General Fuel- Air Combustion of Waste for Energy Production with Minimal Pollution D. Lilley, Lilley & Associates, Stillwater, OK					

Monday Afternoon / 04 January 2010

Session 69-TP-3 — **Aerothermodynamics I** — **Crystal Ballroom M**

Chaired by: N. DOUGHERTY, Jacobs Engineering, Huntsville, AL, and J. KAPAT, University of Central Florida, Oviedo, FL

1400 AIAA-2010-0443 A Review of Aerothermal Modeling for Mars Entry Missions M. Wright, NASA Ames Research Center, Moffett Field, CA	1430 AIAA-2010-0444 A Computational Study of High Enthalpy Flow Over a Rearward Facing Step D. Narayan Ramanath, University of New South Wales at the Australian Defence Force Academy, Canberra, Australia	1500 AIAA-2010-0445 Results & Analysis of Large Scale Article Testing in the Ames 60 MW Interaction Heating Arc Jet Facility M. Loomis, NASA Ames Research Center, Moffett Field, CA	1530 AIAA-2010-0446 Apollo- Shaped Capsule Boundary Layer Transition at High- Enthalpy in T5 E. Marineau, CUBRC, Buffalo, NY	1600 AIAA-2010-0447 Parameter Sensitivity Analysis for Hypersonic Viscous Flow Using a Discrete Adjoint Approach B. Lockwood, University of Wyoming, Laramie, WY			

Monday Afternoon / 04 January 2010

Session 70-TP-4 — **Direct Simulation Monte Carlo Methods I** — **Crystal Ballroom N**

Chaired by: D. GOLDSTEIN, University of Texas, Austin, Austin, TX, and E. TITOV, Pennsylvania State University, University Park, PA

1400 AIAA-2010-0449 Treatment of Electronic Energy Level Transition and Ionization Following the Particle- Based Chemistry Model D. Liechty, NASA Langley Research Center, Hampton, VA	1430 AIAA-2010-0450 A Three- Level Cartesian Geometry- Based Implementation of the DSMC Method D. Gao, University of Minnesota, Minneapolis, MN	1500 AIAA-2010-0451 Parallel Implementation of the Direct Simulation Monte Carlo Method For Shared Memory Architectures D. Gao, University of Minnesota, Minneapolis, MN	1530 AIAA-2010-0989 State- to- State Transition and Non- Equilibrium Chemical Reaction in Direct Simulation Monte Carlo Method J. Kim, KAIST, Daejeon, South Korea				

Monday Afternoon / 04 January 2010

Session 71-TP-5 — **Orbiter Entry Aerothermo Flight Experiments: Orbiter Computational Analyses** — **Crystal Ballroom P**

Chaired by: M. CHOUDHARI, NASA Langley Research Center, Hampton, VA, and J. PAYNE, Sandia National Laboratories, Albuquerque, NM

1400 AIAA-2010-0453 Numerical Simulations of the Boundary Layer Transition Flight Experiment C. Tang, NASA Ames Research Center, Moffett Field, CA	1430 AIAA-2010-0454 Comparison of CFD Predictions with Shuttle Global Flight Thermal Imagery and Discrete Surface Measurements W. Wood, NASA Langley Research Center, Hampton, VA	1500 AIAA-2010-0455 Hypersonic Navier Stokes Comparisons to Orbiter Flight Data G. Candler, University of Minnesota, Minneapolis, MN	1530 AIAA-2010-0456 Effects of Rarefaction on Hypersonic Boundary Layer Flow Over Discrete Surface Roughness K. Stephani, University of Texas, Austin, Austin, TX	1600 AIAA-2010-0457 Orbiter Boundary Layer Stability Analysis at Flight Entry Conditions H. Johnson, University of Minnesota, Minneapolis, MN	1630 AIAA-2010-0458 Boundary Layer Protuberance Simulations in Channel Nozzle Arc Jet J. Marichalar, Jacobs Technology, Houston, TX		

Monday Afternoon / 04 January 2010

Session 72-WE-2 — **Wind Turbine Aerodynamics Modeling and Analysis** — **Crystal Ballroom G2**

Chaired by: J. LAURSEN, Siemens, Brande, Denmark, and C. VAN DAM, University of California, Davis, Davis, CA

1400 AIAA-2010-0459 Hybrid RANS/LES Simulations of a Horizontal Axis Wind Turbine C. Stone, Computational Science & Engineering, Athens, GA	1430 AIAA-2010-0460 Computational Predictions of Airfoil Roughness Sensitivity K. Standish, Siemens, Boulder, CO	1500 AIAA-2010-0461 Using the Actuator Surface Method to Model the Three- Bladed Mexico Wind Turbine S. Breton, École de Technologie Supérieure, Montréal, Canada	1530 AIAA-2010-0462 Validating BEM, Direct and Inverse Free Wake Models with the MEXICO Experiment. D. Micallef, University of Malta, Msida, Malta	1600 AIAA-2010-0463 Comparison of Potential Flow Wake Models for Horizontal- Axis Wind Turbine Rotors S. Cline, University of Victoria, Victoria, Canada			

Monday Afternoon / 04 January 2010

Session 73-WIG-3 / PDL-5 — **Joint PDL/WIG/FD/TP Plasma Actuator Session II** — **Grand Ballroom 1**

Chaired by: D. VAN WIE, Johns Hopkins University Applied Physics Laboratory, Laurel, MD, and N. YURCHENKO, National Academy of Sciences of Ukraine, Kiev, Ukraine

1400 AIAA-2010-0465 Rate of Plasma Thermalization of Pulsed Nanosecond Surface Dielectric Barrier Discharge A. Starikovskii, Drexel University, Philadelphia, PA	1430 AIAA-2010-0467 Dielectric Barrier Discharge Initiation Under the Supersonic Airflow A. Saveliev, Moscow Institute of Physics and Technology, Dolgoprudny, Russia	1500 AIAA-2010-0468 Separation Control Using Vectoring Plasma Actuators S. Fleming, Oklahoma State University, Stillwater, OK	1530 AIAA-2010-0470 Limitations of the DBD effects on the external flow A. Likhanskii, Tech-X, Boulder, CO	1600 AIAA-2010-0469 Surface plasma induced wall jets D. Opaits, Princeton University, Princeton, NJ			

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Monday Afternoon / 04 January 2010

1730 - 1830 | **2010 Dryden Lectureship In Research** | **Crystal Ballroom H**

D. Ian Poll
Professor of Aerospace Engineering
Cranfield University
Bedfordshire, United Kingdom

Tuesday Morning / 05 January 2010

0800 - 0900 | **New Horizons Forum Keynote Address** | **Crystal Ballroom H**

Distinguished Speaker: **Dr. Steven E. Koonin**, Under Secretary for Science, U.S. Department of Energy

Global Energy Challenges

Tuesday Morning / 05 January 2010

0900 - 1130 | **A New Horizons Forum Panel Discussion - Environment & Energy Issues for Aerospace... Issues & Perspectives** | **Crystal Ballroom J2**

The panel will discuss key issues affecting the aerospace community in the years ahead, including topics such as aerospace community impact on energy and environment – good and bad; the role of aerospace systems in environmental assessment & change … climate & weather, natural disasters; power & propulsion – the changes ahead, among others.

Moderator: **George K. Muellner**, AIAA President 2008-2009, The Boeing Company, (Retired), USAF Lt. Gen. (Retired)

Panelists:

- **Rear Admiral David W. Titley**, Oceanographer and Navigator of the Navy, Washington D.C.
- **David E. Parekh**, Vice President, Research, and Director, United Technologies Research Center, Hartford CN
- **Ray O. Johnson**, Senior Vice President and Chief Technology Officer, Lockheed Martin Corporation, Bethesda, MD
- **Chris J. Smith**, Director of Operations, IDS Energy Solutions, The Boeing Company, Saint Louis, MO

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Tuesday Morning / 05 January 2010

0900 - 1200 | **Career and Workforce Development Workshop - Laying the Foundation for the Future of Aerospace I** | **Crystal Ballroom G1**

The morning sessions are focused on personal development topics and activities focused on enhancing your career.

Tuesday Morning / 05 January 2010

Session 74-AA-5 | **Jet Noise II** | **Washington**

Chaired by: S. LELE, Stanford University, Stanford, CA

0900 AIAA-2010-0471 Experimental and Numerical Investigation of Flow Properties of Supersonic Helium- Air Jets S. Miller, NASA Langley Research Center, Hampton, VA	0930 AIAA-2010-0472 Flight Effects on Supersonic Jet: Noise, Thrust, Source Distribution and Shock Patterns D. Long, Aero Systems Engineering, St. Paul, MN	1000 AIAA-2010-0473 Forward Flight Effects on the Shock Structure From a Chevron C- D Nozzle D. Munday, University of Cincinnati, Cincinnati, OH	1030 AIAA-2010-0474 Effects of Jet Noise Source Distribution on Acoustic Far- Field Measurements C. Kuo, Pennsylvania State University, State College, PA	1100 AIAA-2010-0475 Stability of the Inner Nozzle Wake with Relevance to the Coannular Jet Aeroacoustics S. Sarpotdar, Illinois Institute of Technology, Chicago, IL	1130 AIAA-2010-0476 Acoustic Waves from a Supersonic Jet Impinging on an Inclined Flat Plate T. Nonomura, University of Tokyo, Sagamihara, Japan		

Tuesday Morning / 05 January 2010

Session 75-ABP-3 | **Inlets I** | **Crystal Ballroom D**

Chaired by: D. MAYER, The Boeing Company, Kent, WA, and I. HALLIWELL, Avetec, Springfield, OH

0900 AIAA-2010-0477 Analysis of a Channeled Centerbody Supersonic Inlet for F- 15B Flight Research N. Ratnayake, NASA Dryden Flight Research Center, Edwards AFB, CA	0930 AIAA-2010-0479 Coupled Analysis of an Inlet and Fan for a Quiet Supersonic Jet R. Chima, NASA Glenn Research Center, Cleveland, OH	1000 AIAA-2010-0480 Flow Simulation of Supersonic Inlet with Bypass Annular Duct H. Kim, NASA Glenn Research Center, Cleveland, OH	1030 AIAA-2010-0481 Flow Field and Performance Analysis of an Integrated Diverterless Supersonic Inlet J. Masud, IAA, Air University, Islamabad, Pakistan				

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Tuesday Morning / 05 January 2010

Session 76-AD-3 — **Unmanned Aircraft Design** — **Crystal Ballroom K**

Chaired by: R. MCDONALD, California Polytechnic State University, San Luis Obispo, CA

0900 AIAA-2010-0482 Multidisciplinary Unmanned Combat Air Vehicle (UCAV) System Design Using Multi-Fidelity Models S. Choi, Konkuk University, Seoul, South Korea	0930 AIAA-2010-0483 Validation of Models for Small Scale Electric Propulsion Systems D. Lundström, Linköping University, Linköping, Sweden	1000 AIAA-2010-0484 Experimental Validation of a FEA- Based Model Used for Buckling Analysis of Load Stiffening Bendable UAV Wings A. Patil, University of Florida, Gainesville, FL	1030 AIAA-2010-0485 Bioinspired UAV Wing A. Bright, Tufts University, Medford, MA				

Tuesday Morning / 05 January 2010

Session 77-AFM-3 — **Flight Dynamics and Control** — **Chicago**

Chaired by: C. COX and M. BOLENDER, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

0900 AIAA-2010-0488 The Influence of Free-Play and Friction in Elevator Control System on Aircraft Dynamics K. Sibilski, Wroclaw University of Technology, Wroclaw, Poland	0930 AIAA-2010-0489 Challenges and Lessons Learned From Resurrecting a Legacy Research Flight Controller C. Moua, NASA Dryden Flight Research Center, Edwards, CA	1000 AIAA-2010-0490 Simulation and Control of Fixed Wing Aircraft After a Major Component Loss U. Ozdemir, Istanbul Technical University, Istanbul, Turkey	1030 AIAA-2010-0491 Investigation of Attainable Equilibrium Sets for Clearance of Flight Control Laws N. Abramov, De Montfort University, Leicester, Great Britain	1100 AIAA-2010-0492 Using Describing Functions for Limit-Cycle- Oscillation Analysis Applied to Aeroservoelastic Models with Free- Play B. Danowsky, Systems Technology, Inc., Hawthorne, CA	1130 AIAA-2010-0493 3- D Formulation of Formation Flight Based on Model Predictive Control with Collision Avoidance Scheme W. Zhao, Nanyang Technological University, Singapore, Singapore		

Tuesday Morning / 05 January 2010

Session 78-AMT-4 — **Shear Stress Measurement Technology II** — **Crystal Ballroom J1**

Chaired by: T. LIU, Western Michigan University, Kalamazoo, MI, and M. BENNE, The Boeing Company, St Louis, MO

0900 AIAA-2010-0494 Time- Resolved Wall-Shear Imaging on Surfaces Coated with Arrays of Flexible Micro-Pillars (Invited) C. Bruecker, Technical University of Freiberg, Freiberg, Germany	0930 AIAA-2010-0495 Measuring the Two-Dimensional, Two-Directional Temporal Wall- Shear Stress Distribution with the Micro- Pillar Shear-Stress Sensor MPS³ (Invited) S. Grosse, RWTH Aachen University, Aachen, Germany	1000 AIAA-2010-0497 Naval Maneuvering Research and the Need for Shear Stress Measurements (Invited) D. Hess, Naval Surface Warfare Center, Bethesda, MD	1030 AIAA-2010-0498 Optical Miniaturization of a MEMS- Based Floating Element Shear Stress Sensor with Moiré Amplification T. Chen, University of Florida, Gainesville, FL				

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Tuesday Morning / 05 January 2010

Session 79-APA-7 — Applied CFD to Configurations and Experimental Validation — Grand Ballroom 9

Chaired by: T. CHYCZEWSKI, Northrop Grumman Corporation, Bethpage, NY, and W. SICKLES, Arnold Engineering Development Center, Arnold AFB, TN

0900	0930	1000	1030				
AIAA-2010-0500 CFD Assessment of Aerodynamic Degradation of a Subsonic Transport Due to Airframe Damage N. Frink, NASA Langley Research Center, Hampton, VA	AIAA-2010-0501 Creation of Aerodynamic Database for the X- 31 M. Tomac, KTH Royal Institute of Technology, Stockholm, Sweden	AIAA-2010-0502 Computational and Experimental Comparison of a Powered Lift, Upper Surface Blowing Configuration J. Marcos, California Polytechnic State University, San Luis Obispo, CA	AIAA-2010-0503 A MUSCL and WENO – PNS Approach for Vortex Dominated Flowfields D. de Feo, University of Sheffield, Sheffield, Great Britain				

Tuesday Morning / 05 January 2010

Session 80-APA-8 — Moving Body CFD Simulation I — Grand Ballroom 10

Chaired by: D. FINDLAY, Naval Air Systems Command, Patuxent River, MD, and J. MARTEL, Jacobs Engineering, Eglin AFB, FL

0900	0930	1000	1030	1100	1130		
AIAA-2010-0506 Flow Simulation of Tension Cone Inflatable Aeroshell with Fluid Structure Interactions V. Gidzak, University of Minnesota, Minneapolis, MN	AIAA-2010-0507 WITHDRAWN Efficient Automated Overset Adaptive Cartesian/Unstructured Grid Generation for Objects in Close Geometrical Proximity R. Kannan, CFD Research Corporation, Huntsville, AL	AIAA-2010-0508 Hybrid Cartesian Grid/Gridless Algorithm for Store Separation Prediction L. Tang, D&P LLC, Phoenix, AZ	AIAA-2010-0509 Conservative Unsteady Simulation of Arbitrary Boundary Deformation Using Spacetime Meshes T. Rendall, University of Bristol, Bristol, Great Britain	AIAA-2010-0510 Store Separations in Jet Flow Environments J. Lee, Naval Air Systems Command, Patuxent River, MD	AIAA-2010-0511 Kestrel v2 - 6DoF and Control Surface Additions to a CREATE Simulation Tool S. Morton, U.S. Air Force SEEK EAGLE Office, Eglin AFB, FL		

Tuesday Morning / 05 January 2010

Session 81-APA-9 — Unsteady Aerodynamics II — Grand Ballroom 11

Chaired by: B. MCGRATH, Johns Hopkins University Applied Physics Laboratory, Laurel, MD

0900	0930	1000	1030				
AIAA-2010-0513 Simulation of the Dynamic Stall at Low Reynolds Number C. Marongiu, Italian Aerospace Research Center (CIRA), Capua, Italy	AIAA-2010-0514 Unsteady Confined Viscous Flows with Oscillating Walls and Variable Inflow Velocity D. Mateescu, McGill University, Montréal, Canada	AIAA-2010-0515 Improved Methodologies for Maneuver Design of Aircraft Stability and Control Simulations A. Jirasek, U.S. Air Force Academy, Colorado Springs, CO	AIAA-2010-0516 WITHDRAWN Computational Analysis of Winglet Modifications on the KC- 135 M. Arndt, U.S. Air Force Academy, Colorado Springs, CO				

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Tuesday Morning / 05 January 2010

Session 82-ASE-3 — **Quantifying and Modeling Atmospheric Phenomena** — **Atlanta**

Chaired by: W. VAUGHAN, University of Alabama, Huntsville, Huntsville, AL, and J. MURRAY, NASA Langley Research Center, Hampton, VA

0900 AIAA-2010-0518 Gust Load- Line Analysis Research of Wake Vortex Encounter Flight Data A. Brown, National Research Council Canada, Ottawa, Canada	0930 AIAA-2010-0519 Analytical Approach to Wake Vortex and Jet Wake Flow Interaction in Cruising Flight A. Brown, National Research Council Canada, Ottawa, Canada	1000 AIAA-2010-0520 The detection, characterization and tracking of recent Aleutian Island volcanic ash plumes and the assessment of their impact on aviation J. Murray, NASA Langley Research Center, Hampton, VA					

Tuesday Morning / 05 January 2010

Session 83-CS-1 — **HPC I: GPU Applications and Benchmarking** — **Tampa**

Chaired by: C. LI, Aerojet, Folsom, CA

0900 AIAA-2010-0522 An MPI- CUDA Implementation for Massively Parallel Incompressible Flow Computations on Multi-GPU Clusters D. Jacobsen, Boise State University, Boise, ID	0930 AIAA-2010-0523 Porting of an Edge-Based CFD Solver to GPUs A. Corrigan, George Mason University, Fairfax, VA	1000 AIAA-2010-0524 Using GPU on HPC Applications to Satisfy Low- Power Computational Requirement G. Patnaik, Naval Research Laboratory, Washington, DC	1030 AIAA-2010-0525 Acceleration of a Finite-Difference WENO Scheme for Large- Scale Simulations on Many-Core Architectures A. Antoniou, University of Patras, Patra, Greece				

Tuesday Morning / 05 January 2010

Session 84-ECS-2 — **Green Initiatives in the Development and Manufacture of Energetic Materials** — **New York**

Chaired by: K. RINK, University of Idaho, Moscow, ID, and H. LEE, Scot Incorporated, Downers Grove, IL

0900 AIAA-2010-0528 Performance Characterization of Nanoscale Energetic Materials on Semiconductor Bridges (SCBs) G. Strohm, Purdue University, West Lafayette, IN							

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Tuesday Morning / 05 January 2010

Session 85-EDU-2 — **Panels: The CDIO Approach and Industry Engagement in Engineering Education** — **Crystal Ballroom Q**

Chaired by: D. KRAUSCHE, Florida Center for Engineering Education, Gainesville, FL, and R. NIEWOEHNER, U.S. Naval Academy, Annapolis, MD

0900 AIAA-2010-0531 The Education of Future Aeronautical Engineers: Conceiving, Designing, Implementing and Operating E. Crawley, Massachusetts Institute of Technology, Cambridge, MA	0945 AIAA-2010-0532 North American Aerospace Project: CDIO in Aerospace Engineering Education E. Crawley, Massachusetts Institute of Technology, Cambridge, MA	1030 Oral Presentation Panel Discussion: Industry Engagement in Aerospace Education R. Niewoehner, U.S. Naval Academy, Annapolis, MD		

Tuesday Morning / 05 January 2010

Session 86-FD-16 — **Boundary Layer Transition I** — **Grand Ballroom 2**

Chaired by: V. THEOFILIS, Technical University of Madrid, Madrid, Spain, and X. ZHONG, University of California, Los Angeles, Los Angeles, CA

0900 AIAA-2010-0534 Numerical Simulation and Theoretical Analysis on Hypersonic Boundary- Layer Receptivity to Wall Blowing- Suction A. Tumin, University of Arizona, Tucson, AZ	0930 AIAA-2010-0535 Transient Growth of A Mach 5.92 Flat- Plate Boundary Layer X. Wang, University of California, Los Angeles, Los Angeles, CA	1000 AIAA-2010-0536 Investigation of the response of a hypersonic 2D boundary layer to controlled acoustic disturbances D. Heitmann, Technical University of Braunschweig, Braunschweig, Germany	1030 AIAA-2010-0538 On the Complex Spectrum Boundaries Calculation S. Chernyshev, TsAGI, Zhukovsky, Russia	1100 AIAA-2010-1367 Transition Experiments on Blunt Bodies with Isolated Roughness Elements in Hypersonic Free Flight D. Reda, NASA Ames Research Center, Moffett Field, CA			

Tuesday Morning / 05 January 2010

Session 87-FD-17 — **High Order Methods II** — **Grand Ballroom 3**

Chaired by: M. MALIK, NASA Langley Research Center, Hampton, VA, and R. DAVIS, University of California, Davis, Davis, CA

0900 AIAA-2010-0539 A High- Resolution Method Using Adaptive Polynomial for Local Refinement J. Shang, Wright State University, Dayton, OH	0930 AIAA-2010-0540 A High- Order Unifying Discontinuous Formulation for 3- D Mixed Grids T. Haga, Iowa State University, Ames, IA	1000 AIAA-2010-0541 High- Order Spectral Difference Method for the Navier- Stokes Equation on Unstructured Moving Deformable Grid K. Ou, Stanford University, Stanford, CA	1030 AIAA-2010-0542 On the Impact of Triangle Shapes for Boundary Layer Problems Using High-Order Finite Element Discretization H. Sun, Massachusetts Institute of Technology, Cambridge, MA	1100 AIAA-2010-0543 A New Approach for Constructing Highly Stable High Order CESE Schemes S. Chang, NASA Glenn Research Center, Cleveland, OH	1130 AIAA-2010-0544 Preliminary Implementation of a High Order Space- time Method on Overset Cartesian/Quadrilateral Grids S. Tu, Jackson State University, Jackson, MS		

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Tuesday Morning / 05 January 2010

Session 88-FD-18 — **Joint PDL/WIG/FD/TP Plasma Actuator Session III** — **Grand Ballroom 4**

Chaired by: T. CORKE, University of Notre Dame, Notre Dame, IN, and E. STEPHEN, U.S. Air Force Academy, Colorado Springs, CO

0900 AIAA-2010-0545 Effects of Oxygen Content on the Behavior of the Dielectric Barrier Discharge Aerodynamic Plasma Actuator G. Font, U.S. Air Force Academy, Colorado Springs, CO	0930 AIAA-2010-0547 Closed- Loop Stall Control on a Morphing Airfoil Using Hot- Film Sensors and DBD Actuators J. Poggie, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 AIAA-2010-0549 Flow Behavior Behind a Circular Cylinder by DBD Plasma Actuators in Low Reynolds Number S. Yamada, Tokyo University of Science, Tokyo, Japan	1030 AIAA-2010-0550 Low- Pressure Effects on a Single DBD Plasma Actuator K. Bottelberghe, North Dakota State University, Fargo, ND				

Tuesday Morning / 05 January 2010

Session 89-FD-19 — **Low Reynolds Number and Bio-Inspired Aerodynamics I** — **Grand Ballroom 5**

Chaired by: A. ALTMAN, University of Dayton, Dayton, OH, and J. ELDREDGE, University of California, Los Angeles, Los Angeles, CA

0900 AIAA-2010-0551 Three- Dimensional Effects on a Waving Wing A. Jones, University of Cambridge, Cambridge, Great Britain	0930 AIAA-2010-0552 Unsteady Aerodynamic Models for Agile Flight at Low Reynolds Number S. Brunton, Princeton University, Princeton, NJ	1000 AIAA-2010-0553 Numerical Study of Flexible Flapping Wing Propulsion T. Yang, New Mexico State University, Las Cruces, NM	1030 AIAA-2010-0554 A Computational and Experimental Studies of Flexible Wing Aerodynamics H. Aono, University of Michigan, Ann Arbor, MI	1100 AIAA-2010-0555 Computational Analysis of Hovering Hummingbird Flight Z. Liang, Wright State University, Dayton, OH	1130 AIAA-2010-0556 A 3D Computational Study of the Flow-Structure Interaction in Flapping Flight H. Luo, Vanderbilt University, Nashville, TN		

Tuesday Morning / 05 January 2010

Session 90-FD-20 — **Unsteady Flows** — **Crystal Ballroom B**

Chaired by: M. HONG, The Boeing Company, Seattle, WA, and J. LIN, NASA Langley Research Center, Hampton, VA

0900 AIAA-2010-0557 Development of An Integrated Aero- Optics Modeling Capability: OVERFLOW- AeroOptics W. Coirier, Kratos/Digital Fusion Solutions, Inc., Huntsville, AL	0930 AIAA-2010-0558 Transverse Injection into Subsonic Crossflow with Various Injector Orifice Geometries L. Foster, NASA Glenn Research Center, Cleveland, OH	1000 AIAA-2010-0559 Vortex- Shedding Mechanisms in Internal Flows M. Boghosian, Illinois Institute of Technology, Chicago, IL	1030 AIAA-2010-0560 LES of an Oscillating Cylinder in a Steady Flow A. Feymark, Chalmers University of Technology, Göteborg, Sweden	1100 AIAA-2010-0561 Large Eddy Simulation of Pulsed Jet in Cross?ow A. Coussement, Université Libre de Bruxelles, Brussels , Belgium	1130 AIAA-2010-0562 Visualization of a Ground Vortex Flow J. Barata, University of Beira Interior, Covilhã, Portugal		

Tuesday Morning / 05 January 2010

Session 91-FD-21 — **Micro/Nano Fluidics I** — **New Orleans**

Chaired by: W. KIM, Pratt & Whitney, A United Technologies Company, East Hartford, CT, and D. HITT, University of Vermont, Burlington, VT

0900 AIAA-2010-0563 A Computationally Efficient Framework for Modeling Microscale and Rarefied Gas Flows Based on New Constitutive Relations R. Myong, Gyeongsang National University, Jinju, South Korea	0930 AIAA-2010-0564 Oscillatory Magnetogasdynamics Slip Flow in a Microchannel R. Agarwal, Washington University in St. Louis, St. Louis, MO	1000 AIAA-2010-0565 An Experimental Study of Pulsed Micro- Flows Driven by an Insulin Pump B. Wang, Iowa State University, Ames, IA	1030 AIAA-2010-0567 WITHDRAWN Numerical Flow Solutions of a Valveless Micropump M. Galbraith, University of Cincinnati, Cincinnati, OH				

Tuesday Morning / 05 January 2010

Session 92-GPSE-3 — **Emerging Opportunities in Research Flights I** — **Grand Ballroom 6**

Chaired by: S. COLLICOTT, Purdue University, West Lafayette, IN, and J. COHEN, NASA Headquarters, Washington, DC

0900 Oral Presentation Microgravity and Other Research Applications Using the Emerging Human Suborbital Vehicles A. Stern, Southwest Research Institute, Boulder, CO	0930 Oral Presentation Space- X Emerging Research Opportunities E. Spengler, Space-X, Hawthorne, CA	1000 Oral Presentation Armadillo Aerospace Update N. Milburn, Armadillo Aerospace, Rockwall, TX					

Tuesday Morning / 05 January 2010

Session 93-GT-3 / HIS-2 — **History of Wind Tunnels I** — **Miami**

Chaired by: V. CANACCI, and S. EBERHARDT, The Boeing Company, Seattle, WA, and S. SMITH-BRITO, The Boeing Company, Bellevue, WA

0900 Oral Presentation History of UWAL S. Eberhardt, The Boeing Company, Seattle, WA	0930 Oral Presentation History of Wind Tunnels as They Have Influenced Specific Air Vehicle Development S. Smith-Brito, The Boeing Company, Bellevue, WA	1000 Oral Presentation National Full- Scale Aerodynamics Complex, NFAC J. Van Aken, Jacobs Technology, Moffett Field, CA	1030 AIAA-2010-0575 DNW- HST (High Speed Tunnel) 50- Year Anniversary I. Philipsen, German-Dutch Wind Tunnels (DNW), Emmeloord, The Netherlands	1100 Oral Presentation History of Arnold Engineering Development Center Wind Tunnels M. Mills , Arnold Engineering Development Center, Arnold AFB, TN	1130 Oral Presentation A Brief History of Sandia's Wind Tunnels, and a Look to the Future S. Beresh, Sandia National Laboratories, Albuquerque, NM		

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Tuesday Morning / 05 January 2010

Session 94-GTE-4 — **Gas Turbine Combustion** — **Grand Ballroom 13**

Chaired by: J. COHEN, United Technologies Research Center, East Hartford, CT, and M. IHME, University of Michigan, Ann Arbor, MI

0900 AIAA-2010-0578 Comparing Spray Characteristics from RANS NCC Calculations Against Experimental Data for a Turbulent Reacting Flow A. Iannetti, NASA Glenn Research Center, Cleveland, OH	0930 AIAA-2010-0579 Gas Turbine Single Annular Combustor Sector Aerodynamics B. Mohammad, University of Cincinnati, Cincinnati, OH	1000 AIAA-2010-0580 A Transonic Vane for use Downstream of a Pressure Gain Combustor J. Heffer, Whittle Laboratory, Cambridge, Great Britain	1030 AIAA-2010-0581 Effect of Vane Notch and Ramp Design on the Performance of a Rectangular Inter-Turbine Burner A. Briones, University of Dayton Research Institute, Dayton, OH	1100 AIAA-2010-0583 A Numerical Study of Flow Dynamics in an Annular Combustor with Multiple Swirl Injectors H. Sung, Korea Aerospace University, Goyang, South Korea	1130 AIAA-2010-0584 Proper Orthogonal Decomposition for Experimental Investigation of Swirling Flame Instabilities P. Iudiciani, Lund Technical University, Lund, Sweden		

Tuesday Morning / 05 January 2010

Session 95-GTE-5 — **Gas Turbine Materials** — **Crystal Ballroom E**

Chaired by: J. KAPAT, University of Central Florida, Oviedo, FL

0900 AIAA-2010-0587 Crack- Detection Experiments on Simulated Turbine Engine Disks in NASA Glenn Research Center's Rotordynamics Laboratory M. Woike, NASA Glenn Research Center, Cleveland, OH							

Tuesday Morning / 05 January 2010

Session 96-GTE-6 — **Large CFD Simulations of Engine Components (Invited)** — **Grand Ballroom 14**

Chaired by: G. WELCH, U.S. Army Research Laboratory, Cleveland, OH, and M. HATHAWAY, NASA Glenn Research Center, Cleveland, OH

0900 AIAA-2010-1603 Aspects of Numerical Analysis for Unsteady Flows in Aircraft Engines J. Yao, General Electric Company, Niskayuna, NY	0930 AIAA-2010-1604 Flow Characteristics of Tip- Injection on Compressor Rotating Instability via Time-Accurate Simulation J. Chen, Ohio State University, Columbus, OH	1000 AIAA-2010-1605 Unstructured Grid Technology Applied to Axial- flow Compressors R. Webster, University of Tennessee, Chattanooga, Chattanooga, TN	1030 AIAA-2010-1606 Lessons Learned from the GE90 3- D Full Engine Simulations M. Turner, University of Cincinnati, Cincinati, OH				

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Tuesday Morning / 05 January 2010

Session 97-HAPB-3 — **Supersonic Inlets** — **Grand Ballroom 12**

Chaired by: F. MALO-MOLINA, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and W. ENGBLOM, Embry-Riddle Aeronautical University, Daytona Beach, FL

0900 AIAA-2010-0588 Development of a Ludwieg Tube with Free Piston Compression Heating for Scramjet Inlet Starting Experiments D. Buttsworth, University of Southern Queensland, Toowoomba, Australia	0930 AIAA-2010-0589 Experimental and Computational Investigation of a Dynamic Starting Method for Supersonic/Hypersonic Inlets R. Throckmorton, Virginia Polytechnic Institute and State University, Blacksburg, VA	1000 AIAA-2010-0590 Micro- Vortex Generators Applied to a Flow- Field Containing a Normal Shock- Wave and Diffuser N. Titchener, Cambridge University, Cambridge, Great Britain	1030 AIAA-2010-0591 Effect of Reynolds number on supersonic flow bleed A. Hamed, University of Cincinnati, Cincinnati, OH	1100 AIAA-2010-0592 LES for Supersonic Ramp Control Flow Using MVG at M=2.5 and Re?=1440 Q. Li, University of Texas, Arlington, Arlington, TX			

Tuesday Morning / 05 January 2010

Session 98-HS-1 — **Homeland Security** — **Crystal Ballroom P**

Chaired by: J. BRADER, The Aerospace Corporation, Los Angeles, CA

0900 Oral Presentation Full- Scale Demonstrations of Enhanced Low- Speed Maneuverability Airships for ISR Missions B. Buerge, Guardian Flight Systems, LLC, Elizabeth City, NC	0930 AIAA-2010-0594 Protection of Critical Infrastructures: A Methodology for Facilitating Modeling and Simulation of Notional Scenarios A. Payan, Georgia Institute of Technology, Atlanta, GA	1000 AIAA-2010-0595 Fuzzy Counter Ant Algorithm for Maze Problem M. Ahuja, University of Cincinnati, Cincinnati, OH	1030 AIAA-2010-0597 The Monotonic Lagrangian Grid for Fast Air- Traffic Evaluation C. Kaplan, Naval Research Laboratory, Washington, DC				

Tuesday Morning / 05 January 2010

Session 99-NSC-4 — **AIAA Foundation Graduate Student Awards Presentations** — **Crystal Ballroom A**

Chaired by: S. BROCK, American Institute of Aeronautics and Astronautics, Reston, VA

0900 Oral Presentation Advanced Combined Cycle Propulsion Graduate Award D. Wood, University of Colorado, Boulder, Boulder, CO	0930 Oral Presentation High Resolution Optical Measurements in Aerodynamic and Propulsion Systems Graduate Award A. Bhuiyan, Purdue University, West Lafayette, IN	1000 Oral Presentation Hypervelocity Impact Graduate Award J. Mihaly, California Institute of Technology, Pasadena, CA	1030 Oral Presentation John Leland Atwood Graduate Award Winner - Optimal Control Theory and Computational Techniques X. Bai, Texas A&M University, College Station, TX	1100 Oral Presentation High Energy Ions in Electric Thrusters Graduate Award J. Przybylowski , California Institute of Technology, Pasadena, CA			

Tuesday Morning / 05 January 2010

Session 100-PC-7 — Chemical Kinetics and Combustion — Boston

Chaired by: W. TSANG, National Institute of Standards and Technology, Gaithersburg, MD, and Y. JU, Princeton University, Princeton, NJ

0900	0930	1000	1030				
AIAA-2010-0605 To Kerosene Reaction Model Development: Propylcyclohexane, C9H18, Dodecane, C12H26, and Hexadecane C16H34 Combustion N. Slavinskaya, German Aerospace Center (DLR), Stuttgart, Germany	AIAA-2010-0606 Direct Modeling of Auto-Ignition and Flame Propagation of N-heptane- Air Mixtures at HCCI Conditions by Using Dynamic Multi-Timescale Method Y. Ju, Princeton University, Princeton, NJ	AIAA-2010-0607 Kinetic Interaction Effects of Methyl-Butanoate/ n- Heptane Mixture on Extinction Limits of Counterflow Diffusion Flames. M. Uddi, Princeton University, Princeton, NJ	AIAA-2010-0608 A Novel Progress Variable Approach for Predicting NO in Laminar Hydrogen Flames A. Fiolitakis, German Aerospace Center (DLR), Stuttgart, Germany				

Tuesday Morning / 05 January 2010

Session 101-PC-8 — Drops and Sprays II — Los Angeles

Chaired by: J. BELLAN, Jet Propulsion Laboratory, Pasadena, CA, and C. BRUNO, University of Rome "La Sapienza", Rome, Italy

0900	0930	1000	1030				
AIAA-2010-0609 Spray Flames in an Air-Heptane Swirling Combustor K. Luo, Stanford University, Stanford, CA	AIAA-2010-0611 A Concept for Simultaneous High-Frequency Actuation of Liquid Spray Characteristics C. Martin, Virginia Polytechnic Institute and State University, Blacksburg, VA	AIAA-2010-0613 Impact of Fischer-Tropsch Fuels on Aero-Engine Combustion Performance P. Le Clercq, German Aerospace Center (DLR), Stuttgart, Germany	AIAA-2010-0614 Simulations of Spark Ignition of a Swirling n-Heptane Spray Flame with Conditional Moment Closure P. Schroll, University of Cambridge, Cambridge, Great Britain				

Tuesday Morning / 05 January 2010

Session 102-PC-9 — Solid Propellants — Denver

Chaired by: T. JACKSON, University of Illinois, Urbana-Champaign, Urbana, IL, and R. ERICKSON, United Technologies Research Center, East Hartford, CT

0900	0930	1000	1030	1100	1130		
AIAA-2010-0615 Mechanical Erosion of Nozzle Material in Solid-Propellant Rocket Motors P. Thakre, CD-adapco, New Rochelle, NY	AIAA-2010-0616 Erosive Burning of Solid Propellants T. Jackson, University of Illinois, Urbana-Champaign, Urbana, IL	AIAA-2010-0617 Simulations of Composite Solid Propellant Combustion With and Without Internal Burning J. Choi, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-0618 Mechanically Alloyed Al-I Composite Materials S. Zhang, New Jersey Institute of Technology, Newark, NJ	AIAA-2010-0619 Characterization of Fine Aluminum Powder Coated with Nickel as a Potential Fuel Additive S. Vummidi, New Jersey Institute of Technology, Newark, NJ	AIAA-2010-0620 Burning Characteristics of Fuel Droplets Containing Dilute Energetic Nanopartilces Y. Gan, Purdue University, West Lafayette, IN		

Tuesday Morning / 05 January 2010

Session 103-PDL-6 — **Plasma Space Propulsion** — **Crystal Ballroom F**

Chaired by: G. WILLIAMS, NASA Glenn Research Center, Cleveland, OH, and S. MAHALINGAM, Tech-X Corporation, Boulder, CO

0900 AIAA-2010-0621 Superconducting Helicon Thruster R. Sedwick, University of Maryland, College Park, MD	0930 AIAA-2010-0622 Exhaust Plume Spatial Structure of the VASIMR® VX- 200 E. Bering, University of Houston, Houston, TX	1000 AIAA-2010-0623 Hall Thruster Plume Diagnostics Utilizing Microwave Interferometry J. Thurman, U.S. Air Force, Wright-Patterson AFB, OH	1030 AIAA-2010-0624 Towards Hall Thruster Erosion Prediction Using a Kinetic Plasma Model and a Molecular Dynamics Simulation Y. Choi, Tech-X Corporation, Boulder, CO	1100 AIAA-2010-0625 Performance and Contamination Potential of Micro- Pulsed Plasma Thrusters (uPPT) J. Selstrom, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	1130 AIAA-2010-0626 Pulse Discharge Network Development for a Heavy Gas Field Reversed Configuration Plasma Device S. Miller, Missouri University of Science and Technology , Rolla, MO		

Tuesday Morning / 05 January 2010

Session 104-SEC-1 — **Space Exploration Strategies and Mission Logistics** — **Crystal Ballroom L**

Chaired by: A. GALE, Space Settlement Design Competitions, Nassau Bay, TX, and D. DAVIS, The Boeing Company, El Segundo, CA

0900 AIAA-2010-0627 Feasibility Assessment of Nonstop Mars Sample Return System H. Takayanagi, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan	0930 AIAA-2010-0628 Low- Altitude Exploration of the Venus Atmosphere by Balloon G. Landis, NASA Glenn Research Center, Cleveland, OH	1000 AIAA-2010-0629 HERRO: A Science-Oriented Strategy for Crewed Missions Beyond LEO G. Schmidt, NASA Glenn Research Center, Cleveland, OH					

Tuesday Morning / 05 January 2010

Session 105-TP-6 — **Aerothermodynamics II** — **Crystal Ballroom M**

Chaired by: M. WRIGHT, NASA Ames Research Center, Moffett Field, CA, and D. REDDY, NASA Glenn Research Center, Cleveland, OH

0900 AIAA-2010-0635 Modeling of the Electric Field in a Hypersonic Rarefied Flow E. Farbar, University of Michigan, Ann Arbor, MI	0930 AIAA-2010-0630 Effect of Chemical Reaction Rates on Aero-Heating Predictions of Re- Entry Flows D. Reddy, Indian Institute of Technology, Bombay, Mumbai, India	1000 AIAA-2010-0634 Expansion Tunnel Radiation Experiments to Support Hayabusa Re- Entry Observations D. Buttsworth, University of Southern Queensland, Toowoomba, Australia					

Tuesday Morning / 05 January 2010

Session 106-TP-7 — Heat Transfer I — Crystal Ballroom N

Chaired by: T. LAM, The Aerospace Corporation, El Segundo, CA, and J. KAPAT, University of Central Florida, Oviedo, FL

0900 AIAA-2010-0636 Air Flow Regimes for Comfort in Air Conditioned Spaces E. Khalil, Cairo University, Cairo, Egypt	0930 AIAA-2010-0637 Effect of First Vibration Mode on Sub- Critical Thermocapillary Convection in Floating Zone Liquid Bridge A. Ahmed, Air University, Islamabad, Pakistan	1000 AIAA-2010-0638 DNS and LES of Wall-Bounded Compressible Turbulent Flows in Narrow Cooling Channel D. Taieb, CORIA, Saint Etienne Du Rouvray, France	1030 AIAA-2010-0639 Modeling Infrared Sensing Mechanism of Melanophila Beetles J. Zhang, University of Oklahoma, Norman, OK	1100 AIAA-2010-1474 Numerical Simulation of Continuous and Pulsed Film Cooling on a Turbine- Blade Leading–Edge Model, including Surface Conductance D. Stenger, University of Cincinnati, Cincinnati, OH			

Tuesday Morning / 05 January 2010

Session 107-WE-3 — Wind Turbine Aerodynamics Experiments — Crystal Ballroom G2

Chaired by: J. NAUGHTON, University of Wyoming, Laramie, WY, and D. BERG, Sandia National Laboratories, Albuquerque, NM

0900 AIAA-2010-0640 Low Frequency Shedding Prompted by Three- Dimensionality Under Rotational Augmentation S. Schreck, National Renewable Energy Laboratory, Golden, CO	0930 AIAA-2010-0641 Experimental Investigation of the Wind Turbine Blade Root Flow B. Akay, Delft University of Technology, Delft, The Netherlands	1000 AIAA-2010-0642 Aeroacoustic Noise Measurements of a Wind Turbine with BSDS Blades Using an Acoustic Array E. Simley, University of Colorado, Boulder, Boulder, CO	1030 AIAA-2010-0643 3- D Wake Dynamics of the VAWT: Experimental and Numerical Investigation C. Simao Ferreira, Delft University of Technology, Delft, The Netherlands	1100 AIAA-2010-0644 Active Aerodynamic Control of Wind Turbine Blades with High Deflection Flexible Flaps G. Pechlivanoglou, Technical University of Berlin, Berlin, Germany	1130 AIAA-2010-0645 The DAN- AERO MW Experiments H. Madsen, Risø DTU, Roskilde, Denmark		

Tuesday Morning / 05 January 2010

Session 108-WIG-4 / PDL-7 — Plasma-Assisted Combustion II — Grand Ballroom 1

Chaired by: T. OMBRELLO, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and D. YARANTSEV, Russion Academy of Sciences, Moscow, Russia

0900 AIAA-2010-0646 Resonant Laser Induced Breakdown for Fuel- Air Ignition S. Adams, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	0930 AIAA-2010-0648 Pure Rotational CARS Measurements of Thermal Energy Release and Ignition in Nanosecond Pulse Burst Air and Hydrogen- Air Plasmas Y. Zuzeek, Ohio State University, Columbus, OH	1000 AIAA-2010-0650 Laser- Initiated, Microwave Driven Ignition in Methane/Air Mixtures J. Michael, Princeton University, Princeton, NJ	1030 AIAA-2010-0651 Plasma Enhanced Combustion using Microwave Energy Coupling in a Re- entrant Cavity Applicator X. Rao, Michigan State University, East Lansing, MI				

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Tuesday Morning / 05 January 2010

1000 - 1200 **Remembering Dr. Shahyar Pirzadeh (Invited)** **Crystal Ballroom C**

Chaired by: W. JONES, NASA Langley Research Center, Hampton, VA

March 18, 2009 marked the passing of a valued contributor to the field of unstructured numerical mesh generation, Dr. Shahyar Pirzadeh. Dr. Pirzadeh was most notably known for his work with the VGRID unstructured mesh generator. His career was marked with many innovations including the Advancing Layers Method (ALM) and early adoption of the Cartesian Background Grid to control mesh spacing. A methodical approach to his work resulted in numerous advances in the field. This session provides an opportunity for those who knew and worked closely with Shahyar to share memories and thoughts with the community.

Tuesday Afternoon / 05 January 2010

1200 - 1400 **Awards Luncheon** **Grand Ballroom 7/8**

Tuesday Afternoon / 05 January 2010

1400 - **Astrosociology Student Forum** **Crystal Ballroom F**

Chaired by: J. PASS, Astrosociology Research Institute, Huntington Beach, CA, and J. PALAIA, 4Frontiers Corporation, New Port Richey, FL

This session focuses on the issues common to both traditional aerospace engineering/scientific inquiry and the social sciences. Astrosociology represents the social sciences as the only developing multidisciplinary field intended to highlight issues pertinent to the relationship between (1) space and (2) society (or the human dimension). Many questions arise when confronting this relationship. For example, a well-engineered space habitat may meet the life support needs of a human group, but is this adequate for their long-term survival?

Panelists: Simone Caroti, Michael Grant, Michael Serrano, Jason Dunn

Tuesday Afternoon / 05 January 2010		
1400 - 1700	**Career and Workforce Development Workshop - Laying the Foundation for the Future of Aerospace II**	**Crystal Ballroom G1**
The afternoon sessions shift to workforce development topics and activities to develop and grow the aerospace workforce for the near and long term.		

Tuesday Afternoon / 05 January 2010

Session 109-AA-6 — **Jet Noise Suppression II** — **Washington**

Chaired by: K. VISWANATHAN, The Boeing Company, Seattle, WA

1400	1430	1500	1530	1600			
AIAA-2010-0652 Effects of Source Redistribution on Jet Noise Shielding S. Mayoral, University of California, Irvine, Irvine, CA	AIAA-2010-0653 Prediction of Jet Noise Shielding D. Papamoschou, University of California, Irvine, Irvine, CA	AIAA-2010-0654 Adaptation of the Beveled Nozzle for High Speed Jet Noise Reduction K. Viswanathan, The Boeing Company, Seattle, WA	AIAA-2010-0655 Towards Development of an Active Single-Layer Acoustic Liner for Jet Engine Noise Reduction M. Perrino, University of Cincinnati, Cincinnati, OH	AIAA-2010-0656 An Application of Commercial Noise Reduction Techniques to Military Aircraft Nozzles N. Heeb, University of Cincinnati, Cincinnati, OH			

Tuesday Afternoon / 05 January 2010

Session 110-AD-4 — **Conceptual Aircraft Design Geometry Modeling** — **Crystal Ballroom K**

Chaired by: M. MOORE, NASA Langley Research Center, Hampton, VA, and G. CROUSE, Auburn University, Auburn, AL

1400	1430	1500	1530	1600			
AIAA-2010-0657 Vehicle Sketch Pad: A Parametric Geometry Modeler for Conceptual Aircraft Design A. Hahn, NASA Langley Research Center, Hampton, VA	AIAA-2010-0658 Aircraft Conceptual Design Using Vehicle Sketch Pad W. Fredericks, NASA Langley Research Center, Hampton, VA	AIAA-2010-0659 Improved Geometry Modeling for High Fidelity Parametric Design J. Gloudemans, , San Mateo, CA	Oral Presentation Vehicle Sketch Pad Software Demonstration W. Fredericks, NASA Langley Research Center, Hampton, VA	Oral Presentation Geometry Needs of Conceptual Aircraft Design - Panel Discussion A. Hahn, NASA Langley Research Center, Hampton, VA			

Tuesday Afternoon / 05 January 2010

Session 111-AFM-4 — Launch Vehicles — Chicago

Chaired by: G. COOPER, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, and M. KNISKERN, Sandia National Laboratories, Albuquerque, NM

1400 AIAA-2010-0664 Improvements to Power-On Base Pressure Prediction for the Aeroprediction Code F. Moore, Aeroprediction, Inc., King George, VA	1430 AIAA-2010-0665 Analytical Model Development and Impulse Thrusters Pairing Guidelines for Trajectory Corrections of Spin- Stabilized Projectiles D. Corriveau, Defence R&D Canada, Québec, Canada	1500 AIAA-2010-0668 The Range Safety Debris Catalog Analysis in Preparation for the Pad Abort One Flight Testt P. Kutty, Analytical Mechanics Associates, Inc., Edwards, CA					

Tuesday Afternoon / 05 January 2010

Session 112-AMT-5 — Surface Measurement Techniques II — Crystal Ballroom J1

Chaired by: S. BERESH, Sandia National Laboratories, Albuquerque, NM, and A. DRAKE, Northrop Grumman Corporation, San Diego, CA

1400 AIAA-2010-0669 WITHDRAWN Temperature Measurements of Rotating Components Using Phosphor Thermometry A. Khalid, University of Manchester, Manchester, Great Britain	1430 AIAA-2010-0670 Window Temperature Impact on IR Thermography for Heat Transfer Measurements J. Gustavsson, Siemens, Finspong, Sweden	1500 AIAA-2010-0671 Comparative Surface Heat Transfer Measurements in Hypervelocity Flow W. Flaherty, University of Illinois, Urbana, IL	1530 AIAA-2010-0672 Europium- Doped Pyrochlores for Use as Thermographic Phosphors in Thermal Barrier Coatings S. Desai, Vanderbilt University, Nashville, TN	1600 AIAA-2010-0673 Temperature- Cancelled Anodized- Aluminum Pressure Sensitive Paint for Hypersonic Compression Corner Flows T. Kuriki, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1630 AIAA-2010-0674 Experiment Researches on the Location of Transition Onset in the Hypersonic Wind Tunnel X. Zhao, China Academy of Aerospace Aerodynamics, Beijing, China (prc)		

Tuesday Afternoon / 05 January 2010

Session 113-APA-10 — Propellor/Rotorcraft Aerodynamics — Grand Ballroom 9

Chaired by: R. KREEGER, NASA Glenn Research Center, Cleveland, OH, and M. CALVERT, U.S. Army Research, Development and Engineering Command, Redstone Arsenal, AL

1400 AIAA-2010-0675 Evaluation of a Potential Flow Model for Propeller and Wind Turbine Design J. Katz, San Diego State University, San Diego, CA	1430 AIAA-2010-0676 CFD- Based Twist Optimization of Hovering Rotors C. Allen, University of Bristol, Bristol, Great Britain	1500 AIAA-2010-0677 Critical Aspects in the Aerodynamics of Helicopter Blade- Vortex Interaction: A Numerical Study Using LES M. Ilie, University of Central Florida, Orlando, FL	1530 AIAA-2010-0679 A Three- Dimensional Vortex Particle- Panel Method for Modeling Propulsion- Airframe Interaction J. Calabretta, California Polytechnic State University, San Luis Obispo, CA	1600 AIAA-2010-0680 LES Studies of Helicopter Blade- Vortex Mechanism of Interaction: The Icing Effect M. Ilie, University of Central Florida, Orlando, FL			

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Tuesday Afternoon / 05 January 2010

Session 114-APA-11 — **Weapons Carriage and Store Separation** — **Grand Ballroom 10**

Chaired by: S. FERGUSON, The Boeing Company, Renton, WA

1400 AIAA-2010-0681 Scaled- Drop- Tests: WYSIWYG or Not? R. Deslandes, EADS-Military Air Systems, Manching, Germany	1430 AIAA-2010-0682 WITHDRAWN Dynamic Simulation on Weapon Dispensing in High Speed Flows T. Lin, Northrop Grumman Corporation, San Bernardino, CA						

Tuesday Afternoon / 05 January 2010

Session 115-APA-12 — **Wind Tunnel and Flight Testing Aerodynamics** — **Grand Ballroom 11**

Chaired by: M. CHANG, Lockheed Martin, Santa Clarita, CA, and R. VERMELAND, Lockheed Martin, Lancaster, CA

1400 AIAA-2010-0684 Aerodynamic Influence of a Half- Span Model Installation for High- Lift Configuration Experiment Y. Yokokawa, Japan Aerospace Exploration Agency (JAXA), Chofu,Tokyo, Japan	1430 AIAA-2010-0686 Preliminary Study on Flat- Plate Wing with Sweptback Utilizing Wake Measurements M. Kashitani, National Defense Academy, Yokosuka, Japan	1500 AIAA-2010-0687 An Approach Towards Using Dynamic Wind Tunnel Testing to Characterize Micro Aerial Vehicle Stability M. Shields, University of Colorado, Boulder, Boulder, CO					

Tuesday Afternoon / 05 January 2010

Session 116-ASE-4 — **Numerical Modeling of Atmospheric Phenomena** — **Atlanta**

Chaired by: M. POLITOVICH, National Center for Atmospheric Research, Boulder, CO, and E. WHALEN, The Boeing Company, St Louis, MO

1400 AIAA-2010-0688 Simulation of Flows with Large Gradients using Adaptive Mesh Refinement N. Ahmad, Science Applications International Corporation, McLean, VA	1430 AIAA-2010-0690 Application of a Galerkin Finite Element Scheme to Atmospheric Buoyant and Gravity Driven Flows S. Marras, Barcelona Supercomputing Center, Barcelona, Spain	1500 AIAA-2010-0691 An Unstructured CFD Approach for Numerical Weather Prediction R. Aubry, Barcelona Supercomputing Center, Barcelona, Spain					

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Tuesday Afternoon / 05 January 2010

Session 117-ECS-3 — **Energetic Materials: Applications** — **Crystal Ballroom A**

Chaired by: K. RINK, University of Idaho, Moscow, ID, and H. LEE, Scot Incorporated, Downers Grove, IL

1400 AIAA-2010-0694 An Overview of Nanoscale Silicon Reactive Composites Applied to Microengergetics S. Son, Purdue University, West Lafayette, IN	1430 AIAA-2010-0695 Optical Spectroscopy of Fireballs from Metallized Reactive Materials N. Glumac, University of Illinois, Urbana-Champaign, Urbana, IL	1500 AIAA-2010-1598 Analysis of the Influence of Nanometric Aluminum Particle Vaporization on Flame Propagation in Bulk Powder Media B. Dikici, Texas Tech University, Lubbock, TX					

Tuesday Afternoon / 05 January 2010

Session 118-FD-22 — **Fundamental Wall-Bounded Turbulence** — **Grand Ballroom 3**

Chaired by: K. CHRISTENSEN, University of Illinois, Urbana-Champaign, Urbana, IL, and B. MCKEON, California Institute of Technology, Pasadena, CA

1400 AIAA-2010-0697 Energetic Modes in Turbulent Pipe Flow From Resolvent Analysis B. McKeon, California Institute of Technology, Pasadena, CA	1430 AIAA-2010-0698 A Basic Three-Dimensional Turbulent Boundary Layer Experiment to Test Second- Moment Closure Models S. Sadek, Virginia Polytechnic Institute and State University, Blacksburg, VA	1500 AIAA-2010-0699 Extracting Globally Dominant Parameters of A Realistic Rough Surface Using Continuous Wavelets H. Ren, Wright State University, Dayton, OH	1530 AIAA-2010-0700 Structure of Turbulent Boundary Layers and Surface Pressure Fluctuations with Sparse Roughness N. Varano, Virginia Polytechnic Institute and State University, Blacksburg, VA	1600 AIAA-2010-0701 Structure of Turbulent Boundary Layers with Dense Roughness A. Hopkins, Virginia Polytechnic Institute and State University, Blacksburg, VA			

Tuesday Afternoon / 05 January 2010

Session 119-FD-23 — **Boundary Layer Transition II** — **Grand Ballroom 4**

Chaired by: A. TUMIN, University of Arizona, Tucson, AZ, and J. BONS, Ohio State University, Columbus, OH

1400 AIAA-2010-0703 High- Speed PLIF Imaging of Hypersonic Transition over Discrete Cylindrical Roughness P. Danehy, NASA Langley Research Center, Hampton, VA	1430 AIAA-2010-0705 Development and Breakdown of Gortler Vortices in High Speed Boundary Layers F. Li, NASA Langley Research Center, Hampton, VA	1500 AIAA-2010-0706 Numerical Simulations of Hypersonic Boundary-Layer Instability with Wall Blowing S. Ghaffari, Stanford University, Stanford, CA	1530 AIAA-2010-0707 Hypersonic Boundary-Layer Instability with Chemical Reactions O. Marxen, Stanford University, Stanford, CA				

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Tuesday Afternoon / 05 January 2010

Session 120-FD-24 — Cartesian Grid and Immersed Boundary Methods — Crystal Ballroom B

Chaired by: G. HE, Chinese Academy of Sciences, Beijing, China (prc), and T. RAMSAY, Honda R&D Americas Inc, Raymond, OH

1400 AIAA-2010-0708 Towards Large- eddy Simulation of Turbulent Flows with Complex Geometric Boundaries Using Immersed Boundary Method G. He, Chinese Academy of Sciences, Beijing, China (prc)	1430 AIAA-2010-0709 Towards a Ghost- Cell Method for Analysis of Viscous Flows on Cartesian- Grids A. Dadone, Technical University of Bari, Bari, Italy	1500 AIAA-2010-0710 RANS Simulation Around Airfoils Using Building- Cube Method S. Nishimoto, Tohoku University, Sendai, Japan	1530 AIAA-2010-0711 A Second- Order Immersed Boundary Projection Method for Elliptic and Parabolic Problems P. Young, University of Colorado, Boulder, Boulder, CO	1600 AIAA-2010-0712 A Turbulent Wall Model for Immersed Boundary Methods F. Capizzano, Italian Aerospace Research Center (CIRA), Capua, Italy			

Tuesday Afternoon / 05 January 2010

Session 121-FD-25 — Flow Control Simulations — Grand Ballroom 5

Chaired by: K. GHIA, University of Cincinnati, Cincinnati, OH

1400 AIAA-2010-0713 Two- Dimensional Simulation of Horseshoe and Parallel Actuators Inside a Micro Geometry C. Wang, University of Florida, Gainesville, FL	1430 AIAA-2010-0714 Numerical Investigations on the Effects of the Declining Back- Edge of MVG Q. Li, University of Texas, Arlington, Arlington, TX	1500 AIAA-2010-0715 Boundary Condition Implementation for a Coupled Lattice Boltzmann and Navier-Stokes Methodology N. Yeshala, Georgia Institute of Technology, Atlanta, GA	1530 AIAA-2010-0716 Investigation of Turbulent Spot Spreading Mechanism J. Chu, University of Texas, Austin, Austin, TX	1600 AIAA-2010-0717 Fluidic Injection Flow Control for High Pressure Turbine Area Modulation – A Computational Fluid Dynamics Investigation D. Baruzzini, Lockheed Martin Corporation, Fort Worth, TX			

Tuesday Afternoon / 05 January 2010

Session 122-FD-26 — High Order Methods III — New York

Chaired by: R. HARRIS, CFD Research Corporation, Huntsville, AL, and S. TU, Jackson State University, Jackson, MS

1400 AIAA-2010-0718 WITHDRAWN Development of An Adaptive Space- Time Method for High- Order Resolution of Discontinuities, Part II Z. Yang, University of Wyoming, Laramie, WY	1430 AIAA-2010-0719 AUSM- Based High-Order Solution for Euler Equations A. Scandaliato, Ohio Aerospace Institute, Cleveland, OH	1500 AIAA-2010-0720 Partition Design and Optimization for High-Order Spectral Volume Schemes on Tetrahedral Grids R. Harris, CFD Research Corporation, Huntsville, AL	1530 AIAA-2010-0721 Toward a Robust, Higher- Order Cut- Cell Method for Viscous Flows J. Modisette, Massachusetts Institute of Technology, Cambridge, MA	1600 AIAA-2010-0722 A High- Order Gas-Kinetic Navier- Stokes Flow Solver Q. Li, Tsinghua University, Beijing, China (prc)	1630 AIAA-2010-0723 Modified Upwinding Compact Scheme for 1-D and 2- D Shock / Wave Interaction C. Liu, University of Texas, Arlington, Arlington, TX		

Tuesday Afternoon / 05 January 2010

Session 123-FD-27 — **Low Reynolds Number and Bio-Inspired Aerodynamics II** — **Grand Ballroom 6**

Chaired by: H. LUO, Vanderbilt University, Nashville, TN, and D. WILLIS, University of Massachusetts, Revere, MA

1400	1430	1500	1530	1600	1630		
AIAA-2010-0724 The Numerical Simulation of Flapping Wings at Low Reynolds Numbers P. Persson, University of California, Berkeley, Berkeley, CA	AIAA-2010-0725 WITHDRAWN Sinusoidal High-Frequency Oscillation of an AR=2 Flat Plate: Computation and Experiment Y. Suzen, North Dakota State University, Fargo, ND	AIAA-2010-0726 A Numerical Study of Vortex- Dominated Flow around an Oscillating Airfoil with High- Order Spectral Difference Method M. Yu, Iowa State University, Ames, IA	AIAA-2010-0727 Optimization of a PIV Based Study Using Maximum Work Potential and Design of Experiments Techniques D. Stanley, The Boeing Company, Kent, WA	AIAA-2010-0728 Direct Numerical Simulations of Plunging Airfoils Y. Allaneau, Stanford University, Stanford, CA	AIAA-2010-0729 Unsteady Aerodynamics of Low Aspect Ratio Membrane Wings P. Rojratsirikul, University of Bath, Bath, Great Britain		

Tuesday Afternoon / 05 January 2010

Session 124-FD-28 / SST-2 — **Micro-Scale Flow Sensing and Control (Invited)** — **Crystal Ballroom C**

Chaired by: D. HITT, University of Vermont, Burlington, VT, and M. MARTIN, Louisiana State University, Baton Rouge, LA

1400	1430	1500	1530	1600	1630		
Oral Presentation Interfacial Control of High- Viscosity Fluids in Microsystems T. Cubaud, State University of New York, Stony Brook, Stony Brook, NY	Oral Presentation Micro- Optical Sensors for Wall Pressure and Shear Stress V. Otugen, Southern Methodist University, Dallas, TX	Oral Presentation Control of Micro- UAVs M. Amitay, Rensselaer Polytechnic Institute, Troy, NY	Oral Presentation CFD Design for Lab-On- A- Chip Microsystems D. Mott, Naval Research Laboratory, Washington, DC	Oral Presentation Smart Chemical Sensor Systems for Aerospace Applications G. Hunter, NASA Glenn Research Center, Cleveland, OH	Oral Presentation Open Discussion: Micro-Scale Flow Control & Sensing D. Hitt, University of Vermont, Burlington, VT		

Tuesday Afternoon / 05 January 2010

Session 125-GPSE-4 — **Emerging Opportunities in Research Flights II** — **Crystal Ballroom D**

Chaired by: J. COHEN, NASA Headquarters, Washington, DC, and S. COLLICOTT, Purdue University, West Lafayette, IN

1400	1430	1500	1530				
Oral Presentation PharmaSat: A Nanosatellite Platform for Biological Experimentation D. Niesel, University of Texas Medical Branch, Galveston, TX	Oral Presentation Free Flying NanoSatellites and Payload Technologies for Fundamental Space Biology Applications J. Hines, NASA Ames Research Center, Moffet Field, CA	Oral Presentation Decoupling Transport Phenomena in Microgravity to Develop Personalized Medicine on Earth A. Ziemys, University of Texas Health Science Center, Houston, TX	Oral Presentation Perspective on FOTON and BION Experiences M. Skidmore, NASA Ames Research Center, Moffett Field, CA				

Tuesday Afternoon / 05 January 2010

Session 126-GT-4 — **Data Analysis** — **Miami**

Chaired by: S. POWELL, Aerospace Testing Alliance, Arnold AFB, TN, and N. ULBRICH, Jacobs Technology, Moffett Field, CA

1400 Break ,	1500 AIAA-2010-0741 Assessment of Response Surface Models Using Independent Confirmation Point Analysis R. DeLoach, NASA Langley Research Center, Hampton, VA	1530 AIAA-2010-0742 Correlation of Wind Tunnel and Flight Test Results for a P- 51B Airplane N. Ulbrich, Jacobs Technology, Moffett Field, CA	1600 AIAA-2010-0743 Uncertainty Identification of Supersonic Wind Tunnel Testing S. Nagai, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1630 AIAA-2010-0744 Preliminary Study on Diaphragmless Shock Tube for Transonic Airfoil Testing with PDI M. Kashitani, National Defense Academy, Yokosuka, Japan		

Tuesday Afternoon / 05 January 2010

Session 127-GTE-7 — **Gas Turbine Fans and Compressors** — **Grand Ballroom 14**

Chaired by: M. LIST, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and N. KEY, Purdue University, West Lafayette, IN

1400 AIAA-2010-0745 Effects of Radial Distortion on Performance of a Fan D. Voytovych, Purdue University, West Lafayette, IN	1430 AIAA-2010-0746 A Computational Investigation of Vane Clocking Effects on Compressor Forced Response J. Salontay, Purdue University, West Lafayette, IN	1500 AIAA-2010-0747 The Effect of Lipskin Damage on Inlet Distortion S. Kennedy, Queen's University Belfast, Belfast, Northern Ireland					

Tuesday Afternoon / 05 January 2010

Session 128-HAPB-4 — **Ramjet/Scramjet Injectors** — **Grand Ballroom 12**

Chaired by: J. DONOHUE, United Technologies Research Center, East Hartford, CT, and J. LEE, NASA Glenn Research Center, Cleveland, OH

1400 AIAA-2010-0750 Investigation of Droplet Nucleation Inside Supercritical Ethylene Jets Using Small Angle X- Ray Scattering (SAXS) Technique K. Lin, Taitech, Inc., Beavercreek , OH	1430 AIAA-2010-0751 Dual Mode Scramjet Combustor: Analysis of Two Configurations R. Milligan, Taitech, inc., Beavercreek, OH	1500 AIAA-2010-0752 Injection and Disruption of Supersonic Droplets Y. Kim, University of Washington, Seattle, WA	1530 AIAA-2010-0753 Supersonic Turbulent Mixing Structure in Staged Injection Flowfields H. Takahashi, Tohoku University, Sendai, Japan	1600 AIAA-2010-0755 On the Effects of Transverse- Jet Injection into a Supersonic Shear Layer L. Maddalena, California Institute of Technology, Pasadena, CA			

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http://www.aiaa.org/agenda.cfm?lumeetingid=1812&dateget=all#session12921.

Tuesday Afternoon / 05 January 2010

Session 129-HAPB-5 — **Ramjet/Scramjet Simulation with URANS/LES/DES II** — **Grand Ballroom 13**

Chaired by: W. ENGBLOM, Embry-Riddle Aeronautical University, Daytona Beach, FL, and H. HASSAN, North Carolina State University, Raleigh, NC

1400 AIAA-2010-0756 Inlet Buzz and Combustion Oscillation in an Axisymmetric Ramjet Engine H. Sung, Korea Aerospace University, Goyang, South Korea	1430 AIAA-2010-0757 Three- Dimensional Simulation of Ignition Transient in Hyshot Scramjet Configuration S. Won, Seoul National University, Seoul, South Korea	1500 AIAA-2010-0758 LES of the Hyshot Scramjet Combustor A. Ingenito, University of Rome "La Sapienza", Rome, Italy	1530 AIAA-2010-1129 Thrust Prediction in Thermally Choked Ram Accelerator T. Bengherbia, French National Center for Scientific Research (CNRS), Poitiers, France				

Tuesday Afternoon / 05 January 2010

Session 130-HIS-3 / GT-5 — **History of Wind Tunnels II--Historical Research: A "How To" Primer** — **New Orleans**

Chaired by: S. EBERHARDT, The Boeing Company, Seattle, WA, and K. BURNS, Wyle Laboratories, San Diego, CA

1400 Oral Presentation History of Wind Tunnels at Cal Tech F. Khorrami, California Institute of Technology, Pasadena, CA	1430 AIAA-2010-0760 A 50 Year Chronology of the Boeing PolySonic Wind Tunnel: An Era of Aerodynamic Invention and Innovation M. Benne, The Boeing Company, St. Louis, MO	1500 Oral Presentation Panel Discussion: Historical Research- - A "How To" Primer T. Crouch, Senior Curator, Divison of Aeronautics, National Air and Space Museum, Washington, DC					

Tuesday Afternoon / 05 January 2010

Session 131-IS-2 — **Multi-Agent Supervision and Coordination** — **Crystal Ballroom L**

Chaired by: E. ATKINS, University of Michigan, Ann Arbor, MI, and L. LONG, Pennsylvania State University, University Park, PA

1400 AIAA-2010-0762 Multi- Agent Maze Exploration E. Kivelevitch, University of Cincinnati, Cincinnati, OH	1430 AIAA-2010-0763 Assessing Operator Workload and Performance in Expeditionary Multiple Unmanned Vehicle Control A. Clare, Massachusetts Institute of Technology, Cambridge, MA	1500 AIAA-2010-0764 Human- Autonomous System Interaction Framework to Support Safety in Astronaut-Robot Team Interactions M. Lyell, Intelligent Automation, Inc., Rockville, MD	1530 AIAA-2010-0767 Satellite Design Automation Using AI Tools in Step_SATdb and QuickSAT, a Web-Based and Open-Source Satellite Design Automation Environment A. Santangelo, sci_Zone, Holland, MI				

Tuesday Afternoon / 05 January 2010

Session 132-PC-10 — Detonations — Denver

Chaired by: J. SINIBALDI, Naval Postgraduate School, Monterey, CA, and S. MENON, Georgia Institute of Technology, Atlanta, GA

1400 AIAA-2010-0768 Numerical Investigation of Particle Dispersal in Multiphase Explosions Y. Ling, University of Florida, Gainesville, FL	1430 AIAA-2010-0770 Study of Interaction of Dilute or Dense Cloud of Inert and Reactive Particles with Cellular Detonation Structures K. Gottiparthi, Georgia Institute of Technology, Atlanta, GA	1500 AIAA-2010-0771 Effect of Loading Wave Profile on Hydrodynamic Void Collapse in Detonation Initiation A. Swantek, University of Illinois, Urbana-Champaign, Urbana, IL	1530 AIAA-2010-0772 Numerical Simulation of Non- Equilibrium Effects and Ionization in H2 Air Detonations J. Schulz, Georgia Institute of Technology, Atlanta, GA	1600 AIAA-2010-0773 Predicting Mixing and Combustion in the Afterburn Stage of Air Blasts E. Fedina, Swedish Defence Research Agency, Tumba, Sweden			

Tuesday Afternoon / 05 January 2010

Session 133-PC-11 — Laminar Flames I — Los Angeles

Chaired by: E. TASKINOGLU, California Institute of Technology, South Pasadena, CA, and L. BAUWENS, University of Calgary, Calgary, Canada

1400 AIAA-2010-0774 Laminar Flame Speeds of C5 to C8 n- Alkanes at Elevated Pressures and Temperatures A. Kelley, Princeton University, Princeton, NJ	1430 AIAA-2010-0775 Structure of Laminar Methane- Oxygen Diffusion Flames at High Pressures H. Joo, University of Toronto, Toronto, Canada	1500 AIAA-2010-0776 Negative Pressure Dependence of High Pressure Burning Rates of H2/O2 Flames at Lean Conditions M. Burke, Princeton University, Princeton, NJ	1530 AIAA-2010-0777 Flame- Flow Interactions and Flow Reversal G. Bansal, Stanford University, Stanford, CA	1600 AIAA-2010-0778 Laminar Flame Speed of Hydrocarbon Fuels with Preheat and Low Oxygen Content Y. Kochar, Georgia Institute of Technology, Atlanta, GA	1630 AIAA-2010-0779 Pressure Effects on Structure and Temperature Field of Laminar Diffusion Flames H. Gohari Darabkhani, The University of Manchester , Manchester, Great Britain		

Tuesday Afternoon / 05 January 2010

Session 134-PDL-8 — Joint PDL/WIG/FD/TP Plasma Actuator Session IV: RF/HF Discharges — Grand Ballroom 1

Chaired by: C. LAUX, École Centrale Paris, Paris, France, and S. STANFIELD, Wright State University, Dayton, OH

1400 AIAA-2010-0782 Plasma Actuator Created by Capacity Coupled Surface HF Discharge A. Klimov, Russian Academy of Sciences, Moscow, Russia	1430 AIAA-2010-0783 The Effect of Plasma on the Flow Features of an Axisymmetric Jet R. Huffman, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	1500 AIAA-2010-0785 Vortex Generation in Capacitive Discharge E. Son, Russian Academy of Sciences, Dolgoprudny, Russia					

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Tuesday Afternoon / 05 January 2010

Session 135-SE-1 — **Systems Engineering I** — **Tampa**

Chaired by: S. NAGANO, The Aerospace Corporation, Los Angeles, CA, and E. NICHOLS, Orbital Sciences Corporation, Chandler, AZ

1400 AIAA-2010-0786 A Process for Systems of Systems Architecting K. Griendling, Georgia Institute of Technology, Atlanta, GA	1430 AIAA-2010-0787 Complex Systems Engineering Lessons to be Applied to the Smart Grid J. Dahlgren, MITRE Corporation, Hampton, VA	1500 AIAA-2010-0788 Use Zachman Framework to Engineer the Emergent Behavior of a System- of- Systems J. Hsu, Royal Academy of Engineering, Cypress, CA	1530 AIAA-2010-0789 Adaptation of a Strategic Business Model to NASA Project Risk J. Rice, Defense Acquisition University, Huntsville, AL	1600 AIAA-2010-0791 The Ammunition Reliability Anaysis Applied by Prediction of Life Cycle D. Kim, Hanwha Company, Ltd., You-Seong, South Korea			

Tuesday Afternoon / 05 January 2010

Session 136-SEC-2 — **Space Exploration Vehicle and Architecture Design** — **Crystal Ballroom M**

Chaired by: D. ANDREWS, The Boeing Company, Retired, Seattle, WA, and F. BECKER, QinetiQ, Cape Canaveral, FL

1400 AIAA-2010-0792 Architecture of Space Vehicles for Direction-Controlled Artificial Gravity, Using Available Assets B. Benjamin, University of Kansas, Lawrence, KS	1430 AIAA-2010-0793 Deployment of Inflatable Space Habitat Models J. Hill, Oklahoma State University, Stillwater, OK	1500 AIAA-2010-0794 A High Confidence Heavy Lift Launch Vehicle W. Rothschild, John Frassanito & Associates, Inc., Houston, TX	1530 AIAA-2010-0795 Conceptual Design of Crew Exploration Lander for Asteroid Ceres and Saturn Moons Rhea and Iapetus M. Benton, The Boeing Company, Huntington Beach, CA				

Tuesday Afternoon / 05 January 2010

Session 137-SRU-1 — **Space Resource Utilization and Related Technologies** — **Boston**

Chaired by: L. GERTSCH, Missouri University of Science and Technology, Rolla, MO, and J. KLEINHENZ, National Center for Space Exploration Research, Cleveland, OH

1400 AIAA-2010-0797 An Extension of Analysis of Solar- Heated Thermal Wadis to Support Extended-Duration Lunar Exploration R. Balasubramanian, NASA Glenn Research Center, Cleveland, OH	1430 AIAA-2010-0798 Thermal Strategies for Long Duration Mobile Lunar Surface Missions J. Thornton, Carnegie Mellon University, Pittsburgh, PA	1500 AIAA-2010-0799 In Situ Resource Utilization on Mars - Update from DRA 5.0 Study G. Sanders, NASA Johnson Space Center, Houston, TX	1530 AIAA-2010-0800 Employing ISRU Models to Improve Hardware Designs D. Linne, NASA Glenn Research Center, Cleveland, OH	1600 AIAA-2010-0801 Methods for Measurement of Thermophysical Properties of Lunar Simulant J. Kizito, North Carolina A&T State University, Greensboro, NC			

Tuesday Afternoon / 05 January 2010

Session 138-TES-1 — **Energy Efficiency** — **Crystal Ballroom E**

Chaired by: E. KHALIL, Cairo University, Cairo, Egypt, and A. CHOUDHURI, University of Texas, El Paso, El Paso, TX

1400	1430	1500	1530				
AIAA-2010-0802 Thermal Comfort and Air Quality in Sustainable Climate Controled Healthcare Applications E. Khalil, Cairo University, Cairo, Egypt	AIAA-2010-0803 Energy Efficiency Analyses in Sustainable Green Buildings: Codes & Standards E. Khalil, Cairo University, Cairo, Egypt	AIAA-2010-0804 Chemical Energy Recovery from Polystyrene Using Pyrolysis and Gasification I. Ahmed, University of Maryland, College Park, MD	AIAA-2010-1601 Thermal Performance of a Mesoscale Liquid Fueled Combustor V. Vijayan, University of Maryland, College Park, MD				

Tuesday Afternoon / 05 January 2010

Session 139-TP-8 — **Integrated and Multidisciplinary Modeling and Simulation** — **Crystal Ballroom N**

Chaired by: G. NATERER, University of Ontario, Oshawa, ON, and D. REDDY, NASA Glenn Research Center, Cleveland, OH

1400	1430	1500	1530	1600	1630		
AIAA-2010-0807 Dissipative Particle Dynamics Simulation of Electroosmotic Flow in Nanoscale Channels M. Darbandi, Sharif University of Technology, Tehran, Iran	AIAA-2010-0808 Parallelization of Modular Particle-Continuum Method for Hypersonic, Near Equilibrium Flows T. Deschenes, University of Michigan, Ann Arbor, MI	AIAA-2010-0809 More Electric Aircraft Analysis Using Exergy As A Design Comparison Tool R. Gandolfi, EMBRAER, São José Dos Campos, Brazil	AIAA-2010-0810 Orion Active Thermal Control System Dynamic Modeling Using Simulink/MATLAB X. Wang, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-0811 Multiresolution Augmented Artificial Neural Networks for Modeling of Particle Laden Compressible Flows C. Lu, University of Iowa, Iowa City, IA	AIAA-2010-0812 Three Dimensional Adaptive Method for Compressible Multi-Fluids Flows H. Zheng, Sheffield University, Sheffield, Great Britain		

Tuesday Afternoon / 05 January 2010

Session 140-TP-9 — **Non-Equilibrium Flows I** — **Crystal Ballroom P**

Chaired by: A. HASHEMI, Lockheed Martin Corporation, Los Altos, CA

1400	1500	1530				
AIAA-2010-0813 Computation of Hypersonic Shock Wave Flows of Diatomic Gases and Gas Mixtures Using the Generalized Boltzmann Equation R. Agarwal, Washington University in St. Louis, St. Louis, MO	AIAA-2010-0814 Nonequilibrium Ionization and Radiation in Hydrogen- Helium Mixtures C. Park, Korea Advanced Institute of Science and Technology, Daejeon, South Korea	AIAA-2010-0817 Kinetic Solution of Shock Structure in a Non-Reactive Gas Mixture E. Josyula, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH				

Tuesday Afternoon / 05 January 2010

Session 141-TP-10 — **Rarefied Flow Modeling** — **Crystal Ballroom Q**

Chaired by: R. CUNNINGTON, Raytheon Corporation, Tucson, AZ, and E. JOSYULA, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

1400 AIAA-2010-0818 Modeling of CO2 Condensation in the High Pressure Flows Using the Statistical BGK Method R. Kumar, Pennsylvania State University, University Park, PA	1430 AIAA-2010-0819 Closely- Coupled DSMC Hypersonic Re- Entry Flow Simulations with Photon Monte Carlo Radiation I. Sohn, Pennsylvania State University, University Park, PA	1500 AIAA-2010-0820 A Hybrid Particle Scheme for Simulating Multiscale Gas Flows with Internal Energy Nonequilibrium J. Burt, University of Michigan, Ann Arbor, MI	1530 AIAA-2010-0821 Towards the Development of a Novel DSMC/CFD Coupling Scheme for the Simulation of Rarified/Continuum Flows S. Diaz, Florida Institute of Technology, Melbourne, FL	1600 AIAA-2010-0822 All- Particle Multiscale Computation of Hypersonic Rarefied Flow for Mars Entry E. Jun, University of Michigan, Ann Arbor, MI	1630 AIAA-2010-0823 The Coupled Multiscale Multiphysics Method (CM3) for Rarefied Gas Flows D. Kessler, Naval Research Laboratory, Washington, DC		

Tuesday Afternoon / 05 January 2010

Session 142-WE-4 — **Wind Turbine Inflow, Siting, and Wind Farm Analysis** — **Crystal Ballroom G2**

Chaired by: P. MORIARTY, National Renewable Energy Laboratory, Golden, CO, and G. PAWLAS, University of Colorado, Boulder, Boulder, CO

1400 AIAA-2010-0824 Interaction Between a Wind Turbine Array and a Turbulent Boundary Layer J. Lebron, Rensselaer Polytechnic Institute, Troy, NY	1430 AIAA-2010-0825 Wind Farm Wake Simulations in OpenFOAM T. Stovall, University of Colorado, Boulder, Boulder, CO	1500 AIAA-2010-0826 Wind Turbine Siting by Using Mesoscale Model Data Assimilation and Computational Fluid Dynamics F. Zajaczkowski, Pennsylvania State University, State College, PA	1530 AIAA-2010-0827 Large Eddy Simulations of Large Wind- Turbine Arrays in the Atmospheric Boundary Layer J. Meyers, Catholic University of Leuven, Leuven, Belgium	1600 AIAA-2010-0828 Development of an Empirical Obstacle Wake Model for Small Wind Turbine Micrositing A. Brunskill, University of Guelph, Guelph, Canada	1630 AIAA-2010-0829 A Comparison of Wind Turbine Load Statistics for Inflow Turbulence Fields Based on Conventional Spectral Methods and Large Eddy Simulation C. Sim, Purdue University, West Lafayette, IN		

Tuesday Afternoon / 05 January 2010

Session 143-WIG-5 / PDL-9 — **Electrodynamic and Magneto-Hydrodynamic Interactions and Applications** — **Grand Ballroom 2**

Chaired by: V. BITYURIN, Russian Academy of Sciences, Moscow, Russia, and S. SCHNEIDER, NASA Glenn Research Center, Cleveland, OH

1400 AIAA-2010-0830 Impact of a Magnetic Field on Rotation of a Gas Discharge Around an Axisymmetric Body S. Bobashev, Russian Academy of Sciences, Saint Petersburg, Russia	1430 AIAA-2010-0831 Velocity Measurements in Synthetic Jet Using Magnetically Driven Surface Discharges C. Kalra, Princeton University, Princeton, NJ	1500 AIAA-2010-0832 Local MHD Effects on Supersonic Flows in the Nonuniform Magnetic Field E. Sheikin, Saint-Petersburg State University, Saint Petersburg, Russia	1530 AIAA-2010-0834 Physical Grounds of Excitation of Linear Electromagnetic Vibrators in Proximity of a Conducting Surface I. Esakov, Russian Academy of Sciences, Moscow, Russia	1600 AIAA-2010-0835 WITHDRAWN Studies of Non-Equilbrium Effects in Framework of Parachute Concept V. Bityurin, Russian Academy of Sciences, Moscow, Russia			

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Tuesday Afternoon / 05 January 2010

1500 - 1700 **Patent Law Workshop** **Grand Ballroom 10**

Chaired by: R. JAWORSKI, Cooper Dunham, New York, NY

This workshop is designed to provide insight into the patent options that are available, as well as the process for obtaining patents. It will include recent changes to patent law to those who may have already navigated, or who are currently navigating this process and will also discuss some current suggested changes and what their impacts may be.

Tuesday Afternoon / 05 January 2010

1730 - 1830 **2010 William Littlewood Memorial Lecture** **Crystal Ballroom H**

N. Albert Moussa
President
BlazeTech Corporation
Cambridge, Massachusetts

Wednesday Morning / 06 January 2010

0800 - 0900 **New Horizons Forum Keynote Address** **Crystal Ballroom H**

Distinguished Speaker: **Gen Lester Lyles**, USAF (Ret.)
Member of the Review of U.S. Human Space Flight Plans Committee
Former Vice Chief of Staff of the United States Air Force, and Commander, Air Force Materiel Command (Invited)

The Future of the U.S. Space Program

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Wednesday Morning / 06 January 2010

0900 - 1130 **New Horizons Forum Panel Discussion - Space in the 21st Century - Changing Priorities** **Crystal Ballroom J2**

The panel will discuss topics such as the new NASA – rationale roles and missions, the future of human spaceflight, Government initiatives vs. private sector investment in a resource constrained environment, the impact of the emerging commercial space industry, to name a few.

Moderator: **Robert S. Dickman**, AIAA Executive Director, Maj. Gen., USAF (Retired)

Panelists:

- **Maj. Gen. Ellen M. Pawlikowski**, Deputy Director, National Reconnaissance Office, Chantilly, VA
- **Gary E. Payton**, Deputy Under Secretary, Air Force Space Programs, Washington D.C.
- **Anthony Galasso**, Director, Advanced Integration Capabilities, Phantom Works, Integrated Defense Systems, Huntington Beach, CA
- **Alexis Livanos**, Corporate Vice President and Chief Technology Officer, Northrop Grumman Corporation, Los Angeles, CA
- **Damon Wells**, Senior Policy Analyst, Office of Science and Technology Policy (OSTP), Washington D.C.
- **Janet E. Petro**, Deputy Director, John F. Kennedy Space Center, Kennedy Space Center, FL

Wednesday Morning / 06 January 2010

0900 - 1200 **NRC Biological and Physical Sciences in Space Decadal Survey Townhall** **Grand Ballroom 13**

An open discussion between NRC decadal survey committee and the AIAA microgravity research community. This is a unique and valuable opportunity for participants in the January, 2010 ASM to have significant input to this congressionally requested study, which is intended to help NASA determine the direction of research for microgravity science and exploration for the next decade.

Wednesday Morning / 06 January 2010

0900 - 1100 **Renewable Fuels: Are Biofuels the Future Fuel for Aviation ?** **Grand Ballroom 14**

Chaired by: J. TRENT, NASA Ames Research Center, Moffett Field, CA, and V. LYONS, NASA Glenn Research Center, Cleveland, OH

Panel session dealing with current and future issues involving renewable energy

Wednesday Morning / 06 January 2010

Session 144-AA-7 — **Computational Aeroacoustics (CAA)** — **Washington**

Chaired by: D. HIXON, University of Toledo, Toledo, OH

0900 AIAA-2010-0836 A Collision Detection Approach To Chimera Grid Assembly for High Fidelity Simulations of Turbofan Noise G. Zagaris, University of Illinois, Urbana-Champaign, Champaign, IL	0930 AIAA-2010-0837 Optimization of Finite-Difference Boundary Stencils for Improved Viscous Stability R. Hixon, University of Toledo, Toledo, OH	1000 AIAA-2010-0838 Simulation of CAA Benchmark Problems Using High- Order Spectral Difference Method and Perfectly Matched Layers Y. Zhou, Iowa State University, Ames, IA	1030 AIAA-2010-0839 Proposed Boundary Conditions for Gust-Airfoil Interaction Noise A. Lau, University of Southampton, Southampton, Great Britain				

Wednesday Morning / 06 January 2010

Session 145-ABP-4 — **Inlets II** — **Grand Ballroom 12**

Chaired by: J. FLAMM, NASA Langley Research Center, Hampton, VA, and V. DIPPOLD, NASA Glenn Research Center, Cleveland, OH

0900 AIAA-2010-0840 Modeling of Coupled Open Rotor Engine Intakes S. Loiodice, University of Cambridge, Cambridge, Great Britain	0930 AIAA-2010-0841 A Numerical Investigation of S- Duct Flows with Boundary-Layer Ingestion B. Johnson, University of Tennessee, Chattanooga, Chattanooga, TN	1000 AIAA-2010-0842 Re- Design of Boundary Layer Ingesting Offset Inlet via Passive Flow Control Manner B. Lee, NASA Glenn Research Center, Cleveland, OH					

Wednesday Morning / 06 January 2010

Session 146-AD-5 — **Transonic and Supersonic Aircraft Design** — **Crystal Ballroom K**

Chaired by: W. ANEMAAT, DARcorporation, Lawrence, KS, and D. BENCHERGUI, Bombardier Aerospace, Dorval, Canada

0900 AIAA-2010-0843 A Multi- Shock Inverse Design Method for Low-Boom Supersonic Aircraft A. Haas, Stanford University, Stanford, CA	0930 AIAA-2010-0844 Boom- Constrained Drag Minimization for Design of Supersonic Concepts S. Rallabhandi, National Institute of Aerospace, Hampton, VA	1000 AIAA-2010-0845 A Mixed- Fidelity Approach for Design of Low- Boom Supersonic Aircraft W. Li, NASA Langley Research Center, Hampton, VA	1030 AIAA-2010-0847 Value Operations Methodology for Value Driven Design: Medium Range Passenger Airliner Validation R. Curran, Delft University of Technology, Delft, The Netherlands	1100 AIAA-2010-0846 Zero Lift Drag and Drag Divergence Prediction for Finite Wings in Aircraft Conceptual Design T. Takahashi, Northrop Grumman Corporation, Torrance, CA	1130 AIAA-2010-0848 Operating Efficiency of Military Transports (Jets and Turbo- Props) and Comparisons with Civil Aircraft R. Nangia, Nangia Aero Research, Bristol, Great Britain		

Wednesday Morning / 06 January 2010

Session 147-AFM-5 — Flight Dynamics - UAVs — Chicago

Chaired by: M. XIN, Mississippi State University, Starkville, MS, and S. KOMADINA, Northrop Grumman Corporation, Torrance, CA

0900 AIAA-2010-0852 Micro UAV Holonomy Control System Robust for Gust Wind R. Kojima, Yamaguchi University, Ube, Japan	0930 AIAA-2010-0853 Automated Dynamic Propeller Testing at Low Reynolds Numbers D. Gamble, Oklahoma State University, Stillwater, OK	1000 AIAA-2010-0854 Flight Testing of Small Electric Powered Small UAS's with Folding Propellers C. Hall, North Carolina State University, Raleigh, NC					

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Session 148-AMT-6 — Rayleigh Scattering Techniques — Crystal Ballroom J1

Chaired by: A. MIELKE, NASA Glenn Research Center, Cleveland, OH, and M. REEDER, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH

0900 AIAA-2010-0855 Study of Fabry- Perot Etalon Stability and Tuning for Spectroscopic Rayleigh Scattering M. Clem, NASA Glenn Research Center, Cleveland, OH	0930 AIAA-2010-0856 Progress on a Rayleigh Scattering Mass Flux Measurement Technique A. Mielke-Fagan, NASA Glenn Research Center, Cleveland, OH	1000 AIAA-2010-0857 Towards High-Repetition Rate Rayleigh and Raman Scattering Imaging in Turbulent Jets and Flames J. Sutton, Ohio State University, Columbus, OH	1030 AIAA-2010-0858 Microplasma Electron Number Density Measurement by Resonant Coherent Microwave Rayleigh Scattering Z. Zhang, University of Tennessee, Knoxville, TN	1100 AIAA-2010-0859 WITHDRAWN Time- Resolved Multi-parameter Rayleigh Scattering Measurement System D. Bivolaru, George Washington University, Hampton, VA			

Wednesday Morning / 06 January 2010

Session 149-APA-13 — Active Flow Control II — Grand Ballroom 9

Chaired by: M. AMITAY, Rensselaer Polytechnic Institute, Troy, NY, and M. POST, U.S. Air Force Academy, Colorado Springs, CO

0900 AIAA-2010-0861 Transient Control of the Separating Flow over a Dynamic Airfoil G. Woo, Georgia Institute of Technology, Atlanta, GA	0930 AIAA-2010-0862 Experimental Investigation of Actuators for Flow Control in S- Duct Inlets J. Vaccaro, Rensselaer Polytechnic Institute, Troy, NY	1000 AIAA-2010-0863 High- Lift Enhancement Using Fluidic Actuation M. DeSalvo, Georgia Institute of Technology, Atlanta, GA	1030 AIAA-2010-0864 Experimental and Computational Study on Flow Characteristics by Synthetic Jets Configuration W. Kim, Seoul National University, Seoul, South Korea				

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Wednesday Morning / 06 January 2010

Session 150-APA-14 — Moving Body CFD Simulation II — Grand Ballroom 10

Chaired by: J. LEE, Naval Air Systems Command, Patuxent River, MD, and W. SICKLES, Arnold Engineering Development Center, Arnold AFB, TN

0900 AIAA-2010-0865 Numerical Study of Two Flapping Airfoils in Tandem Configuration T. Broering, University of Louisville, Louisville, KY	0930 AIAA-2010-0866 Finite- Volume Method with Transpiration Boundary Conditions for Flow About Oscillating Wings K. Huckriede, University of Twente, Enschede, The Netherlands	1000 AIAA-2010-0867 CFD- Modeling of Rotor Flowfield Aboard Ship Y. Lee, Naval Air Systems Command, Patuxent Rover, MD					

Wednesday Morning / 06 January 2010

Session 151-APA-15 — Transonic, Supersonic, Hypersonic Aerodynamics I — Crystal Ballroom D

Chaired by: J. DEBONIS, NASA Glenn Research Center, Cleveland, OH, and L. AUMAN, U.S. Army Research, Development and Engineering Command, Huntsville, AL

0900 AIAA-2010-0871 Experimental investigation into Parameters Governing Corner Interactions for Transonic Shock-Wave/Boundary- Layer Interactions D. Burton, Cambridge University, Cambridge, Great Britain	0930 AIAA-2010-0872 A Possible Mechanism for the Appearance of the Carbuncle Phenomenon in Aerodynamic Simulations M. Ramalho, Universidade de Brasilia, Brasilia, Brazil	1000 AIAA-2010-0873 Ballistic Range Experiment on the Low Sonic Boom Characteristics of Supersonic Biplane A. Toyoda, Tohoku University, Sendai, Japan	1030 AIAA-2010-0874 Implicit LES for Shock/Blunt Body Interaction M. Oliveira, University of Texas, Arlington, Arlington, TX	1100 AIAA-2010-0875 A High Order Compact Scheme for Hypersonic Aerothermodynamics V. Fico, STFC Daresbury Laboratory, Warrington, Great Britain			

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Session 152-APA-16 — Unsteady Aerodynamics III — Grand Ballroom 11

Chaired by: A. ALTMAN, University of Dayton, Dayton, OH

0900 AIAA-2010-0876 Particle Image Velocimetry Studies on Shock Wave Diffraction with Freestream Flow N. Gongora-Orozco, University of Manchester, Manchester, Great Britain	0930 AIAA-2010-0877 Modeling Dynamic Stall of SC- 1095 Airfoil at High Mach Number B. Clark, Georgia Institute of Technology, Atlanta, GA	1000 AIAA-2010-0878 Ensemble and Phase-Locked Averaged Loads Controlled by Plasma Duty Cycles X. Meng, Northwestern Polytechnical University, Xi'an, China (prc)					

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Session 153-ASE-5 — AeroSpace Environment Modeling and Instrumentation — Atlanta

Chaired by: J. WISE, U.S. Air Force Research Laboratory, Hanscom AFB, MA, and D. FERGUSON, U.S. Air Force Research Laboratory, Albuquerque, NM

0900 AIAA-2010-0882 An Electromagnetic Interference Reduction Check List for Unmanned Aircraft System J. Tristancho, UPC, Castelldefels, Spain	0930 AIAA-2010-0884 Introducing a Flight-Ready Spacecraft Charge Monitor L. Goembel, Goembel Instruments, Baltimore, MD	1000 AIAA-2010-0886 Modeling of Martian Dust Collection for Non-Stop Mars Sample Return Mission T. Ozawa, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1030 AIAA-2010-1608 High Energy Electron Climatology that Supports Deep Charging Risk Assessment in GEO J. Bodeau, Northrop Grumman Corporation, Redondo Beach, CA				

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Session 154-CS-2 — Engineering Computing/Modeling Environments and Tools — Tampa

Chaired by: F. CHEN, Aerojet, Sacramento, CA

0900 AIAA-2010-0887 Validation of Universal Controls Analysis Tool Six Degree of Freedom Kinematics J. Faure, Florida Institute of Technology, Melbourne, FL	0930 AIAA-2010-0888 WITHDRAWN Global Integrated Design Environment, GLIDE, a Collaborative Engineering Application M. McGuire, NASA Glenn Research Center, Cleveland, OH	1000 AIAA-2010-0889 Synchronize and Stabilize Lifecycle Model for Large- Scale Software Systems R. Selby, Northrop Grumman Corporation, Redondo Beach, CA					

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Session 155-EDU-3 — Curriculum Development and Best Practices — Crystal Ballroom Q

Chaired by: A. BYERLEY, U.S. Air Force Academy, Colorado Springs, CO

0900 AIAA-2010-0891 Living Learning Labs: A Component of the University of Alabama's Engineering Math Advancement Program K. Boykin, University of Alabama, Tuscaloosa, AL	0930 AIAA-2010-0892 ROCKS K- 12 Model Rocketry Outreach Program at Arizona State University J. Villarreal, Arizona State University, Tempe, AZ	1000 AIAA-2010-0893 Capstone Design Project Challenges in Inter-institutional, Geographically Dispersed Teams P. Witte, Georgia Institute of Technology, Atlanta, GA	1030 AIAA-2010-0894 USAF Test Pilot School Curriculum: Test Management Projects 2009 A. Freeborn, U.S. Air Force Test Pilot School, Edwards AFB, CA	1100 AIAA-2010-0895 Design of a Typical Outcome Portfolio for Assessment and Continuous Improvement S. Karunamoorthy, Saint Louis University, St. Louis, MO			

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Wednesday Morning / 06 January 2010

Session 156-FD-29 — **Boundary Layer Transition III** — **Grand Ballroom 3**

Chaired by: G. CANDLER, University of Minnesota, St Louis Park, MN, and E. WHITE, Texas A&M University, College Station, TX

0900 AIAA-2010-0896 Boundary Layer Stability Analysis of the Free-Piston Shock Tunnel HIEST Transition Experiments J. Gronvall, University of Minnesota, Minneapolis, MN	0930 AIAA-2010-0897 Comparison of Experimentally Measured and Computed Second-Mode Disturbances in Hypersonic Boundary-Layers C. Alba, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 AIAA-2010-0898 Linear Stability Analysis of Nose Bluntness Effects on Hypersonic Boundary Layer Transition J. Lei, University of California, Los Angeles, Los Angeles, CA	1030 AIAA-2010-0900 Numerical Investigation of Boundary- layer Transition Initiated by a Wave Packet for a Cone at Mach 6 J. Sivasubramanian, University of Arizona, Tucson, AZ				

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Session 157-FD-30 — **Internal Flows** — **Grand Ballroom 4**

Chaired by: J. BONS, Ohio State University, Columbus, OH, and M. BRIGHT, Northrop Grumman Corporation, San Diego, CA

0900 AIAA-2010-0902 Consideration Of Three-Dimensional Phenomena Within Two-Dimensional Meridional Flow Models A. Willburger, University of Kassel, Kassel, Germany	0930 AIAA-2010-0903 Heat Transfer Effects on the Performance of a Radial Turbine Working Under Pulsatile Flow Conditions F. Hellstrom, KTH Royal Institute of Technology, Stockholm, Sweden	1000 AIAA-2010-0904 Organized Streamwise Vorticity on Convex Surfaces With Particular Reference to Turbine Blades J. Gostelow, National Research Council Canada, Ottawa, Canada	1030 AIAA-2010-0905 Numerical Simulation of Swirling Flowfield in Combustion Chamber for Hybrid Rocket Engine K. Yoshimura, Tohoku University, Sendai, Japan				

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Session 158-FD-31 — **Micro/Nano Fluidics II** — **Grand Ballroom 5**

Chaired by: K. CASSEL, Illinois Institute of Technology, Wheaton, IL

0900 AIAA-2010-0906 Current Conduction and Fluid Flow in Nanochannels for Electrokinetic Power Generation S. Datta, Ohio State University, Columbus, OH	0930 AIAA-2010-0908 Electrochemical MHD for Microfluidic Applications K. Isaac, Missouri University of Science and Technology, Rolla, MO	1000 AIAA-2010-0909 Optimizing the Arrangement and Shape of Grooves in Microfluidic Components D. Mott, Naval Research Laboratory, Washington, DC					

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Wednesday Morning / 06 January 2010

Session 159-FD-32 — **Non-Equilibrium Thermofluid Phenomena (Invited)** — **Grand Ballroom 6**

Chaired by: A. ALEXEENKO, Purdue University, West Lafayette, IN, and A. TUMIN, University of Arizona, Tucson, AZ

0900 AIAA-2010-0910 Turbulence and Stochasticity in High- Speed Reactive Flows E. Oran, Naval Research Laboratory, Washington, DC	1000 AIAA-2010-0911 The Limits of Two- Temperature Kinetic Model in Air C. Park, Korea Advanced Institute of Science and Technology, Daejeon, South Korea	1100 AIAA-2010-0912 The Potential Role of Electronically- Excited States in Recombining Flows G. Candler, University of Minnesota, Minneapolis, MN			

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Session 160-FD-33 — **Passive Flow Control** — **Crystal Ballroom L**

Chaired by: R. JOSLIN, Office of Naval Research, Arlington, VA, and U. GHIA, University of Cincinnati, Cincinnati, OH

0900 AIAA-2010-0914 Momentum Increase in Wall Adjacent Flow via Hexagonal Embedded Cavities A. Lang, University of Alabama, Tuscaloosa, AL	0930 AIAA-2010-0915 DNS of Passive Surface Textures to Constrain the Spreading of Turbulent Spots J. Strand, University of Texas, Austin, Austin, TX	1000 AIAA-2010-0916 Large Eddy Simulation of Flow Over a Flat-Window Cylindrical Turret with Passive Flow Control P. Morgan, Ohio Aerospace Institute, Wright-Patterson AFB, OH	1030 AIAA-2010-0917 Control of Flow Past a Circular Cylinder via a Spanwise Surface Wire: Effect of the Scale of the Wire A. Ekmekci, University of Toronto, Toronto, Canada				

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Session 162-FD-35 — **Turbulent Separating Flows** — **Crystal Ballroom M**

Chaired by: D. RIZZETTA, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and A. GROSS, University of Arizona, Tucson, AZ

0900 AIAA-2010-0918 Three- Dimensional Turbulent Flow Separation in Diffusers E. Jeyapaul, Iowa State University, Ames, IA	0930 AIAA-2010-0919 Hybrid RANS/LES Simulations of Turbulent Channel and Diffuser Flows A. Gross, University of Arizona, Tucson, AZ	1000 AIAA-2010-0920 A Comparison of Detached- Eddy Simulation and Reynolds- Stress Modeling Applied to the Flow over a Backward-Facing Step and an Airfoil at Stall A. Probst, University of Braunschweig, Braunschweig, Germany	1030 AIAA-2010-0921 A DES Procedure Applied to the Flow Over a NACA0012 Airfoil R. Bozinoski, University of Califonia, Davis, Davis, CA	1100 AIAA-2010-0922 Large- Eddy Simulation of Compressible Flow over Backward- Facing Step Using Chebyshev Multidomain Method H. Kanchi, University of Illinois, Chicago, Chicago, IL	1130 AIAA-2010-0923 Implicit LES of Compressible Turbulent Flow over a Backward-Facing Step in the Nozzle of Solid Rocket Motor K. Ishiko, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan		

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Session 163-FD-36 — Unsteady Compressible Flows — Crystal Ballroom N

Chaired by: J. ELDREDGE, University of California, Los Angeles, Los Angeles, CA, and H. BABINSKY, University of Cambridge, Cambridge, Great Britain

0900 AIAA-2010-0924 A Numerical Study of Pressure/Shock Waves Interactions in Transonic Airfoil Flow Using Optimized WENO Schemes I. Klioutchnikov, RWTH Aachen University, Aachen, Germany	0930 AIAA-2010-0925 An Experimental and Numerical Study of an Oscillating Transonic Shock Wave in a Duct P. Bruce, University of Cambridge, Cambridge, Great Britain	1000 AIAA-2010-0926 Time- Accurate Simulation of Shock Propagation and Reflection in an Axi-Symmetric Shock Tube M. Lamnaouer, University of Central Florida , Orlando, FL	1030 AIAA-2010-0928 Parametric Viscous Analysis of Gust Interaction with SD7003 Airfoil V. Golubev, Embry-Riddle Aeronautical University, Daytona Beach, FL	1100 AIAA-2010-0929 WITHDRAWN Implicit Large Eddy Simulation of Transition to Turbulence in Low Reynolds Number Flows A. Uranga, Massachusetts Institute of Technology, Cambridge, MA			

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Session 164-GT-6 — Data Analysis & Instrumentation — Crystal Ballroom G1

Chaired by: W. BAKER, Lockheed Martin Corporation, Fort Worth, TX, and J. VAN AKEN, Jacobs Technology, Moffett Field, CA

0900 AIAA-2010-0930 Optimization of Regression Models of Experimental Data Using Confirmation Points N. Ulbrich, Jacobs Technology, Moffett Field, CA	0930 AIAA-2010-0931 The Role of Hierarchy in Response Surface Modeling of Wind Tunnel Data R. DeLoach, NASA Langley Research Center, Hampton, VA	1000 AIAA-2010-0932 Development of a User Interface for a Regression Analysis Software Tool N. Ulbrich, Jacobs Technology, Moffett Field, CA	1030 AIAA-2010-0933 Low Frequency Vibration Data Analysis via Digital Image Data of High Speed Camera Y. Jeng, National Cheng Kung University, Tainan, Taiwan (roc)	1100 AIAA-2010-0934 Debond Detection of Shell /Insulation in SRM by Thermal Wave NDT Z. Yang, Xi'an Hi-Tech Institute, Xi'an, China (prc)			

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Session 165-GTE-8 — Gas Turbine Engine Modeling — Crystal Ballroom A

Chaired by: R. WEBSTER, University of Tennessee, Chattanooga, Chattanooga, TN, and A. HALE, Aerospace Testing Alliance, Arnold AFB, TN

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Wednesday Morning / 06 January 2010

Session 166-HAPB-6 — Supersonic Inlets and Isolators — Crystal Ballroom E

Chaired by: D. REDDY, NASA Glenn Research Center, Cleveland, OH, and R. MOEHLENKAMP, Pratt & Whitney, A United Technologies Company, West Palm Beach, FL

0900 AIAA-2010-0938 Experimental Investigation on the Influence of Yaw Angle on the Inlet Performance at Mach 7 O. Hohn, German Aerospace Center (DLR), Cologne, Germany	0930 AIAA-2010-0939 The Three Weak Solution Regimes of Supersonic Conical Flow and Their Impact on Engine Inlets N. Smith, University of Maryland, College Park, MD	1000 AIAA-2010-0940 Design of Modular, Shape- transitioning Inlets for a Conical Hypersonic Vehicle R. Gollan, NASA Langley Research Center, Hampton, VA	1030 AIAA-2010-0941 A Computational Investigation of Flow Through an Axisymmetric Supersonic Inlet M. Conway, Purdue University, West Lafayette, IN	1100 AIAA-2010-0942 Parametric Investigation of Racetrack- to-Circular Cross- Section Transition of a Dual-mode Ramjet Isolator N. Bagaveyev, Embry-Riddle Aeronautical University, Daytona Beach, FL			

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Session 167-IS-3 — Fault-Tolerant Flight Control — Crystal Ballroom P

Chaired by: S. HARVEY, U.S. Air Force Research Laboratory, Kirtland AFB, NM, and E. ATKINS, University of Michigan, Ann Arbor, MI

0900 AIAA-2010-0944 Fault- Tolerant Flight Control System Design by a Dual- Loop Control Strategy M. Mehrtash, Concordia University, Montréal, Canada	0930 AIAA-2010-0945 Adaptive Sliding Mode Fault Tolerant Control of Civil Aircraft with Separated Uncertainties T. Wang, Concordia University, Montréal, Canada	1000 AIAA-2010-0946 Dynamic Inverse Resilient Control of a Damaged Asymmetric General Aviation Aircraft M. Arruda, Wichita State University, Wichita, KS	1030 AIAA-2010-0947 Fault- Tolerant Control for Quadrotor UAV via Backstepping Approach X. Zhang, Concordia University, Montréal, Canada	1100 AIAA-2010-0948 Trajectory Tracking Control of a Quadrotor Unmanned Mini-Helicopter Z. Zuo, Beijing University of Aeronautics and Astronautics, Beijing, China (prc)			

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Session 238-MDO-1 — Optimization Algorithms and Methodology I — Crystal Ballroom C

Chaired by: P. BERAN, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and A. LANDMANN, The Boeing Company, Woodinville, WA

0900 AIAA-2010-1310 WITHDRAWN Comparison of Heuristic Optimization Methods for Multidisciplinary Design of Air- Launched Space Launch Vehicle A. Rafique, Beihang University, Beijing, China (prc)	0930 AIAA-2010-1311 Aerospace Design: A Comparative Study of Optimizers J. Badyrka, Auburn University, Auburn, AL	1000 AIAA-2010-1313 Simplex Elements Stochastic Collocation for Uncertainty Propagation in Robust Design Optimization J. Witteveen, Stanford University, Stanford, CA	1030 AIAA-2010-1314 High Fidelity Multidisciplinary Optimization (HFMDO) K. Alston, M4 Engineering, Long Beach, CA	1100 AIAA-2010-1315 The KNOMAD Methodology for Integration of Multidisciplinary Engineering Knowledge Within Aerospace Production R. Curran, Delft University of Technology, Delft, The Netherlands			

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Wednesday Morning / 06 January 2010

Session 168-PC-12 — **Laminar Flames II** — **Los Angeles**

Chaired by: J. POWERS, University of Notre Dame, Notre Dame, IN, and M. MATALON, University of Illinois, Urbana-Champaign, Urbana, IL

0900 AIAA-2010-0950 Performance of JP- 8 Surrogate Models in Predicting Laboratory Jet Flames V. Katta, Innovative Scientific Solutions, Inc., Dayton, OH	0930 AIAA-2010-0951 Laminar Burning Speeds and Markstein Lengths of n- Decane/Air, n-Decane/O2/He, Jet-A/Air and S- 8/Air Flames D. Singh, Purdue University, West Lafayette, IN	1000 AIAA-2010-0953 Edge Flames in Confined Mixing Layers J. Bieri, Northwestern University, Evanston, IL	1030 AIAA-2010-0954 Analysis of the Reaction-Advection- Diffusion Spectrum Oflaminar Premixed Flames A. Al-Khateeb, University of Notre Dame, Notre Dame, IN				

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Session 169-PC-13 — **Solid Propellants and Detonations** — **Denver**

Chaired by: O. HAIDN, German Aerospace Center (DLR), Lampoldshausen, Germany, and C. CARTER, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

0900 AIAA-2010-0956 Study of Heat Loads from Steady Deflagration and Pulsed Detonation Combustion A. Naples, Innovative Scientific Solutions, Inc., Dayton, OH	0930 AIAA-2010-0957 Determination of Practical Computational Cell Size for Simulation of H2 Air Detonations in Pulse Detonation Engines I. Ho, Naval Postgraduate School, Monterey, CA	1000 AIAA-2010-0958 Parametric Investigation on the Sensitivity of the Simplified Aluminum Combustion Modeling H. Yang, Yonsei University, Seoul, South Korea	1030 AIAA-2010-0960 Aluminium Agglomerate Size Measurement of the Nano/Micro- Aluminized Composite Propellants J. Kandasamy, Indian Institute of Technology, Madras, Chennai, India				

Wednesday Morning / 06 January 2010

Session 170-PDL-10 — **Joint PDL/WIG/FD/TP Plasma Actuator Session V: DBDs** — **Grand Ballroom 1**

Chaired by: J. POGGIE, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and J. LINEBERRY, LyTec, Manchester, TN

0900 AIAA-2010-0961 Periodic Electrodynamic Field of Dielectric Barrier Discharge P. Huang, Wright State University, Dayton, OH	0930 AIAA-2010-0962 Spatially Resolved Optical Emission Spectroscopy Measurements within a Single Microdischarge of a Dielectric Barrier Discharge S. Stanfield, Wright State University, Dayton, OH	1000 AIAA-2010-0963 Simulations of Initial Argon Dielectric Barrier Discharges Using the PIC Code Magic M. Huerta, University of Miami, Coral Gables, FL	1030 AIAA-2010-0964 Investigation of Impedance Characteristics and Power Delivery for Dielectric Barrier Discharge Plasma Actuators J. Zito, University of Florida, Gainesville, FL	1100 AIAA-2010-0965 Novel Multi- Barrier Plasma Actuators for Increased Thrust R. Durscher, University of Florida, Gainesville, FL	1130 AIAA-2010-0966 Three- Dimensional Plasma and Fluid Flow Simulation Inside a Microscale Electrohydrodynamic Pump C. Wang, University of Florida, Gainesville, FL		

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Wednesday Morning / 06 January 2010

Session 171-SE-2 — **Systems Engineering II** — **Boston**

Chaired by: J. EILER, Stellar Solutions, Littleton, CO, and E. NICHOLS, Orbital Sciences Corporation, Chandler, AZ

0900 AIAA-2010-0967 A System Lifecycle Approach to Maintenance Planning in Aerospace Using Digital Manufacturing J. Butterfield, Queen's University Belfast, Belfast, Northern Ireland	0930 AIAA-2010-0968 Through- Life Support and the Aircraft Lifecycle L. Webb, RMIT University, Melbourne, Australia	1000 AIAA-2010-0969 A Systems Engineering Approach to Aero-Engine Life Cycle Costing J. Wong, University of Southampton, Southampton, Great Britain	1030 AIAA-2010-0970 System Level Airworthiness Tool (SLAT) D. Burke, North Carolina State University, Raleigh, NC	1100 AIAA-2010-0971 Systems Engineering in Step_SATdb and QuickSAT, a Web-Based and Open Source Satellite Design Automation Environment A. Santangelo, sci_Zone, Rio Ranco, NM	1130 AIAA-2010-0972 An Evolution of Morphological Analysis Applications in Systems Engineering H. Jimenez, Georgia Institute of Technology, Atlanta, GA		

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Session 172-SEC-3 — **Applied Research to Enable Space Access and Exploration** — **Crystal Ballroom F**

Chaired by: P. MURAD, Morningstar Applied Physics, LLC, Vienna, VA, and C. REYNERSON, The Boeing Company, Chantilly, VA

0900 AIAA-2010-0973 Strategic Perspectives and Technical Architecture Overview of Indian Space Exploration Missions V. Sundararajan, , San Jose, CA	0930 AIAA-2010-0974 Global Trends in Space Access and Utilization S. Rahman, NASA Stennis Space Center, Stennis Space Center, MS	1000 AIAA-2010-1609 The Challenges of Developing the Technology for A Realistic Starship Propulsor P. Murad, Morningstar Applied Physics, LLC, Vienna, VA	1030 AIAA-2010-1610 Pure Electromagnetic Propulsion and the Problem of GEM (Gravity and Electro- Magnetism) Unification J. Brandenburg, Orbital Technologies Corporation, Madison , WI				

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Session 173-TES-2 — **Fire Dynamics and Modeling** — **Crystal Ballroom B**

Chaired by: J. MODER, NASA Glenn Research Center, Cleveland, OH, and G. ROY, Office of Naval Research, Arlington, VA

0900 AIAA-2010-0976 BRANZFIRE: Application to Structural Fires with Sprinklers M. Mohammed, Lilley & Associates, Stillwater, OK	0930 AIAA-2010-0977 A Two- Story House Fire: Temperatures and Smoke Detector Activation with Various Fires Using the CFAST Fire Computer Code R. Vadlamuri, Lilley & Associates, Stillwater, OK	1000 AIAA-2010-0978 Two- Room Structural Fire Calculations with the FDS Computer Code for Smoke and Heat Detector Response S. Kotha, Lilley & Associates, Stillwater, OK	1030 AIAA-2010-0979 Heat Transfer Simulation of Slug Flow in Microchannels A. Mehdizadeh, University of Florida, Gainesville, FL				

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Session 174-TP-11 — **Ablation I** — **New Orleans**

Chaired by: R. AGARWAL, Washington University in St Louis, St Louis, MO, and R. GOSSE, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

0900 AIAA-2010-0981 Non- Equilibrium Ablation of Phenolic Impregnated Carbon Ablator F. Milos, NASA Ames Research Center, Moffett Field, CA	0930 AIAA-2010-0983 Simulaing Ablating Phenomenon for Earth Reentry J. Shang, Wright State University, Dayton, OH	1000 AIAA-2010-0984 Microscopic Scale Simulation of the Ablation of Fibrous Materials J. Lachaud, NASA Ames Research Center, Moffett Field, CA	1030 AIAA-2010-0982 Modeling the Motion of Pyrolysis Gas Through Charring Ablating Material Using Discontinuous Galerkin Finite Elements A. Bhatia, University of Florida, Gainesville, FL				

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Session 175-TP-12 — **Direct Simulation Monte Carlo Methods II** — **Miami**

Chaired by: D. GOLDSTEIN, University of Texas, Austin, Austin, TX

0900 AIAA-2010-0985 Analysis of Kinetic Approach to Homogeneous Condensation in Water Expansions Z. Li, Pennsylvania State University, State College, PA	0930 AIAA-2010-0986 Rarefied Compressible Two- Dimensional Jet Flows K. Khasawneh, New Mexico State University, Las Cruces, NM	1000 AIAA-2010-0987 Modeling of Electronic Excitation and Radiation for Hypersonic Re- Entry Flows in DSMC T. Ozawa, Japan Aerospace Exploration Agency, Chofu, Japan	1030 AIAA-2010-0988 Modeling of Crew Exploration vehicle Re-entry Ablation Flows E. Titov, Pennsylvania State University, University Park, PA				

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Session 176-TP-13 — **Thermal Protection Systems** — **New York**

Chaired by: E. SHORT, and J. KAPAT, University of Central Florida, Oviedo, FL

0900 AIAA-2010-0991 Reducing Aerodynamic Heating by the Opposing Jet in Supersonic and Hypersonic Flows I. Tamada, Kyushu University, Fukuoka, Japan	0930 AIAA-2010-0992 Assessment of Injection Induced Turbulence Model for the Hemisphere with Wall Injection G. Jeong, Seoul National University, Seoul, South Korea	1000 AIAA-2010-0993 Development of a Numerical Code for TPS Design and High-Temperature and High-Strength material D. Kim, Seoul National University, Seoul, South Korea	1030 AIAA-2010-0994 Reliability of Classical Molecular Dynamics Method to Thermodynamic Properties of Hydrogen H. Nagashima, Aoyama Gakuin University, Sagamihara, Japan				

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Session 177-WE-5 — **Offshore Wind Turbine Simulation and Control** — **Crystal Ballroom G2**

Chaired by: J. JONKMAN, National Renewable Energy Laboratory, Golden, CO, and H. NAMIK, University of Auckland, Auckland, New Zealand

0900 AIAA-2010-0996 Incorporating Irregular Nonlinear Waves in Coupled Simulation of Offshore Wind Turbines P. Agarwal, Stress Engineering Services, Houston, TX	0930 AIAA-2010-0998 A Comparison of First-Order Aerodynamic Analysis Methods for Floating Wind Turbines T. Sebastian, University of Massachusetts, Amherst, Amherst, MA	1000 AIAA-2010-0999 Individual Blade Pitch Control of a Floating Offshore Wind Turbine on a Tension Leg Platform H. Namik, University of Auckland, Auckland, New Zealand	1030 AIAA-2010-1000 Active Structural Control of Offshore Wind Turbines M. Lackner, University of Massachusetts, Amherst, Amherst, MA	1100 AIAA-2010-1001 Lateral Tower Load Mitigation by Generator Torque Control B. Kallesøe, Risø DTU, Roskilde, Denmark			

Wednesday Morning / 06 January 2010

Session 178-WIG-6 / PDL-11 — **Microwave-Based Flow Control** — **Grand Ballroom 2**

Chaired by: E. SON, Russian Academy of Sciences, Moscow, Russia, and C. SUCHOMEL, U.S. Air Force, Wright-Patterson AFB, OH

0900 AIAA-2010-1002 Effective Area of Microwave Discharge Interaction with EM Beam Exciting It D. Bychkov, Russian Academy of Sciences, Moscow, Russia	0930 AIAA-2010-1003 Boundary- Layer Control Based on Localized Plasma Generation: Development of the Microwave System I. Esakov, Russian Academy of Sciences, Moscow, Russia	1000 AIAA-2010-1004 Instabilities and Vortex Characteristics During Interaction of Microwave Filaments with Body in Supersonic Flow O. Azarova, Russian Academy of Sciences, Moscow, Russia	1030 AIAA-2010-1005 Interaction of Microwave- Generated Plasma with Hemisphere- Cone-Cylinder D. Knight, Rutgers University, Piscataway, NJ	1100 AIAA-2010-1006 Electrodynamic Problems of Boundary-Layer Control Method Based on Array of Microwave- Heated Elements I. Esakov, Russian Academy of Sciences, Moscow, Russia	1130 AIAA-2010-1007 Boundary- Layer Control Based on Localized Plasma Generation: Wind- Tunnel Investigations P. Vynogradskyy, National Aviation University, Kiev, Ukraine		

Wednesday Afternoon / 06 January 2010

1200 - 1300 — **6th Annual Public Policy Luncheon** — **Grand Ballroom 7/8**

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Wednesday Afternoon / 06 January 2010

Session 179-AA-8 — Vibration and Active Noise Control — Washington

Chaired by: C. TINNEY, University of Texas, Austin, Austin, TX

1400 AIAA-2010-1008 Navier- Stokes Simulations of Acoustic Streaming for Flow Control and Micropropulsion T. Surti, Embry-Riddle Aeronautical University, Daytona Beach, FL	1430 AIAA-2010-1009 Sound Transmission Calculation Through Structural Models K. Murakami, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1500 AIAA-2010-1010 WITHDRAWN Vibration Control of A Rotating Smart Composite Beam O. Ozdemir Ozgumus, Istanbul Technical University, Istanbul, Turkey					

Wednesday Afternoon / 06 January 2010

Session 180-AD-6 — Aircraft Conceptual Design Studies — Crystal Ballroom K

Chaired by: M. PRICE, Queen's University Belfast, Belfast, Northern Ireland, and D. HALL, DHC Engineering, Morro Bay, CA

1400 AIAA-2010-1011 A Conceptual Design of a Short Takeoff and Landing Regional Jet Airliner A. Hahn, NASA Langley Research Center, Hampton, VA	1430 AIAA-2010-1012 Conceptual Design of a Submersible Airplane G. Crouse, Auburn University, Auburn, AL	1500 AIAA-2010-1013 Toward Zero Sonic-Boom and High Efficiency Supersonic Flight, Part I: A Novel Concept of Supersonic Bi- Directional Flying Wing G. Zha, University of Miami, Coral Gables, FL	1530 AIAA-2010-1014 The Suitability of Hybrid vs. Conventional Airships for Persistent Surveillance Missions B. Buerge, Guardian Flight Systems, LLC, Elizabeth City, NC	1600 AIAA-2010-1015 Reducing Aviation's Environmental Impact Through Large Aircraft for Short Ranges G. Kenway, University of Toronto, Toronto, Canada	1630 AIAA-2010-1016 Aerodynamic Optimization of an Over-the- Wing- Nacelle-Mount Configuration R. Yoneta, Tohoku University, Sendai, Japan		

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Session 181-AD-7 — Micro Air Vehicle Design — Crystal Ballroom L

Chaired by: G. CROUSE, Auburn University, Auburn, AL, and P. BERAN, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

1400 AIAA-2010-1017 Micro Air Vehicle Flapping Wing Effectiveness, Efficiency and Aeroelasticity Relationships P. Wu, University of Florida, Gainesville, FL	1430 AIAA-2010-1018 Development of Flapping Wing Micro Air Vehicles - Design, CFD, Experiment and Actual Flight C. Hsu, Wright State University, Dayton, OH	1500 AIAA-2010-1019 Characteristics of Butterfly Wing Motions and Their Application to Micro Flight Robot M. Fuchiwaki, Kyushu Institute of Technology, Iizuka, Japan	1530 AIAA-2010-1020 Preliminary and Conceptual Design of a Remotely Piloted Ducted Fan MAV B. Stiltner, AVID LLC, Blacksburg, VA	1600 AIAA-2010-1021 Detailed Design, Construction, and Flight Tests of a Remotely Piloted Ducted Fan MAV B. Stiltner, AVID LLC, Blacksburg, VA	1630 AIAA-2010-1022 Evaluation of Automatically Designed Micro Air Vehicles and Flight Testing K. Amadori, Linköping University, Linköping, Sweden		

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Session 182-AFM-6 — **Flight Dynamics - Flapping Flight** — **Chicago**

Chaired by: G. ABATE, U.S. Air Force Research Laboratory, Eglin AFB, FL, and A. AHMED, Auburn University, Auburn, AL

1400 AIAA-2010-1023 Dynamics and Control of a Biomimetic Vehicle Using Biased Wingbeat Forcing Functions: Part I - Aerodynamic Model M. Oppenheimer, U.S. Air Force, Wright-Patterson AFB, OH	1430 AIAA-2010-1024 Dynamics and Control of a Biomimetic Vehicle Using Biased Wingbeat Forcing Functions: Part II - Controller D. Doman, U.S. Air Force, Wright-Patterson AFB, OH	1500 AIAA-2010-1025 An Experimental Study of Unsteady Vortex Structures in the Wake of a Piezoelectric Flapping Wing L. Clemons, Iowa State University, Ames, IA	1530 AIAA-2010-1026 Proper Orthogonal Decomposition of Flexible Clap and Fling Motions via High- Speed Deformation Measurements B. Stanford, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 AIAA-2010-1027 Flexible Hovering Wing Motions: Proper Orthogonal Decomposition Analysis T. Fitzgerald, University of Maryland, College Park, MD	1630 AIAA-2010-1028 Optimal Flight of Rufous Hummingbirds in Hover: An Experimental Investigation H. Bocanegra Evans, New Mexico State University, Las Cruces, NM		

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Session 183-AMT-7 — **Velocimetry** — **Crystal Ballroom J1**

Chaired by: T. JENKINS, MetroLaser, Inc., Irvine, CA, and S. WATANABE, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan

1400 AIAA-2010-1029 A Stereoscopic PIV Study of a Near- Field Wingtip Vortex H. Igarashi, Iowa State University, Ames, IA	1430 AIAA-2010-1030 Three- Component Velocity Field Measurements Near a Parachute During a Drop Test T. Jenkins, MetroLaser, Inc., Irvine, CA	1500 AIAA-2010-1031 PIV Measurements of the CEV Hot Abort Motor Plume for CFD Validation M. Wernet, NASA Glenn Research Center, Cleveland, OH	1530 AIAA-2010-1032 PIV Investigation of Reynolds Number 200 Photodriven Flapping Wings in Air A. Bani Younes, University of Dayton, Dayton, OH	1600 AIAA-2010-1033 Particle Size Control for PIV Seeding Using Dry Ice B. Love, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	1630 AIAA-2010-1034 Planar Doppler Velocimetry Applied in the AEDC 16T Large-Scale Transonic Wind Tunnel J. Wehrmeyer, Aerospace Testing Alliance, Arnold AFB, TN		

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Session 184-APA-17 — **Create-AV: Testing and Evaluation of High Performance Computing Software I** — **Grand Ballroom 9**

Chaired by: N. HARIHARAN, CREATE-AV, Patuxent River, MD

1400 AIAA-2010-1035 Landing Pitch Control Analysis of a Blended Wing Body UCAV J. Chung, Naval Air Systems Command, Patuxent River, MD	1430 AIAA-2010-1036 Effective Use of CFD for Military Aircraft Stability and Control Evaluations D. Findlay, Naval Air Systems Command, Patuxent River, MD	1500 AIAA-2010-1037 CFD Generation of Flight Databases for UAVs for Use in the Flight Certification Air-Worthiness Process T. Shafer, Naval Air Systems Command, Patuxent River, MD	1530 AIAA-2010-1039 Demonstration of An Integrated Test and Evaluation(IT&E) Process for Airframe-Propulsion Systems Asapplied to A Current Weapon System Program M. Davis, Aerospace Testing Alliance, Arnold AFB, TN				

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Wednesday Afternoon / 06 January 2010

Session 185-APA-18 — High Angle of Attack and High Lift Aerodynamics — Grand Ballroom 10

Chaired by: J. AZEVEDO, National Institute for Space Research (INPE), São José dos Campos, Brazil, and S. MORRIS, Engineering Systems, Inc., Colorado Springs, CO

1400 AIAA-2010-1040 Assessment of Sting Effect on X- 31 Aircraft Model Using CFD A. Jirasek, U.S. Air Force Academy, Colorado Springs, CO	1430 AIAA-2010-1041 Influence of Plasma Actuations on Forebody Side Forces and Wakes Z. Zhao, Northwestern Polytechnical University, Xi'an, China (prc)	1500 AIAA-2010-1043 Maximum Lift of the Wing Shape Bodies for Unsteady Motion Converges to About CL=2.5 K. Izumi, Japan Aerospace Exploration Agency (JAXA), Chofu , Japan	1530 AIAA-2010-1044 A Computational Study on the Effect of Chine Nose Shapes on a Slender Body Flight Vehicle at High Angles of Attack S. Lim, Yeungnam University, Gyeongsan, South Korea	1600 AIAA-2010-1045 A Proposal of New Fuselage Configurations for Realizing Reusable Launch Vehicles T. Ishida, Kyushu University, Fukuoka, Japan			

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Session 186-APA-19 — Transonic, Supersonic, Hypersonic Aerodynamics II — Grand Ballroom 11

Chaired by: K. WAITHE, Gulffstream Aerospace Corporation, Savannah, GA, and J. DESPIRITO, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD

1400 AIAA-2010-1046 Numerical Evaluation of Aerodynamic Interference Between Wing and Fuselage for Hypersonic Experimental Aircraft A. Tanabe, Keio University, Yokohama, Japan	1430 AIAA-2010-1047 Simulation of Hypersonic Shock Wave/Boundary Layer Interaction Using High Order WENO Scheme Y. Shen, University of Miami, Coral Gables, FL	1500 AIAA-2010-1048 Explicit Exact and Third-Order Pressure-Deflection Solutions for Oblique Shock and Expansion Waves D. Mateescu, McGill University, Montréal, Canada	1530 AIAA-2010-1049 Interaction of Heated Filaments with a Blunt Cylinder in Supersonic Flow K. Anderson, , ,	1600 AIAA-2010-1050 Numerical Investigation of an Elliptic Cone at High Angle of Incidence in Nonequilibrium Flow M. Atkinson, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH			

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Session 187-APA-20 — VSTOL/STOL Aerodynamics — Grand Ballroom 12

Chaired by: R. TRAMEL, Kratos/Digital Fusion Solutions, Inc., Huntsville, AL, and M. CALVERT, U.S. Army Research, Development and Engineering Command, Redstone Arsenal, AL

1400 AIAA-2010-1051 The Turbulent Structure of a Ground Vortex J. Barata, Universidade Beira Interior, Covilhã, Portugal	1430 AIAA-2010-1052 A Compact Method for Modeling the Aerodynamics of Ducted Fan Vehicles O. Ohanian, AVID LLC, Blacksburg, VA	1500 AIAA-2010-1053 Design and Performance of Circulation Control Flap Systems R. Golden, California Polytechnic State University, San Luis Obispo, CA	1530 AIAA-2010-1054 Assessing the v2- f Turbulence Models for Circulation Control Applications T. Storm, California Polytechnic State University, San Luis Obispo, CA				

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Wednesday Afternoon / 06 January 2010

Session 188-CS-3 — **HPC II: CPU/Cluster Applications and Benchmarking** — **Tampa**

Chaired by: G. PATNAIK, Naval Research Laboratory, Silver Spring, MD

1400 AIAA-2010-1057 CGNS I/O Performance on Parallel File Systems T. Hauser, Northwestern University, Evanston, IL	1430 AIAA-2010-1058 Performance Characterization of Overflow on Multi- Core Based Cluster Computers T. Hauser, Northwestern University, Evanston, IL	1500 AIAA-2010-1059 WITHDRAWN Java HPCC Multi-Physics Solver T. Ludewig, HPCC-Space GmbH, Salzgitter, Germany					

Wednesday Afternoon / 06 January 2010

Session 189-EDU-4 — **Workshop: Project-Based Learning Experiences** — **Crystal Ballroom Q**

Chaired by: P. GRAY, U.S. Naval Academy, Annapolis, Maryland, and S. BANZAERT, Massachusetts Institute of Technology, Cambridge, MA

1400
Oral Presentation
Workshop: Designing, Conducting, and Assessing Project- Based Learning Experiences in Engineering Education

E. Crawley, Massachusetts Institute of Technology, Cambridge, MA

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Session 190-FD-37 — **Boundary Layer Transition IV** — **Grand Ballroom 3**

Chaired by: S. SCHNEIDER, Purdue University, West Lafayette, IN, and M. HOLDEN, CUBRC, Buffalo, NY

1400 AIAA-2010-1061 Hypersonic Boundary-Layer Transition Experiments in a Mach-6 Quiet Tunnel D. Berridge, Purdue University, West Lafayette, IN	1430 AIAA-2010-1062 Boundary- Layer Transition on Cones at Angle of Attack in a Mach- 6 Quiet Tunnel E. Swanson, Purdue University, West Lafayette, IN	1500 AIAA-2010-1063 Infrared Measurements of Boundary- Layer transition on an Inclined Cone at Mach 6 A. van den Kroonenberg, Technical University of Braunschweig, Braunschweig, Germany	1530 AIAA-2010-1064 Simulation of Boundary Layer Transition on Elliptic Cones in Hypersonic Flow M. Bartkowicz, University of Minnesota, St Paul, MN	1600 AIAA-2010-1065 Receptivity of Hypersonic Boundary Layers over Straight and Flared Cones P. Balakumar, NASA Langley Research Center, Hampton, VA			

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Wednesday Afternoon / 06 January 2010

Session 191-FD-38 — **Error Estimates and Adaptive Mesh Methods** — **Grand Ballroom 4**

Chaired by: R. CUMMINGS, U.S. Air Force Academy, Colorado Springs, CO, and A. CARY, The Boeing Company, St Louis, MO

1400 AIAA-2010-1067 On 3- D Goal- Oriented Anisotropic Mesh Adaptation Applied to Inviscid Flows in Aeronautics A. Loseille, George Mason University, Fairfax, VA	1430 AIAA-2010-1068 An Adaptive Dual- Mesh Method for Premixed Combustion Using the Level Set Approach D. Hartmann, RWTH Aachen University, Aachen, Germany	1500 AIAA-2010-1069 Cell- Based ENO- MRA for Mesh Adaptation and Structure Identification H. Udaykumar, University of Iowa, Iowa City, IA	1530 AIAA-2010-1070 Adaptive Remeshing for Unsteady RANS Computations E. Gammacurta, École Polytechnique de Montréal , Montréal, Canada	1600 AIAA-2010-1071 Error Analysis of a Modified Discontinuous Galerkin Recovery Scheme for Diffusion Problems D. French, University of CIncinnati, Cincinnati, OH	1630 AIAA-2010-1072 An Efficient Adaptive Cartesian Vorticity Transport Solver for Rotorcraft Flowfield Analysis R. Harris, CFD Research Corporation, Huntsville, AL		

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Session 192-FD-39 — **Experimental and Computational Fluid Flow Problems** — **Grand Ballroom 5**

Chaired by: S. OLCMEN, The University of Alabama, Tuscaloosa, AL, and Z. MAHMUD

1400 AIAA-2010-1073 Afterbody Convective Heating of a Martian Descent Vehicle I. Egorov, TsAGI, Zhukovsky, Russia	1430 AIAA-2010-1075 Three Dimensional Simulations of Richtmyer- Meshkov Instabilities in Shock-Tube Experiments A. Gowardhan, Los Alamos National Laboratory, Los Alamos, NM						

Wednesday Afternoon / 06 January 2010

Session 193-FD-40 — **Finite Difference and Finite Volume Methods** — **Grand Ballroom 6**

Chaired by: K. BERGERON, U.S. Air Force Academy, Colorado Springs, CO, and V. VATSA, NASA Langley Research Center, Hampton, VA

1400 AIAA-2010-1079 Comparison of Node-Centered and Cell-Centered Unstructured Finite- Volume Discretizations: Inviscid Fluxes B. Diskin, National Institute of Aerospace, Hampton, VA	1430 AIAA-2010-1080 Development of High-Order Realizable Finite-Volume Schemes for Quadrature- Based Moment Method V. Vikas, Iowa State University, Ames, IA	1500 AIAA-2010-1081 New Gradient Calculation Method for MUSCL Type CFD Schemes in Arbitrary Polyhedra E. Shima, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1530 AIAA-2010-1082 Finite Volume Distance Field Solution Applied to Medial Axis Transform H. Xia, University of Cambridge, Cambridge, Great Britain	1600 AIAA-2010-1083 A Cell- Centered Finite Volume Method for Chemically Reacting Flows on Hybrid Grids S. Spiegel, North Carolina State University, Raleigh, NC	1630 AIAA-2010-1084 Characteristic Boundary Condtitions for Compressible Viscous Flows on Curvilinear Grids B. Landmann, University of Florida, Gainesville, FL		

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Session 194-FD-41 **High-Rate Unsteady Aerodynamics at Low Reynolds Number** **Tampa**

Chaired by: M. OL, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

1400 Break ,	1600 AIAA-2010-1085 Résumé of the AIAA FDTC Low Reynolds Number Discussion Group's Canonical Cases M. OL, Air Force Research Lab, Wright-Patterson, AFB, OH	1630 AIAA-2010-1086 Unsteady Force Measurement of SD7003 Foil Under Pitch- Up, Hold and Pitch- Down Motion at Re = 1 x 104 S. Srigrarom, Nanyang Technological University, Singapore, Singapore		

Wednesday Afternoon / 06 January 2010

Session 195-FD-42 **Joint PDL/WIG/FD/TP Plasma Actuator Session VI** **Miami**

Chaired by: G. FONT, U.S. Air Force Academy, Colorado Springs, CO, and S. ROY, University of Florida, Gainesville, FL

1400 AIAA-2010-1087 PIV Study on Forebody Vortex Cores under Plasma Actuations J. Wang, Northwestern Polytechnical University, Xi'an, China (prc)	1430 AIAA-2010-1088 Control of Separation from the Flap of a High-Lift Airfoil with DBD Plasma Actuation J. Little, Ohio State University, Columbus, OH	1500 AIAA-2010-1089 Investigation of a Pulsed- Plasma Jet for Shock/Boundary Layer cCntrol V. Narayanaswamy, University of Texas, Austin, Austin, TX	1530 AIAA-2010-1090 Separation Control Using DBD Plasma Actuators: Thrust Enhancement Studies S. Guo, University of Minnesota, Minneapolis, MN	1600 AIAA-2010-1091 Effect of Plasma Actuator Excitation for Controlling Bypass Transition in Boundary Layers R. Hanson, University of Toronto, Toronto, Canada	1630 AIAA-2010-1092 Physics- Based Analysis of Horseshoe Plasma Actuator for Improving Film Cooling Effectiveness C. Wang, University of Florida, Gainesville, FL		

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Session 196-FD-43 **Supersonic Flow Control** **New York**

Chaired by: J. SCHMISSEUR, U.S. Air Force, Arlington, VA, and I. GURSUL, University of Bath, Bath, Great Britain

1400 AIAA-2010-1094 PSP Measurements of Supersonic Flow Across an Open Cavity with Serrations O. Picolet, INSA, Lyon, France	1430 AIAA-2010-1095 Preliminary Numerical Investigation of a Mach 3 Inlet Configuration with and without Aspiration and Micro- Ramps D. Galbraith, University of Cincinnati, Cincinnati, OH	1500 AIAA-2010-1096 Principles of a High-Bandwidth Microacutator Producing Supersonic Pulsed Microjets J. T Solomon, Florida State University, Tallahassee, FL	1530 AIAA-2010-1097 Micro- Vortex Generators and Recirculating Flow Control of Normal Shock Stability and Position Sensitivity T. Herges, University of Illinois, Urbana-Champaign, Urbana, IL	1600 AIAA-2010-1098 Flow Control Using Thermal Bumps in Hypersonic Flow E. Erdem, University of Manchester, Manchester, Great Britain			

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Wednesday Afternoon / 06 January 2010

Session 197-FD-44 — **Turbulence Modeling and Methods** — **Crystal Ballroom P**

Chaired by: P. TUCKER, Whittle Laboratory, Cambridge, Great Britain

1400 AIAA-2010-1099 Multi- Wall Recycling / Rescaling Method for Inflow Turbulence Generation J. Boles, North Carolina State University, Raleigh, NC	1430 AIAA-2010-1101 Application of a Two-Layer Model for Implicit Large- Eddy Simulations Using a High- Order Compact Scheme M. Lu, Western Michigan University, Kalamazoo, MI	1500 AIAA-2010-1102 Analysis of a Realizable Unified RANS- LES Model H. Gopalan, University of Wyoming, Laramie, WY	1530 AIAA-2010-1103 Smooth- Wall Boundary Conditions for Dissipation- Based Turbulence Models W. Phillips, Utah State University, Logan, UT	1600 AIAA-2010-1104 Effects of Turbulence Modeling on RANS Simulations of Tip Vortices J. Wells, Virginia Polytechnic Institute and State University, Blacksburg, VA			

Wednesday Afternoon / 06 January 2010

Session 198-GPSE-5 — **ISS Research Results** — **Crystal Ballroom A**

Chaired by: J. ROBINSON, NASA Johnson Space Center, Houston, TX, and F. CHIARAMONTE, NASA Glenn Research Center, Cleveland, OH

1400 AIAA-2010-1105 Laminar Smoke Points in Coflow Measured Aboard the International Space Station K. Dotson, University of Maryland, College Park, MD	1430 Oral Presentation Phase Separation in Microgravity P. Lu, Harvard Univeristy, Cambridge, MA	1500 AIAA-2010-1107 Extensional Properties of a Dilute Polymer Solution Following Preshear in Microgravity J. Soulages, Massachusetts Institute of Technology, Cambridge, MA	1530 Oral Presentation CIR Operations Update R. Corban, NASA Glenn Research Center, Cleveland, OH	1600 Oral Presentation MCDA/FLEX D. Dietrich, NASA Glenn Research Center, Cleveland, OH			

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Session 199-GT-7 — **Modern Design of Experiments** — **Crystal Ballroom G1**

Chaired by: D. GARRARD, Aerospace Testing Alliance, Arnold AFB, TN, and J. OSBORNE

1400 AIAA-2010-1111 Analysis of Variance in the Modern Design of Experiments R. DeLoach, NASA Langley Research Center, Hampton, VA	1430 AIAA-2010-1112 Hypersonic Laminar-Turbulent Transition Experiment Design: From Wind Tunnel Model Definition to MDOE Approach A. Marino, Italian Aerospace Research Center (CIRA), Capua, Italy	1500 AIAA-2010-1113 Design of Orion Soil Impact Study Using the Modern Design of Experiments R. DeLoach, NASA Langley Research Center, Hampton, VA					

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Session 200-GTE-9 — **Gas Turbine Engines -Turbines II** — **Crystal Ballroom B**

Chaired by: R. GAETA, Georgia Institute of Technology, Smyrna, GA, and I. HALLIWELL, Avetec, Springfield, OH

1400 AIAA-2010-1116 Unsteady Performance of a Turbine Driven by a Pulse Detonation Engine K. Rouser, U.S. Air Force Institute of Technology, Dayton, OH	1430 AIAA-2010-1117 Comparison of Heat Transfer Coefficient and Thermal Performance of a Narrow Impingement Channel M. Ricklick, University of Central Florida, Orlando, FL	1500 AIAA-2010-1119 Active Separation Control on Highly Loaded LPT Blades using Microjets E. Fernandez, Florida A&M University-Florida State University, Tallahassee, FL	1530 AIAA-2010-1121 Fluid Dynamics of Impinging Wakes and Separation Control on a Low- Pressure Turbine Profile K. Gompertz, The Ohio State University, Columbus, OH				

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Session 201-HAPB-7 — **Hypersonic Vehicle Design** — **Crystal Ballroom E**

Chaired by: R. STARKEY, University of Colorado, Boulder, Boulder, CO, and R. SPRINGER, Johns Hopkins University Applied Physics Laboratory, Laurel, MD

1400 AIAA-2010-1122 Integrated Aero- Servo- Thermo- Propulso- Elasticity (ASTPE) Methodology for Hypersonic Scramjet Vehicle Design/Analysis R. Starkey, University of Colorado, Boulder, CO	1430 AIAA-2010-1125 Simulation of a Combined Cycle for High Speed Propulsion V. Fernández-Villacé, von Karman Institute for Fluid Dynamics, Rhode-St-Genèse, Belgium						

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Session 202-HAPB-8 — **Ramjet/Scramjet Performance** — **Crystal Ballroom F**

Chaired by: T. O'BRIEN, Aerojet, Folsom, CA, and D. LUCIA, U.S. Air Force Scientific Advisory Board, Andrews AFB, MD

1400 AIAA-2010-1126 Experimental Study of Test Medium Vitiation Effects on Dual- Mode Scramjet Mode Transition R. Rockwell, University of Virginia, Charlottesville, VA	1430 AIAA-2010-1127 Numerical Simulation of Vitiation Effects on a Hydrogen- Fueled Dual-Mode Scramjet M. Vyas, NASA Glenn Research Center, Cleveland, OH	1500 AIAA-2010-1128 Numerically Simulated Comparative Performance of a Scramjet and Shcramjet at Mach 11 J. Chan, University of Toronto, Toronto, Canada					

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Wednesday Afternoon / 06 January 2010

Session 203-HIS-4 — **Human Space Exploration** — **Crystal Ballroom N**

Chaired by: S. EBERHARDT, The Boeing Company, Seattle, WA, and K. BURNS, Wyle Laboratories, San Diego, CA

1400 AIAA-2010-1131 Denying the Apollo Moon Landings: Conspiracy and Questioning in Modern American History R. Launius, Smithsonian Institution, Washington, DC	1430 AIAA-2010-1132 Developing a Spatial History of Spaceflight: The Smithsonian Atlas of Space Exploration R. Launius, Smithsonian Institution, Washington, DC	1500 AIAA-2010-1135 Constructing the Origins of the Solar System: Scientific Knowledge and Public Perceptions R. Launius, Smithsonian Institution, Washington, DC					

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Session 204-IS-4 — **Intelligent Adaptation and Model Identification** — **Crystal Ballroom M**

Chaired by: J. STECK, Wichita State University, Wichita, KS, and E. ATKINS, University of Michigan, Ann Arbor, MI

1400 AIAA-2010-1137 Noncertainty- Equivalent Adaptive Missile Control via Immersion and Invariance K. Lee, Kwandong University, Kwandong , South Korea	1430 AIAA-2010-1138 Reconfigurable Control Allocation Technology Using Weighted Least Squares for Nonlinear System in Unmanned Aerial Vehicle Q. Zhou, Concordia University, Montréal, Canada	1500 AIAA-2010-1139 Advanced Static Soaring Flight Controls for Input Constrained Aircraft N. Kahveci, Ford Motor Company, Dearborn, MI	1530 AIAA-2010-1140 Flow Field Data Mining of Pareto- Optimal Airfoils Using Proper Orthogonal Decomposition A. Oyama, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan				

Wednesday Afternoon / 06 January 2010

Session 239-MDO-2 — **Optimization Applications I** — **Crystal Ballroom C**

Chaired by: J. CHRISSIS, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH, and Y. KO, AVID LLC, Blacksburg, VA

1400 AIAA-2010-1316 On Structural Layout Using Multifidelity Geometry in Aircraft Conceptual Design D. Lazzara, Massachusetts Institute of Technology, Cambridge, MA	1430 AIAA-2010-1317 Deterministic Design Optimization of a Bendable Load Stiffened UAV Wing V. Jagdale, University of Florida, Gainesville, FL	1500 AIAA-2010-1318 Metamodels for Aerothermodynamic Design Optimization of Hypersonic Spiked Blunt Bodies M. Ahmed, University of Sheffield, Sheffield, Great Britain	1530 AIAA-2010-1320 Whole Mission Simulation for Aircraft Preliminary Design P. Krus, Linköping University, Linköping, Sweden	1600 AIAA-2010-1321 Advanced Multidisciplinary Optimization Techniques for Efficient Subsonic Aircraft Design S. Lehner, Purdue University, W. Lafayette, IN			

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Wednesday Afternoon / 06 January 2010

Session 205-PC-14 — Combustion Modeling — Los Angeles

Chaired by: S. RADHAKRISHNAN, Jet Propulsion Laboratory, Pasadena, CA, and T. LIEUWEN, Georgia Institute of Technology, Atlanta, GA

1400 AIAA-2010-1142 Large Eddy Simulation of a Turbulent Gaseous Jet in Oscillating Crossflow L. Zhang, Georgia Institute of Technology, Atlanta, GA	1430 AIAA-2010-1144 CFD- Simulation of the Injection and Combustion of LOX and H2 at Supercritical Pressures M. Poschner, University of the Federal German Armed Forces, Munich, Germany	1500 AIAA-2010-1145 Numerical Prediction of Interior Ballistics Performance of Projectile Accelerator by Solid/Gas Two- Phase Reacting Flow Simulation H. Miura, Keio University, Yokohama, Japan	1530 AIAA-2010-1146 Theoretical and Numerical Estimation of Acoustic Damping of a Model Combustion Chamber T. Shimizu, Japan Aerospace Exploration Agency (JAXA), Kanagawa, Japan	1600 AIAA-2010-1147 Numerical and Experimental Investigation of Syngas Combustion on a Semi-Technical Scale Burner M. Di Domenico, German Aerospace Center (DLR), Stuttgart, Germany			

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Session 206-PC-15 — Fundamentals of Airbreathing Combustion — Denver

Chaired by: J. TISHKOFF, U.S. Air Force Office of Scientific Research, Arlington, VA, and K. MCMANUS, General Electric Company, Niskayuna, NY

1400 AIAA-2010-1148 Unsteady Aspects of Lean Premixed-Prevaporized (LPP) Gas Turbine Combustors: Flame- Flame Interactions S. Dhanuka, University of Michigan, Ann Arbor, MI	1430 AIAA-2010-1149 Sub- to- Supercritical Jet Mixing and Core Length Analysis A. Roy, University of Florida, Gainesville, FL	1500 AIAA-2010-1150 Convective and Film Cooled Nozzle Extension for a High Pressure Rocket Subscale Combustion Chamber R. Arnold, Purdue University, West Lafayette, IN	1530 AIAA-2010-1151 Response of an Annular Burner Nozzle to Transverse Acoustic Excitation J. O'Connor, Georgia Institute of Technology, Atlanta, GA	1600 AIAA-2010-1152 Extraction of Combustion Instability Mechanisms from Detailed Computational Simulations R. Smith, Purdue University, West Lafayette, IN	1630 AIAA-2010-1153 Non- Normality and Internal Flame Dynamics in Premixed Flame-Acoustic Interaction P. Subramanian, Indian Institute of Technology, Madras, Chennai, India		

Wednesday Afternoon / 06 January 2010

Session 207-PDL-12 — Laser Applications — Grand Ballroom 1

Chaired by: T. MADDEN, U.S. Air Force Research Laboratory, Kirtland AFB, NM, and W. BEHRENS, Northrop Grumman Corporation, Rancho Palos Verdes, CA

1400 AIAA-2010-1154 Laser Induced Avalanche Ionization in Gases or Gas Mixtures with REMPI or Femtosecond Laser Pulse Pre- Ionization M. Shneider, Princeton University, Princeton, NJ	1430 AIAA-2010-1155 Effect of Flow Cooling on Gain and Output Power of an Electrically Excited Oxygen- Iodine Laser J. Bruzzese, Ohio State University, Columbus, OH	1500 AIAA-2010-1156 Experimental and Computational Investigation of a Converging- Diverging Nozzle- Diffuser with Cross Flow Injection C. Noren, U.S. Air Force Research Laboratory, Kirtland AFB, NM	1530 AIAA-2010-1157 WITHDRAWN Progress in Development of a Capabilities- Based Near- Term HEL Area Defense Weapon Z. George, Raytheon Corporation, Tucson, AZ	1600 AIAA-2010-1158 Optical Measurements of a Compressible Shear Layer Using a Laser- Induced Air Breakdown Beacon M. Rennie, University of Notre Dame, Notre Dame, IN			

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Wednesday Afternoon / 06 January 2010

Session 208-SEC-4 — **Challenges to Exploration of the Moon and Mars** — **Crystal Ballroom D**

Chaired by: N. RAMACHANDRAN, Jacobs Technology, Huntsville, AL, and M. BENTON, The Boeing Company, Huntington Beach, CA

1400 AIAA-2010-1160 Fatalities on Past Antarctic Exploration Expeditions as Manned Spaceflight Hazard Identification Guides P. Wallace, Rocinante Aerospace, Simi Valley, CA	1430 AIAA-2010-1161 On Rocket Plume, Lunar Crater and Lunar Dust Interactions D. Liu, ZONA Technology, Inc., Scottsdale, AZ						

Wednesday Afternoon / 06 January 2010

Session 209-SRU-2 — **Solar Thermal Lunar Resource Extraction and Processing** — **Atlanta**

Chaired by: K. SACKSTEDER, NASA Glenn Research Center, Cleveland, OH, and G. SANDERS, NASA Johnson Space Center, Houston, TX

1400 AIAA-2010-1162 Solar Power System for Lunar ISRU Applications T. Nakamura, Physical Sciences, Inc., Pleasanton, CA	1430 AIAA-2010-1163 Demonstrating the Solar Carbothermal Reduction of Lunar Regolith to Produce Oxygen R. Gustafson, ORBITEC, Madison, WI	1500 AIAA-2010-1164 Pressure Controlled Heat Pipe Solar Receiver for Oxygen Production from Lunar Regolith J. Hartenstine, Advanced Cooling Technologies, Lancaster, PA	1530 AIAA-2010-1166 Solar Energy Systems for Lunar Oxygen Generation A. Colozza, Analex Corporation, Cleveland, OH	1600 AIAA-2010-1167 Solar Concentrator Concept for Providing Direct Solar Energy for Oxygen Production at the Lunar South Pole A. Colozza, Analex Corporation, Cleveland, OH		

Wednesday Afternoon / 06 January 2010

Session 210-TES-3 — **Combustion II** — **Boston**

Chaired by: H. CHAMBERS, HFC Consulting, Westervile, OH, and P. ROHATGI, University of Wisconsin, Milwaukee, Milwaukee, WI

1400 AIAA-2010-1168 Studies of Large Coherent Structures and Their Effects on Swirl Combvustion N. Syred, Cardiff University, Cardiff, Great Britain	1430 AIAA-2010-1169 Premixed Swirl Combustion and Flashback Analysis with Hydrogen/Methane Mixtures A. Bagdanavicius, Cardiff University, Cardiff, Great Britain	1500 AIAA-2010-1170 Assessment of Turbulence- Chemistry Interaction Models in the National Combustion Code (NCC) - Part I T. Wey, NASA Glenn Research Center, Cleveland, OH	1530 AIAA-2010-1171 Combined Combustion and System Modeling of Semi- Closed Cycle PoWER Engine B. Singh, University of Florida, Gainesville, FL	1600 AIAA-2010-1172 Investigation of Flashback Propensity in Turbines with Syngas Fuels A. Choudhuri, University of Texas, El Paso, El Paso, TX			

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Wednesday Afternoon / 06 January 2010

Session 211-TP-14 — Ablation II — New Orleans

Chaired by: J. DEC, NASA Langley Research Center, Hampton, VA, and X. ZHONG, University of California, Los Angeles, Los Angeles, CA

1400	1430	1500	1530	1600			
AIAA-2010-1174 Prediction Accuracy of Thermal Response of Ablator Under Arcjet Flow Conditions T. Suzuki, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan	AIAA-2010-1175 Chemistry Model for Ablating Carbon-Phenolic Material During Atmospheric Re- Entry A. Martin, University of Michigan, Ann Arbor, MI	AIAA-2010-1176 Steady- State Ablation Model Coupling with Hypersonic Flow R. Upadhyay, University of Texas, Austin, Austin, TX	AIAA-2010-1177 Understanding High Recession Rates of Carbon Ablators Seen in Shear Tests in an Arc Jet D. Driver, NASA Ames Research Center, Moffett Field, CA	AIAA-2010-1596 Shock- Tube Study of Surface Reaction of Atomic Hydrogen on Solid Carbon S. Hyun, KAIST, Daejeon, South Korea			

Wednesday Afternoon / 06 January 2010

Session 212-TP-15 — Aerothermodynamics III — Grand Ballroom 13

Chaired by: D. KUNTZ, Sandia National Laboratories, Albuquerque, NM, and M. WRIGHT, NASA Ames Research Center, Moffett Field, CA

1400	1430	1500	1530	1600			
AIAA-2010-1179 Implicit Surface Boundary Conditions for Blowing, Equilibrium Composition, and Diffusion- Limited Oxidation M. MacLean, CUBRC, Buffalo, NY	AIAA-2010-1180 Flowfield Uncertainty Analysis for Hypersonic CFD Simulations A. Alexeenko, Purdue University, West Lafayette, IN	AIAA-2010-1181 Aeroheating measurements on a reentry capsule model in free- piston shock tunnel HIEST H. Tanno, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan	AIAA-2010-1183 The Influence of Stabilization Parameters in the SUPG Finite Element Method for Hypersonic Flows B. Kirk, NASA Johnson Space Center, Houston, TX	AIAA-2010-1182 Stream Function Calculation on General Surface Mesh Topologies and General Geometries R. Bond, Sandia National Laboratories, Albuquerque, NM			

Wednesday Afternoon / 06 January 2010

Session 213-TP-16 — Heat Transfer II — Grand Ballroom 14

Chaired by: E. MAROTTA, Texas A&M University, College Station, TX, and E. SILK, NASA Goddard Space Flight Center, Greenbelt, MD

1400	1430	1500	1530				
AIAA-2010-1184 Towards Prediction of Transpiration Cooling A. Steingrimsson, Embry-Riddle Aeronautical University, Daytona Beach, FL	AIAA-2010-1185 Influence of Interactions Between Turbulence and Radiation on Transmissivities in Hypersonic Turbulent Boundary Layers A. Feldick, Pennsylvania State University, University Park, PA	AIAA-2010-1186 WITHDRAWN Experimentation on Digitized Heat Transfer for Two- Phase Laminar flow in a Horizontal Tube S. Shajiee, University of Colorado, Boulder, Boulder, CO	AIAA-2010-1187 Effect of Free Surface Heat Transfer on Oscillatory Thermocapillary Flow in Differentially Heated Cylindrical Annulus S. Jafri, Air University, Islamabad, Pakistan				

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Wednesday Afternoon / 06 January 2010

Session 214-WE-6 — **Wind Turbine Structures, Materials, and Sensors** — **Crystal Ballroom G2**

Chaired by: D. LAIRD and M. RUMSEY, Sandia National Laboratories, Albuquerque, NM

1400 AIAA-2010-1188 Analysis of an Embedded Blade Root Carrot Subject to Cold Weather Using a Finite Element Model P. Lillo, University of Victoria, Victoria, Canada	1430 AIAA-2010-1189 Strength and Fatigue of Wind Turbine Rotor Laminates and Subcomponents R. Nijssen, Knowledge Centre Wind Turbine Materials and Constructions (WMC), Wieringerwerf, The Netherlands	1500 AIAA-2010-1190 Small Wind Turbine Performance Evaluation Using Tower- and Nacelle- Mounted Anemometers B. Ziter, University of Guelph, Guelph, Canada	1530 AIAA-2010-1192 Updating of a Wind Turbine Model for the Evaluation of Methods for Operational Monitoring Using Inertial Measurements J. White, Purdue University, Lafayette, IN				

Wednesday Afternoon / 06 January 2010

Session 215-WIG-7 / PDL-13 — **Characterization and Simulation of Plasmas** — **Grand Ballroom 2**

Chaired by: I. BLANKSON, NASA Glenn Research Center, Cleveland, OH, and A. EROFEEV, Russian Academy of Sciences, Saint Petersburg, Russia

1400 AIAA-2010-1193 Experimental Study of Surface- Volumetric Discharge Transition at Various Polarization and Angle of Falling of Microwave Radiation K. Alexandrov, Russian Academy of Sciences, Moscow, Russia	1430 AIAA-2010-1194 Monte Carlo Simulation of Nonequilibrium Conductivity Produced by Electron Beam in MHD Flows E. Sheikin, Saint-Petersburg State University, Saint Petersburg, Russia	1500 AIAA-2010-1195 Role of Charged Particle Inertia in Pulsed Electrical Discharges J. Poggie, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 AIAA-2010-1196 Evalution of Gasdynamic and Electrodynamic Properties of Nonequilibrium Plasma of Shockwave A. Kuranov, Saint-Petersburg State University, Saint Petersburg, Russia	1600 AIAA-2010-1197 A System of Deeply Subcritical Microwave Discharges in a Supersonic Air Stream I. Esakov, Russian Academy of Sciences, Moscow, Russia			

Wednesday Afternoon / 06 January 2010

1730 - 1830 — **2010 von Kármán Lectureship In Astronautics** — **Crystal Ballroom H**

Eileen M. Collins
Colonel USAF Retired and Former Astronaut

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Wednesday Afternoon / 06 January 2010

Session 161-FD-34
1830 - 2200

Transition Study Group Open Forum

New York

Chaired by: W. SARIC, Texas A&M University, College Station, TX
Panel Discussion

Thursday Morning / 07 January 2010

0800 - 0900

New Horizons Forum Keynote Address

Crystal Ballroom H

Distinguished Speaker: **Lt General David A. Deptula**
Deputy Chief of Staff, Intelligence, Surveillance and Reconnaissance

Intelligence, Surveillance and Reconnaissance Transformation

Thursday Morning / 07 January 2010

0900 - 1130

New Horizons Forum Panel Discussion - Unmanned Air Systems: The Next Generations

Crystal Ballroom J2

The panel will discuss issues and opportunities that are shaping these systems including emerging military roles & missions, new technologies and their implications, the importance of autonomy, cultural acceptance, the emerging civil and commercial markets, and the role of optionally piloted vehicles in shaping future UAS.

Moderator:
Brian Argrow, Associate Dean for Education, Alfred and Betty Look Professor of Engineering, Director, Research and Engineering Center for Unmanned Vehicles (RECUV), Department of Aerospace Engineering Sciences, University of Colorado, Boulder, CO

Panelists:

- **John R. Stanton**, Executive Director, National Air Security Operations for the Office of Air and Marine, U.S. Customs and Border Protection, Washington D.C.
- **Scott Winship**, Vice President and Program Manager for Northrop Grumman Integrated Systems Sector's U.S. Navy Unmanned Combat Air System (N-UCAS), San Diego, CA
- **Ron Perkins**, Director, Advanced Unmanned Air Systems, the Boeing Company, Kent, WA
- **Colonel Eric Mathewson**, Director, U.S. Air Force Unmanned Aircraft Systems Task Force, Headquarters U.S. Air Force, Pentagon, Washington DC.
- **Capt. Robert Dishman**, Program Manager, Naval Air Systems Command's Persistent Maritime Unmanned Aircraft Systems Program Office (PMA-262), Patuxent River, Md.

Thursday Morning / 07 January 2010

Session 216-AA-9 — Cavity and Duct Acoustics — Washington

Chaired by: G. RAMAN, Illinois Institute of Technology, Glenview, IL

0900 AIAA-2010-1198 Control of Resonant Flow Inside a Supersonic Cavity Using High Bandwidth Micro-Actuators M. Ali, Florida A&M University - Florida State University, Tallahassee, FL	0930 AIAA-2010-1200 Cavity Flow Assessment Using Advanced Turbulence Modeling N. Liggett, Georgia Institute of Technology, Atlanta, GA	1000 AIAA-2010-1202 Coupled RANS/LES for SOFIA Cavity Acoustic Prediction S. Woodruff, NASA Dryden Flight Research Center, Edwards, CA	1030 AIAA-2010-1203 WITHDRAWN On Resonances in a Three- Dimensional Open Cavity P. Cobo, Institute of Acoustics (CSIC), Madrid, Spain				

Thursday Morning / 07 January 2010

Session 217-AD-8 — Aerospace Design Education — Crystal Ballroom L

Chaired by: W. CROSSLEY, Purdue University, West Lafayette, IN, and D. KRAUSCHE, Florida Center for Engineering Education, Gainesville, FL

0900 AIAA-2010-1204 AeroMorph as a Morphing Design Tool in an Educational Environment C. Lafountain, University of Cincinnati, Cincinnati, OH	0930 AIAA-2010-1205 Designing a Green Aircraft; Cal Poly's 2009 Undergraduate Aircraft Designs R. McDonald, California Polytechnic State University, San Luis Obispo, CA	1000 AIAA-2010-1206 Design and Flight Testing of an ECO-Sport Aircraft C. Jouannet, Linköping University, Linköping, Sweden	1030 AIAA-2010-1208 CCSU Moonbuggy Vehicle Design, Building and Competition V. Naoumov, Central Connecticut State University, New Britain, CT	1100 AIAA-2010-1209 Numerical Simulation of an Adaptive Airfoil System using SMA Actuators E. Abdullah, RMIT University, Bundoora, Australia			

Thursday Morning / 07 January 2010

Session 218-AFM-7 — Planetary Entry — Chicago

Chaired by: B. PAMADI and D. OWENS, NASA Langley Research Center, Hampton, VA

0900 AIAA-2010-1210 Mars Entry, Descent, and Landing Trajectory and Atmosphere Reconstruction S. Dutta, Georgia Institute of Technology, Atlanta, GA	0930 AIAA-2010-1212 Analytic Hypersonic Aerodynamics for Conceptual Design of Entry Vehicles M. Grant, Georgia Institute of Technology, Atlanta, GA						

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Thursday Morning / 07 January 2010

Session 219-AMT-8 — **Measurement Technology Applications** — **Crystal Ballroom J1**

Chaired by: S. GOGINENI, Spectral Energies, LLC, Dayton, OH, and H. HU, Iowa State University, Ames, IA

0900	0930	1000	1030	1100			
AIAA-2010-1214 Influence of Unsteadiness on Thrust Measurements of Pulse Detonation Engines F. Lu, University of Texas, Arlington, Arlington, TX	AIAA-2010-1215 Measurement and Analysis of Unsteady Flows in IC Engines S. Olcmen, University of Alabama, Tuscaloosa, AL	AIAA-2010-1216 Photogrammetric Measurement of Recession Rates of Low Temperature Ablators in Supersonic Flow D. Callaway, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	AIAA-2010-1217 Optimization of Stochastic Estimation Techniques in a High-Speed, Axisymetric Jet J. Kastner, University of Cincinnati, Cincinnati, OH	AIAA-2010-1218 Quantitative Flow Visualization of Correctly Expanded Supersonic Jets by Rainbow Schlieren Deflectometry Y. Miyazato, University of Kitakyushu, Kitakyushu, Japan			

Thursday Morning / 07 January 2010

Session 220-APA-21 — **Active Flow Control III** — **Grand Ballroom 9**

Chaired by: J. LITTLE, Ohio State University, Columbus, OH, and J. GEORGE, Innovative Aerospace Solutions, Downey, CA

0900	0930	1000	1030	1100			
AIAA-2010-1219 Experimental Studies of Plasma Actuator Performance for Separation Control D. Poon, University of Minnesota, Minneapolis, MN	AIAA-2010-1220 Separation Control Using Plasma Actuators: 2- D and Edge Effects in Steady Flow in Low Pressure Turbines D. Burman, University of Minnesota, Minneapolis, MN	AIAA-2010-1221 Plasma Actuator Simulation: Force Contours and Dielectric Charging Characteristics M. Mamunuru, University of Minnesota, Minneapolis, MN	AIAA-2010-1222 Plasma Flow Control on Low Aspect Ratio Wings at Low Reynolds Numbers S. Vey, Berlin Institute of Technology, Berlin, Germany	AIAA-2010-1223 Plasma Actuator with Multiple Encapsulated Electrodes to Influence the Induced Velocoty C. Hale, University of Manchester, Manchester, Great Britain			

Thursday Morning / 07 January 2010

Session 221-APA-22 — **Aerodynamic Design Methodologies** — **Grand Ballroom 10**

Chaired by: S. NADARAJAH, McGill University, Montréal, Canada, and A. FARINA, U.S. Army Research, Development and Engineering Command, Picatinny Arsenal, NJ

0900	0930	1000	1030	1100			
AIAA-2010-1225 A New Cokriging Method for Variable-Fidelity Surrogate Modeling of Aerodynamic Data Z. Han, German Aerospace Center (DLR), Braunschweig, Germany	AIAA-2010-1226 An Interactive Preliminary Design System of High Speed Forebody and Inlet Flows M. Liou, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-1227 Lift Superposition and Aerodynamic Twist Optimization for Achieving Desired Lift Distributions K. Lane, California Polytechnic State University, San Luis Obispo, CA	AIAA-2010-1228 Inverse Airfoil Design Utilizing CST Parameterization K. Lane, California Polytechnic State University , San Luis Obispo, CA	AIAA-2010-1229 A Coupled Kinematics and Energetics Model for Flapping Flight H. Salehipour, University of Massachusetts, Lowell , Lowell, MA			

Thursday Morning / 07 January 2010

Session 222-APA-23 — **Create-AV: Testing and Evaluation of High Performance Computing Software II** — **Grand Ballroom 11**

Chaired by: J. LAIOSA, Naval Air Warfare Center, Patuxent River, MD

0900 AIAA-2010-1230 Application of the Helios Computational Platform to Rotorcraft Flowfields J. Sitaraman, National Institute of Aerospace, Hampton, VA	0930 AIAA-2010-1231 Determining the Applicability and Effectiveness of Current CFD Methods in Store Certification Activities J. Dean, U.S. Air Force SEEK EAGLE Office, Eglin AFB, FL	1000 AIAA-2010-1232 CREATE- AV DaVinci: Computationally- Based Engineering for Conceptual Design G. Roth, Aeronautical Systems Center, Wright-Patterson AFB, OH	1030 AIAA-2010-1233 Rigid, Maneuvering, and Aeroelastic Results for Kestrel - A CREATE Simulation Tool S. Morton, DoD HPCMP/CREATE Kestrel Team, Eglin AFB, FL	1100 AIAA-2010-1234 A Dual- Mesh Simulation Strategy for Improved AV- 8B Aft- Fuselage Buffet Load Prediction N. Hariharan, CREATE-AV, Patuxent River, MD			

Thursday Morning / 07 January 2010

Session 223-APA-24 — **Icing or Roughness Effects on Vehicle Aerodynamics** — **Grand Ballroom 12**

Chaired by: M. CHANG, Lockheed Martin Corporation, Santa Clarita, CA, and R. KREEGER, NASA Glenn Research Center, Cleveland, OH

0900 AIAA-2010-1236 Eulerian Method for Ice Accretion on Multiple-Element Airfoil Sections J. Hospers, University of Twente, Enschede, The Netherlands	0930 AIAA-2010-1237 Ice Accretion Effect on the Aerodynamic Characteristics of KC-100 Aircraft S. Jung, Gyeongsang National University, Jinju, South Korea	1000 AIAA-2010-1238 Design optimization of hot- air anti- icing systems by FENSAP-ICE M. Pellissier, McGill University, Montréal, Canada					

Thursday Morning / 07 January 2010

Session 224-APA-25 — **Innovative Aerodynamic Concepts and Designs** — **Grand Ballroom 13**

Chaired by: R. VERMELAND, Lockheed Martin Corporation, Lancaster, CA

0900 AIAA-2010-1239 Parametric Study of Peripheral Nozzle Confi gurations for Supersonic Retropropulsion N. Bakhtian, Stanford University, Palo Alto, CA	0930 AIAA-2010-1240 Aerodynamic Performance of Extended Formation Flight A. Ning, Stanford University, Stanford, CA						

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Thursday Morning / 07 January 2010

Session 225-FD-45 — **Boundary Layer Transition: Stabilization** — **Grand Ballroom 3**

Chaired by: A. FEDOROV, Moscow Institute of Physics and Technology, Zhukovsky, Russia, and X. WANG, University of California, Los Angeles, Los Angeles, CA

0900 AIAA-2010-1242 Temporal Stability of Hypersonic Boundary Layer on Porous Wall: Comparison of Theory with DNS A. Fedorov, Moscow Institute of Physics and Technology, Zhukovsky, Russia	0930 AIAA-2010-1243 Effect of Porous Coating on Boundary- Layer Instability X. Wang, University of California, Los Angeles, Los Angeles, CA	1000 AIAA-2010-1244 Carbon Dioxide Injection for Hypervelocity Boundary Layer Stability R. Wagnild, University of Minnesota, Minneapolis, MN	1030 AIAA-2010-1245 Direct Numerical Simulation of supersonic Boundary Layer Stabilization Using Grooved Wavy Surface A. Novikov, TsAGI, Zhukovsky, Russia				

Thursday Morning / 07 January 2010

Session 226-FD-46 — **Contributions to RTO AVT-136** — **New Orleans**

Chaired by: J. SCHMISSEUR, U.S. Air Force, Arlington, VA

0900 AIAA-2010-1246 A Review of Transition Studies on Full- Scale Flight Vehicles at Duplicated Flight Conditions in the LENS Tunnels and Comparisons with Prediction Methods and Flight Measurement T. Wadhams, CUBRC, Buffalo, NY	0930 AIAA-2010-1247 Modeling Approaches for Gas- Surface Interactions G. Herdrich, University of Stuttgart, Stuttgart, Germany	1000 AIAA-2010-1248 Catalysis Phenomena Determination in Plasmatron Facility for Flight Experiment Design (Invited) O. Chazot, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium	1030 AIAA-2010-1249 Realization of a Gas-Surface Interaction Test Case for Model Validation D. Fletcher, University of Vermont, Burlington, VT	1100 AIAA-2010-1250 CFD Analysis of CUBRC Base Flow Experiments M. Barnhardt, University of Minnesota, Minneapolis, MN	1130 AIAA-2010-1251 Experimental Investigation of the Supersonic Wake of a Reentry Capsule F. Schrijer, Delft University of Technology, Delft, The Netherlands		

Thursday Morning / 07 January 2010

Session 227-FD-47 — **Environmental and Fundamental Turbulence** — **Grand Ballroom 4**

Chaired by: M. PLESNIAK, George Washington University, Washington, DC, and K. MOHSENI, University of Colorado, Boulder, Boulder, CO

0900 AIAA-2010-1252 Effect of Isotropic Free-Stream Turbulence on the Anisotropy of Favorable Pressure Gradient Turbulent Boundary Layers S. Torres-Nieves, Rensselaer Polytechnic Institute, Troy, NY	0930 AIAA-2010-1253 Comparison Of High Resolution Large- Eddy Simulations And Synthetic Turbulent Wind Fields T. Auerswald, Technical University of Braunschweig, Braunschweig, Germany	1000 AIAA-2010-1254 Direct Numerical Simulation of the Turbulent Ekman Layer: Turbulent Energy Budgets S. Marlatt, United Launch Alliance, Denver, CO	1030 AIAA-2010-1255 Instantaneous Turbulent Flow Structures of the Numerically- Simulated Ekman Layer S. Marlatt, United Launch Alliance, Littleton, CO	1100 AIAA-2010-1257 A Numerical Study of Spiral Turbulence S. Dong, Purdue University, West Lafayette, IN			

Thursday Morning / 07 January 2010

Session 228-FD-48 — Flow Control Actuators — Grand Ballroom 5

Chaired by: J. GREGORY, Ohio State University, Columbus, OH

0900	0930	1000	1030				
AIAA-2010-1258 Effect of Inlet Flow Configuration on Combustion Powered Actuators A. Rajendar, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-1259 Miniature Shock Tube Actuators for Flow Control Applications R. Ramachandran, Illinois Institute of Technology , Chicago, IL	AIAA-2010-1260 Microjet Based Active Flow Control on a Fixed Wing UAV P. Kreth, Florida A&M University-Florida State University, Tallahassee, FL	AIAA-2010-1261 Turbulence Characteristics of Axisymmetric and Non-Circular Synthetic Jets L. Oren, University of Cincinnati, Cincinnati, OH				

Thursday Morning / 07 January 2010

Session 229-FD-49 — Fluid Dynamics of Non-Aerospace Applications — Crystal Ballroom K

Chaired by: T. RAMSAY, Honda R&D Americas, Inc., Raymond, OH, and J. GREGORY, Ohio State University, Columbus, OH

0900	0930	1000					
Oral Presentation CFD Use in the Automotive Industry T. Ramsay, Honda R&D Americas, Inc., Raymond, OH	AIAA-2010-1264 Fluid Structure Interaction Analysis in Human Upper Airways to Understand Sleep Apnea G. Mylavarapu, University of Cincinnati, Cincinnati, OH	AIAA-2010-1265 WITHDRAWN Numerical Simulations of Blood Flow in Arteries Y. Suzen, North Dakota State University, Fargo, ND					

Thursday Morning / 07 January 2010

Session 230-FD-50 — New Developments in CFD Algorithms — Crystal Ballroom M

Chaired by: G. MAY, RWTH Aachen University, Aachen, Germany, and M. LIOU, NASA Glenn Research Center, Cleveland, OH

0900	0930	1000	1030				
AIAA-2010-1266 A Directional Renumbering Strategy for Improving Unstructured Grid Data Structure N. Fouladi, Sharif University of Technology, Tehran, Iran	AIAA-2010-1267 An Adaptive Nonlinear Frequency Domain Method for Viscous Periodic Steady State Flows A. Mosahebi, McGill University, Montréal, Canada	AIAA-2010-1268 Efficient Hessian Calculations using Automatic Differentiation and the Adjoint Method M. Rumpfkeil, University of Wyoming, Laramie, WY	AIAA-2010-1269 An Edge- Averaged Semi- Meshless Framework for Numerical Solution of Conservation Laws E. Chiu, Stanford University, Stanford, CA				

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Thursday Morning / 07 January 2010

Session 231-FD-51 — **New Developments in Flux Formulas and Equations** — **Crystal Ballroom N**

Chaired by: P. ORKWIS, University of Cincinnati, Loveland, OH, and J. SHANG, Wright State University, Dayton, OH

0900 AIAA-2010-1271 Updates to Multi-Dimensional Flux Reconstruction for Hypersonic Simulations on Tetrahedral Grids P. Gnoffo, NASA Langley Research Center, Hampton, VA	0930 AIAA-2010-1272 Performance of Low-Dissipation Euler Fluxes and Preconditioned Implicit Schemes in Low Speeds K. Kitamura, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1000 AIAA-2010-1273 Three- Dimensional Carbuncles and Euler Fluxes K. Kitamura, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1030 AIAA-2010-1274 Derivation and Numerical Simulation of Regularized (Observable) Euler Equations K. Mohseni, University of Colorado, Boulder, Boulder, CO				

Thursday Morning / 07 January 2010

Session 232-FD-52 — **Reduced Order Models and Physical Modeling and Analysis** — **Grand Ballroom 6**

Chaired by: P. MORGAN, U.S. Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, and C. VENKATASUBBAN

0900 AIAA-2010-1275 A Reduced- Order Model for Unsteady Flow over Circular Cylinder M. Ghommem, Virginia Polytechnic Institute and State University, Blacksburg, VA	0930 AIAA-2010-1276 Closure for Improved Reduced- Order Models using High Performance Computing I. Akhtar, Virginia Tech, Blackburg, VA	1000 AIAA-2010-1277 Assessment of the Effects of Computational Parameters on Physics-based Models of Ice Accretion M. Nucci, Georgia Institute of Technology, Atlanta, GA	1030 AIAA-2010-1278 Estimating Turbulent Wall Shear and Boundary Layer Thickness for Hydro-dynamically Rough Surfaces by Perturbing Known Smooth Results L. DeChant, Sandia National Laboratories, Albuquerque, NM	1100 AIAA-2010-1279 Modeling of Snow Friction of an Aircraft Ski L. Suhani, Embry-Riddle Aeronautical University, Daytona Beach , FL			

Thursday Morning / 07 January 2010

Session 233-FD-53 — **Shock Interaction Studies Under RTO AVT-136** — **Crystal Ballroom P**

Chaired by: D. KNIGHT, Rutgers University, Piscataway, NJ, and B. REIMANN, German Aerospace Center (DLR), Lilienthalplatz, Germany

0900 AIAA-2010-1281 A Review of Experimental Studies with the Double Cone and Hollow Cylinder/Flare Configurations in the LENS Hypervelocity Tunnels and Comparisons with Navier- Stokes and DSMC Computations M. Holden , CUBRC, Buffalo, NY	0930 AIAA-2010-1282 Numerical Investigation of Double- Cone and Cylinder Experiments in High Enthalpy Flows Using the DLR TAU Code B. Reimann, German Aerospace Center (DLR), Braunschweig, Germany	1000 AIAA-2010-1283 Numerical Investigation of Double- Cone Flow Experiments with High-Enthalpy Effects I. Nompelis, University of Minnesota, Minneapolis, MN	1030 AIAA-2010-1284 An Assessment of CFD for Prediction of 2- D and 3- D High- Speed Flows D. Gaitonde, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1100 AIAA-2010-1285 Chemically Reacting Flows Around a Double Cone, Including Ablation Effects (Invited) D. Drikakis, Cranfield University, Cranfield, Great Britain			

Thursday Morning / 07 January 2010

Session 234-FD-54 — **Turbulent Jets and Mixing Layers** — **Crystal Ballroom Q**

Chaired by: A. FERRANTE, University of Washington, Seattle, WA

0900	0930	1000	1030	1100	1130		
AIAA-2010-1287 LES of an Inclined Jet into a Supersonic Turbulent Crossflow: Synthetic Inflow Conditions A. Ferrante, University of Washington, Seattle, WA	AIAA-2010-1288 Large Eddy Simulation of Pulsed Jets in High Speed Turbulent Crossflow R. Pasumarti, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-1289 Investigation of Non-Swirling and Swirling Turbulent Jet Flows using Unified LES-RANS Models H. Gopalan, University of Wyoming, Laramie, WY	AIAA-2010-1290 Investigation of Large Scale Flow Structures in an Offset Attaching Jet Using Spectral Linear Stochastic Estimation N. Gao, Dalian University of Technology, Dalian, China (prc)	AIAA-2010-1291 Investigation of Coherent Structures in Turbulent Mixing Layers Using Large Eddy Simulation A. McMullan, Loughborough University, Loughborough, Great Britain	AIAA-2010-1292 POD based spectral Higher- Order Stochastic Estimation W. Baars, University of Texas at Austin, Austin, TX		

Thursday Morning / 07 January 2010

Session 235-GPSE-6 — **Physics and Material Science I** — **Crystal Ballroom D**

Chaired by: H. NAHRA, NASA Glenn Research Center, Cleveland, OH, and J. MARCHETTA, University of Memphis, Memphis, TN

0900	0930	1000	1030	1100			
AIAA-2010-1294 A Study of Fluid Interface Configurations in Exploration Vehicle Propellant Tanks G. Zimmerli, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-1295 3- D Multiscale Adaptive Eulerian- Lagrangian Method for Multiphase Flows with Phase Change J. Sim, University of Michigan, Ann Arbor, MI	Oral Presentation Liquid Acquisition Strategies for Exploration Missions D. Chato, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-1297 Simulating Self-Pressurization in Propellant Tanks A. Winter, University of Memphis, Memphis, TN	AIAA-2010-1298 Heat Entrapment Effects Within Liquid Acquisition Devices W. Duval, NASA Glenn Research Center, Cleveland, OH			

Thursday Morning / 07 January 2010

Session 236-GT-8 — **High Reynolds Number Aerodynamics and Testing** — **Crystal Ballroom G1**

Chaired by: R. WAHLS, NASA Langley Research Center, Hampton, VA, and J. QUEST, European Transonic Windtunnel, Cologne, Germany

0900	0930	1000	1030	1100	1130		
Oral Presentation Providing Adequate Prerequisites for Laminar Testing at High Reynolds Number in the ETW D. Schimanski, European Transonic Windtunnel, Cologne, Germany	AIAA-2010-1300 Transonic High Reynolds Number Transition Experiments in the ETW Cryogenic Wind Tunnel J. Perraud, ONERA, Toulouse, France	AIAA-2010-1301 Advanced Measurement Techniques for High Reynolds Number Testing in Cryogenic Wind Tunnels U. Fey, German Aerospace Center (DLR), Göttingen, Germany	Oral Presentation Natural Laminar Flow Testing in High Unit Reynolds Number Facilities A. Garzon, , ,	AIAA-2010-1302 Assessment of the National Transonic Facility for Natural Laminar Flow Testing J. Crouch, The Boeing Company, Renton, WA	Oral Presentation Recent Progress at the U.S. National Transonic Facility W. Kilgore, NASA Langley Research Center, Hampton, VA		

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http://www.aiaa.org/agenda.cfm?lumeetingid=1812&dateget=all#session12756.

Thursday Morning / 07 January 2010

Session 237-GT-9 — **Instrumentation and Controls** — **Grand Ballroom 14**

Chaired by: D. SMITH, Aerospace Testing Alliance, Arnold AFB, TN, and D. SCHIMANSKI, European Transonic Windtunnel, Cologne, Germany

0900 AIAA-2010-1304 Advanced Capabilities for Wind Tunnel Testing in the 21st Century J. Kegelman, NASA Langley Research Center, Hampton, VA	0930 AIAA-2010-1305 Fiber Optics for Remote Delivery of High Power Pulsed Laser Beams J. Kriesel, Opto-Knowledge Systems Inc., Torrance, CA	1000 AIAA-2010-1306 Requirements for Fly-the- Mission Control in Aerodynamic Wind Tunnels J. Sheeley, Aerospace Testing Alliance, Arnold AFB, TN	1030 AIAA-2010-1307 Reduction of Dynamic Response of a Wind Tunnel Sting Mount Using a Hub Damper Unit R. Glaese, CSA Engineering, Inc., Huntsville, AL	1100 AIAA-2010-1308 Reduction of Dynamic Response of a Wind Tunnel Sting Mount Using Co- cured Composite and Viscoelastic Materials S. Hsu, Stirling Dynamics, Inc., Kirkland, WA	1130 AIAA-2010-1309 Model- Based Predictive Control System in a Transonic Aerodynamic Test Facility J. Sheeley, Aerospace Testing Alliance, Arnold AFB, TN		

Thursday Morning / 07 January 2010

Session 271-MDO-3 — **Optimization Algorithms and Methodology II** — **Crystal Ballroom C**

Chaired by: A. ARSLAN, Northrop Grumman Corporation, Torrance, CA

0900 AIAA-2010-1500 Multi- Objective Optimization of Supersonic Projectiles using Evolutionary Algorithms D. Lisk, Queen's University Belfast, Belfast, Northern Ireland	0930 AIAA-2010-1501 Multi- Objective Optimization of High-Speed Train Nose Shape Using the Vehicle Modeling Function Y. Ku, Hyundai Kia Motors , Hwaseong, Gyeonggi-Do, South Korea	1000 AIAA-2010-1503 Sensitivity Analysis for Optimization of Dynamic Systems with Reduced Order Modeling P. Beran, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1030 AIAA-2010-1504 Control of Boundary Representation Topology in Multidisciplinary Analysis and Design R. Haimes, Massachusetts Institute of Technology, Cambridge, MA				

Thursday Morning / 07 January 2010

Session 240-MVC-3 — **Simulation Environments and Data Processing** — **Crystal Ballroom B**

Chaired by: D. THOMPSON, Mississippi State University, Mississippi State, MS, and G. POWER, Arnold Engineering Development Center, Arnold AFB, TN

0900 AIAA-2010-1322 Caedium: A Unified Simulation Environment R. Smith, Symscape, Enfield, NH	0930 AIAA-2010-1323 An Intelligent Agent Architecture for Concurrent CFD Feature Extraction C. Mortensen, Brigham Young University, Provo, UT	1000 AIAA-2010-1324 RCAAPS - Rotorcraft Computational AeroAcoustics Post-Processing System E. Duque, Intelligent Light, Rutherford , NJ	1030 AIAA-2010-1325 Data Compression of Large- Scale Flow Computation Using Discrete Wavelet Transform R. Sakai, Tohoku University, Sendai, Japan	1100 AIAA-2010-1326 A Prototype System for Evaluating Civil Airplane's Airport Compatibility based on Virtual Reality F. Haocheng, Beijing University of Aeronautics and Astronautics, Beijing, China (prc)			

Thursday Morning / 07 January 2010

Session 241-PC-16 — **Advanced Combustion Concepts** — **Los Angeles**

Chaired by: J. GORD, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and C. LI, Aerojet, Folsom, CA

0900 AIAA-2010-1328 Analysis and Prediction of Dual- Mode Chemical and Electric Ionic Liquid Propulsion Performance B. Donius, Missouri University of Science and Technology, Rolla, MO	0930 AIAA-2010-1329 On Continuous NOx Reduction of Aero-propulsion Engines H. Mongia, Purdue University, West Lafayette, IN	1000 AIAA-2010-1330 OH- PLIF Calibration and Investigation Within the Ultra Compact Combustor K. LeBay, U.S. Air Force Institute of Technology, Wright-Patterson AFB, OH	1030 AIAA-2010-1331 Effects of Non-Equilibrium Plasma on Counterflow Diffusion Flames W. Sun, Princeton University, Princeton, NJ	1100 AIAA-2010-1332 Scalar Mixing Enhancement In A Swirl Stabilized Combustor Trough Passive And Active Injection Control A. Lacarelle, Technical University of Berlin, Berlin, Germany			

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Session 242-PC-17 — **Bluffbody and Obstacle Interaction with Flames** — **Denver**

Chaired by: M. ANAND, Rolls-Royce, Indianapolis, IN, and Y. HARDALUPAS, Imperial College London, London, Great Britain

0900 AIAA-2010-1333 Effects of Acoustic Excitation on Bluffbody Stabilized Premixed Reacting Flows V. Sankaran, United Technologies Research Center, East Hartford, CT	0930 AIAA-2010-1334 On the Evolution of Vorticity for Bluff- body Stabilized Premixed Flames Z. Carr, State University of New York, Buffalo, Buffalo, NY	1000 AIAA-2010-1335 Effects of Pylon- Aided Fuel Injection on Mixing in a Supersonic Flowfield Q. Tu, University of Florida, Gainesville, FL	1030 AIAA-2010-1336 Detonation Initiation Improvements Using Swept- Ramp Obstacles C. Brophy, Naval Postgraduate School, Monterey, CA	1100 AIAA-2010-1337 Blowoff Dynamics of V-Shaped Bluff Body Stabilized,Turbulent Premixed Flames in a Practical Scale Rig S. Chaudhuri, University of Connecticut, Storrs, CT			

Thursday Morning / 07 January 2010

Session 243-PDL-14 — **Plasma Physics and Kinetics** — **Grand Ballroom 1**

Chaired by: D. LEVIN, Pennsylvania State University, University Park, PA, and S. ROY, University of Florida, Gainesville, FL

0900 AIAA-2010-1339 Low Pressure Semiconductor Processing Transport Property Modeling Using Direct Simulation Monte Carlo H. Deng, Pennsylvania State University, University Park, PA	0930 AIAA-2010-1340 Inactivation of Yeast Cells Using Dielectric Barrier Discharge N. Mastanaiah, University of Florida, Gainesville, FL	1000 AIAA-2010-1341 Ultra–Lean and Ultra–Rich Flames Stabilization by High–Voltage Nanosecond Pulsed Discharge A. Nikipelov, NEQLab Research BV, The Hague,, The Netherlands	1030 AIAA-2010-1343 Compact Catalyst–Free Liquid Fuel to Syngas Reformer with Plasma–Assisted Flame Stabilization A. Nikipelov, NEQLab Research BV, The Hague,, The Netherlands	1100 AIAA-2010-1344 Pulsed Thermionic Power Conversion with Positive Work Function Difference B. Alderman, Princeton University, Princeton, NJ			

Thursday Morning / 07 January 2010

Session 244-SOS-1 — **Space Operations and Support** — **Crystal Ballroom F**

Chaired by: J. LAUBE, Northrop Grumman Corporation, Redondo Beach, CA

0900 AIAA-2010-1345 Economic Factors for Launch Complex Development in Current Economy G. Finger, Reynolds, Smith & Hills, Inc., Merritt Island, FL	0930 AIAA-2010-1346 Probability of Failure Estimation for New Vehicles Using the Bivariate Approach to Learning C. Draper, ACTA, Torrance, CA	1000 AIAA-2010-1347 Can Your Airport Become a Spaceport? The Benefits of a Spaceport Development Plan B. Gulliver, Reynolds, Smith & Hills, Inc., Merritt Island, FL	1030 AIAA-2010-1348 Ground Side Infrastructure for Space-Based Solar Power B. Gulliver, Reynolds, Smith & Hills, Inc., Merritt Island, FL	1100 AIAA-2010-1349 Lessons Learned in Operational Space and Air Traffic Management D. Murray, Federal Aviation Administration, Washington, DC			

Thursday Morning / 07 January 2010

Session 245-SST-1 — **Sensor Systems** — **Crystal Ballroom E**

Chaired by: M. NIXON, The Boeing Company, Albuquerque, NM, and V. OTUGEN, Southern Methodist University, Dallas, TX

0900 AIAA-2010-1350 A GPS- Based Pitot-Static Calibration Method Using Global Output Error Optimization J. Foster, NASA Langley Research Center, Hampton, VA	0930 AIAA-2010-1352 Improved signal processing technique leads to more robust Self Diagnostic Accelerometer System R. Tokars, NASA Glenn Research Center, Brook Park,, OH						

Thursday Morning / 07 January 2010

Session 247-TES-5 — **Numerical Simulation II** — **Boston**

Chaired by: G. JACOBS, San Diego State University, La Mesa, CA, and S. SHERIF, University of Florida, Gainesville, FL

0900 AIAA-2010-1358 Heat Transfer Past A Single Cylinder: Numerical Investigations A. Abdel Raouf, Cairo University, Cairo, Egypt	0930 AIAA-2010-1359 Trajectories of Projectiles in 3- D Space with an Excel/VBA Code D. Lilley, Lilley & Associates, Stillwater, OK	1000 AIAA-2010-1360 NME: Some Useful Excel/VBA Codes for Numerical Methods in Engineering D. Lilley, Lilley & Associates, Stillwater, OK	1030 AIAA-2010-1361 Estimating Grid-Induced Errors in Unsteady CFD Solutions Using a Discrete Error Transport Equation B. Williams, CFD Research Corporation, Huntsville, AL	1100 AIAA-2010-1362 A Numerical Investigation of Swirling Turbulent Buoyant Jets at Transient Reynolds Numbers G. Taub, University of Florida, Gainesville, FL			

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Thursday Morning / 07 January 2010

Session 248-TP-17 — **Heat Pipes, Loop Heat Pipes, and Innovative Heat Pipe Designs** — **Miami**

Chaired by: E. SHORT, and J. OCHTERBECK, Clemson University, Clemson, SC

0900 AIAA-2010-1363 WITHDRAWN Pressure- Controlled Heat Pipe D. Sarraf, Advanced Cooling Technologies, Lancaster, PA	0930 AIAA-2010-1365 Titanium- Water Loop Heat Pipe Operating Characteristics Under Standard and Elevated Acceleration Fields A. Fleming, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 AIAA-2010-1366 Investigation of Gravitational Effects On Fractal Loop Heat Pipe Performance E. Silk, NASA Goddard Space Flight Center, Greenbelt, MD					

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Session 249-TP-18 — **Non-Intrusive Methods** — **New York**

Chaired by: C. SEGAL, University of Florida, Gainesville, FL, and D. REDDY, NASA Glenn Research Center, Cleveland, OH

0900 AIAA-2010-1370 Shock Front Radiation Studies at CUBRC R. Parker, CUBRC, Buffalo, NY	0930 AIAA-2010-1597 Simulation of Cryogenics Cavitation S. Kelly, University of Florida, Gainesville, FL						

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Session 250-WE-7 — **Wind Turbine Operating Environment** — **Crystal Ballroom G2**

Chaired by: N. KELLEY, National Renewable Energy Laboratory, Golden, CO, and L. MANUEL, University of Texas, Austin, Austin, TX

0900 AIAA-2010-1373 k- E Simulations of the Neutral ABL: Achieving Horizontal Homogeneity on Practical Grids J. Sumner, École de Technologie Supérieure, Montréal, Canada	0930 AIAA-2010-1374 Compact Representation of Large Eddy Simulations of the Atmospheric Boundary Layer Using Proper Orthogonal Decomposition M. Saini, University of Wyoming, Laramie, WY	1000 AIAA-2010-1376 Enhanced Energy Capture Through Gust-Tracking in the Urban Wind Environment T. Berténi, Quiet Revolution Ltd., London, Great Britain	1030 AIAA-2010-1377 Interaction of an Eulerian Flue Gas Plume with Wind Turbines T. Fletcher, University of Glasgow, Glasgow, Great Britain				

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Thursday Morning / 07 January 2010

Session 251-WIG-8 / PDL-15 — **Plasma-Based Flow Control** — **Grand Ballroom 2**

Chaired by: D. KNIGHT, Rutgers University, Piscataway, NJ, and S. BOBASHEV, Russian Academy of Sciences, Saint Petersburg, Russia

0900 AIAA-2010-1378 The Nature of Surface MW Discharge K. Khodataev, Moscow Radiotechnical Institue RAS, , Russia	0930 AIAA-2010-1381 Interaction of a Heated Filament with a Blunt Body in Supersonic Flow K. Anderson, Rutgers University, Piscataway, NJ	1000 AIAA-2010-1382 Supersonic Body Streamline at Different Configuration Gas Discharge A. Erofeev, Russian Academy of Sciences , Saint Petersburg, Russia	1030 AIAA-2010-1383 Boundary- Layer Control Based on Localized Plasma Generation: Aerodynamic Problem N. Yurchenko, National Academy of Sciences of Ukraine, Kiev, Ukraine				

Thursday Afternoon / 07 January 2010

1300 - 1600 — **Fluid Dynamics Challenges in Flight Dynamics** — **Miami**

Chaired by: S. MCPARLIN, QinetiQ, Farnborough, Great Britain, and M. OL, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

Panel Discussion:

Dr. Holger Babinsky, University of Cambridge, UK: “European Research Program on Unsteady Shock-Induced Separation UFAST: Introduction and Summary of the Transonic Experiments”

Prof. Charles Hirsch, NUMECA, Belgium: "(U)RANS Simulations of UFAST Test Cases: Expected and Unexpected Lessons Learned.””

Dr. George Barakos, University of Liverpool, UK: “Hybrid LES and DES Computations of Transonic Shockwave/Boundary-Layer Interaction: Recent Progress Reported in the UFAST Project.””

Mr. Kurtis R. Long (University of California, Santa Cruz) and Dr. Murray Tobak (NASA Ames Research Center): “Topological Aspects of the FAITH Experiment.” ”

Discussion during remaining time.

Thursday Afternoon / 07 January 2010

1300 - 1700 — **National Science and Technology Council- Biannual Aeronautics R&D Plan Update** — **Crystal Ballroom A**

Chaired by: W. DAVIS, Office of Science and Technology Policy, Washington, DC

This session is the formal rollout of the biannual report, and an opportunity for attendees to find out more information about what the next steps for implementation of the National Aeronautics R&D Plan are, anc what opportunities individuals will have to engage the administration on appropriate future actions or components update that is required under the Executive Order that created the original National Aero R&D Policy and Plan in December of 2004.

Thursday Afternoon / 07 January 2010

Session 252-AA-10 — **Atmospheric Sound Propagation and Sonic Boom** — **Washington**

Chaired by: J. PAGE, Wyle Laboratories, Arlington, VA

1300	1330	1400	1430	1500	1530		
AIAA-2010-1384 Nonlinear Acoustic Propagation Predictions with Applications to Aircraft and Helicopter Noise S. Lee, Pennsylvania State University, University Park, PA	AIAA-2010-1385 Sonic Boom Modeling of Advanced Supersonic Business Jets in NextGen J. Rachami, Wyle Laboratories, Arlington, VA	AIAA-2010-1386 Slot Nozzle Effects for Reduced Sonic Boom on a Generic Supersonic Wing Section R. Castner, NASA Glenn Research Center, Cleveland, OH	AIAA-2010-1387 Experimental Study of Investigations Between Weak Shock Wave and Turbulence A. Matsuda, Nagoya University, Nagoya, Japan	AIAA-2010-1388 Real Gas Effects on Weak Shock Wave Propagation in an Atmosphere T. Sakai, Nagoya University, Aichi, Japan	AIAA-2010-1389 Global Variation of Sonic Boom Intensity Due to Seasonal Atmospheric Gradients H. Yamashita, Tohoku University, Sendai, Japan		

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Session 253-AD-9 — **Student Aircraft Conceptual Designs** — **Crystal Ballroom L**

Chaired by: D. CARTER, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and C. BIL, RMIT University, Bundoora, Australia

1300	1330	1400	1430	1500	1530		
AIAA-2010-1391 Conceptual Design of a Hybrid Lift Airship for Intra- Regional Flexible Access Transport J. Agte, Massachusetts Institute of Technology, Cambridge, MA	AIAA-2010-1392 Conceptual Design of an Environmentally Responsible 150-Passenger Commercial Aircraft N. Smith, California Polytechnic State University, San Luis Obispo, CA	AIAA-2010-1393 Supersonic Bi-Directional Flying Wing, Part II: Conceptual Design of A High Speed Civil Transport D. Espinal, University of Miami, Coral Gables, FL	AIAA-2010-1394 Novel Senior Design Approach of a Hydrogen Citation X B. Watters, University of Texas, Arlington, Arlington, TX	AIAA-2010-1395 Parametric Design of Low Emission Hybrid- lift Cargo Aircraft A. Donaldson, Massachusetts Institute of Technology, Cambridge, MA	AIAA-2010-1396 Conceptual Design of a Next Generation, 150 Passenger Commercial Transport R. Halper, California Polytechnic State University, San Luis Obispo, CA		

Thursday Afternoon / 07 January 2010

Session 254-AMT-9 — **Coherent Anti-Stokes Raman Spectroscopy** — **Crystal Ballroom J1**

Chaired by: J. GORD, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH, and S. NAIK, Purdue University, West Lafayette, IN

1300	1330	1400	1430	1500	1530	1600	
AIAA-2010-1397 CARS Spectral Fitting of Multiple Resonant Species Using Sparse Libraries A. Cutler, George Washington University, Newport News, VA	AIAA-2010-1398 Single- Beam Coherent Anti- Stokes Raman Scattering (CARS) Spectroscopy with Tailored Ultrashort Laser Pulses J. Gord, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	AIAA-2010-1399 Picosecond Laser–Based Fiber-Coupled CARS Spectroscopy for Gas-Phase Thermometry P. Hsu, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH	AIAA-2010-1400 Beam Shaping for CARS Measurements in Turbulent Environments G. Magnotti, George Washington University, Hampton, VA	AIAA-2010-1401 Dual- Pump CARS Measurements in a Gas Turbine Combustor Facility Using the NASA 9- Point Lean Direct Injector M. Thariyan, Purdue University, West Lafayette, IN	AIAA-2010-1402 Temperature Measurements in Flames at 1000 Hz Using Femtosecond Coherent Anti- Stokes Raman Spectroscopy R. Lucht, Purdue University, West Lafayette, IN	AIAA-2010-1403 Electronic- Resonance-Enhanced Coherent Anti- Stokes Raman Scattering of Nitric Oxide: Non- Perturbative Time- Dependent Modeling N. Chai, Purdue University, West Lafayette, IN	

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Session 255-AMT-10 — **Fluorescence-Based Techniques** — **Crystal Ballroom K**

Chaired by: S. KEARNEY, Sandia National Laboratories, Albuquerque, NM, and N. JIANG, Ohio State University, Columbus, OH

1300 AIAA-2010-1404 Multiple Velocity Profile Measurements in Hypersonic Flows Using Sequentially- Imaged Fluorescence Tagging B. Bathel, NASA Langley Research Center, Hampton, VA	1330 AIAA-2010-1405 Hydroxyl Tagging Velocimetry in a Supersonic Flow over a Piloted Cavity N. Grady, Vanderbilt University, Nashville, TN	1400 AIAA-2010-1406 High- Speed Multi- Line OH Planar Laser-Induced Fluorescence in Unsteady Flames J. Miller, Iowa State University, Ames, IA	1430 AIAA-2010-1407 MHz- Rate NO PLIF Imaging in a Mach 10 Hypersonic Wind Tunnel N. Jiang, Ohio State University, Columbus, OH	1500 AIAA-2010-1408 High- Spectral Resolution PLIF Imaging of Compressible Flows and Plasmas A. Bhuiyan, Purdue University, West Lafayette, IN			

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Session 256-APA-26 — **Active Flow Control IV** — **Grand Ballroom 9**

Chaired by: J. GEORGE, Innovative Aerospace Solutions, Downey, CA, and J. AZEVEDO, National Institute for Space Research (INPE), São José dos Campos, , Brazil

1300 AIAA-2010-1409 Flow Separation Control By Trapped Vortex R. Donelli, Italian Aerospace Research Center (CIRA), Capua, Italy	1330 AIAA-2010-1411 Active Flow Control Technique for the Reduction of Helicopter BVI Noise: A Numerical Study Using LES M. Ilie, University of Central Florida, Orlando, FL	1400 AIAA-2010-1412 PIV around a NACA0012 Airfoil with a Plasma Actuator for Noise Reduction S. Koike, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1430 AIAA-2010-1413 Boundary Condition Models for Synthetic Jet Simulation I. Yoo, Inha University, Incheon, South Korea				

Thursday Afternoon / 07 January 2010

Session 257-APA-27 — **Miscellaneous Topics in CFD and Applied Aerodynamics** — **Grand Ballroom 10**

Chaired by: M. CHAFFIN, Cessna Aircraft Company, Wichita, KS, and S. MORRIS, Engineering Systems, Inc., Colorado Springs, CO

1300 AIAA-2010-1414 Evaluation of Radial Basis Functions for CFD Volume Data Interpolation T. Rendall, University of Bristol, Avon, Great Britain	1330 AIAA-2010-1416 Influence of Turbulence Modelling and Grid Resolution In Computations of the DPW4 CRM Configuration P. Eliasson, FOI Swedish Defence Research Agency, Stockholm, Sweden	1400 AIAA-2010-1417 Drag Prediction on NASA CRM Using Automatic Hexahedra Grid Generation A. Hashimoto, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1430 AIAA-2010-1418 Multidimensional Adaptive Sampling for Global Metamodelling T. Mackman, University of Bristol, Avon , Great Britain	1500 AIAA-2010-1419 An Aerodynamic Study of an Urban Maglev Vehicle J. Wells, Old Dominion University, Norfolk, VA			

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Thursday Afternoon / 07 January 2010

Session 258-APA-28 — **Optimization Methods in Applied Aerodynamics** — **Grand Ballroom 11**

Chaired by: W. ANDERSON, University of Tennessee, Chattanooga, Chattanooga, TN

1300 AIAA-2010-1420 Optimal Kinematics of Hovering Insect Flight for Minimum Mechanical Power M. Kurdi, Universal Technology Corp. , ,	1330 AIAA-2010-1421 An Adjoint- Based Shape Optimization of Gas Turbine Blades A. Mousavi, McGill university, Montréal, Canada	1400 AIAA-2010-1422 Optimization of Wings in Ground Effect Using Multi- Objective Genetic Algorithm J. Lee, Hoseo University, Asan, South Korea	1430 AIAA-2010-1423 Optimization of Flatback Airfoils for Wind Turbine Blades Using a Genetic Algorithm with an Artificial Neural Network X. Chen, Washington University in St. Louis, St. Louis, MO				

Thursday Afternoon / 07 January 2010

Session 259-APA-29 — **Unmanned Aerial Vehicle Designs/Tests** — **Grand Ballroom 12**

Chaired by: L. AUMAN, U.S. Army Research, Development and Engineering Command, Huntsville, AL, and C. COX, U.S. Air Force Research Laboratory, Wright-Patterson Air Force Base, OH

1300 AIAA-2010-1425 Evaluation of DES for Weapon Bays in UCAVs S. Lawson, University of Liverpool, Liverpool, Great Britain	1330 AIAA-2010-1427 Aerodynamic Analysis of a Multi- Mission Short-Shrouded Coaxial UAV: Part II – Translation Flight C. Thipyopas, ISAE, Toulouse, France	1400 AIAA-2010-1428 Conceptual Design and Computational Investigation of Stabilator Mounted Coplanar with Wing M. Arndt, U.S. Air Force Academy, Colorado Springs, CO	1430 AIAA-2010-1429 Flow Sensory Actuators for MAVs V. Kumar, Florida A&M University-Florida State University, Tallahassee, FL				

Thursday Afternoon / 07 January 2010

Session 260-FD-55 — **CFD Applications Including Optimization** — **Grand Ballroom 3**

Chaired by: N. GEORGIADIS, NASA Glenn Research Center, Cleveland, OH, and T. RAMSAY, Honda R&D Americas, Inc., Raymond, OH

1300 AIAA-2010-1430 Adjoint- Based Design of Passive and Active Shock Mitigation Devices A. Stueck, Hamburg University of Technology, Hamburg, Germany	1330 AIAA-2010-1431 A Comparative Aerodynamic Study of Commercial Bicycle Wheels Using CFD M. Godo, Intelligent Light, Rutherford, NJ	1400 AIAA-2010-1432 Shape Optimization and Fluid Dynamic Analysis of a Translating Flexible Body S. Thomson, Brigham Young University, Provo, UT	1430 AIAA-2010-1433 Higher Order Two Dimensional Aerodynamic Optimization Using Unstructured Grids and Adjoint Sensitivity Computations M. Azab, University of British Columbia, Vancouver, Canada	1500 AIAA-2010-1434 Stability Analysis of Full Geometry Aircraft through CFD and Response Surface Method W. Kim, Konkuk University, Seoul, South Korea			

Thursday Afternoon / 07 January 2010

Session 261-FD-56 — Experimental Studies of Fluid Dynamic Phenomena — Grand Ballroom 4

Chaired by: H. HU, Iowa State University, Ames, IA, and G. ZHA, University of Miami, Coral Gables, FL

1300	1330	1400	1430				
AIAA-2010-1437 High- Speed, Three-Dimensional Quantification of Ladybug (Hippodamia Convergens) Flapping Wing Kinematics During Takeoff R. George, Brigham Young University, Provo, UT	AIAA-2010-1439 Low Pressure PLIF Visualization and Mixing Quantification in a Multi-Stream Injection Nozzle A. Ragheb, University of Illinois, Urbana-Champaign, Urbana, IL	AIAA-2010-1440 The Effects of Atomic Oxygen on the Sealing and Mechanical Performance of an Elastomer Seal N. Garafolo, University of Akron, Cleveland, OH	AIAA-2010-1441 Normal- and Shear-Stress Over a Flat-Surface Established an Inclined Cylinder on T. Shizawa, Tokyo University of Science, Chino, Japan				

Thursday Afternoon / 07 January 2010

Session 262-FD-57 — Fluid-Structure Interactions — Grand Ballroom 5

Chaired by: D. LOCKARD, NASA Langley Research Center, Hampton, VA, and F. LADEINDE, TTC Technologies, Inc., Stony Brook, NY

1300	1330	1400	1430	1500			
AIAA-2010-1442 Frequency Response of Cylindrical Resonators in a Viscous Fluid M. Martin, Louisiana State University, Baton Rouge, LA	AIAA-2010-1444 Philiadium Gregarium Versus Aurelia Aurita: On Propulsion Propulsion of Jellyfish S. Etienne, École Polytechnique de Montréal , Montréal , Canada	AIAA-2010-1445 Implicit Runge- Kutta Time Integrators for Fluid- Structure Interactions J. Cori, École Polytechnique de Montréal, Montréal, Canada	AIAA-2010-1446 Spacecraft Thruster Efficiency Optimization with Respect to Coupled Solid- Liquid Dynamics A. Baeten, Augsburg University of Applied Sciences, Augsburg, Germany	AIAA-2010-1447 WITHDRAWN A Hybrid Interpolation Method for Information Exchange in Computational Aeroelasticity X. Wang, Shanghai Jiao Tong University, Shanghai, China (prc)			

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Session 263-FD-58 — High Order Methods IV — Grand Ballroom 6

Chaired by: C. VENKATASUBBAN, and A. GROSS, University of Arizona, Tucson, AZ

1300	1330	1400	1430	1500	1530		
AIAA-2010-1448 Efficient Solution Techniques for Discontinuous Galerkin Discretizations of the Navier- Stokes Equations on Hybrid Anisotropic Meshes N. Burgess, University of Wyoming, Laramie, WY	AIAA-2010-1449 Computation Of Flows with Shocks Using Spectral Difference Scheme with Artificial Viscosity S. Premasuthan, Stanford University, Stanford, CA	AIAA-2010-1450 A High Order Cut Cell Method for Numerical Simulation of Three Dimensional Hypersonic Boundary- Layer Transition with Finite Surface Roughness L. Duan, University of California,, Los Angeles, CA	AIAA-2010-1451 Improved Seventh-Order WENO Scheme Y. Shen, University of Miami, Coral Gables, FL	AIAA-2010-1452 Low Diffusion E- CUSP Scheme with High Order WENO Scheme for Preconditioned Navier-Stokes Equations Y. Shen, University of Miami, Coral Gables, FL	AIAA-2010-1453 High Order Interpolation Methods and Related URANS Schemes on Composite Ggrids J. Le Gouez, ONERA, Châtillon, France		

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Session 264-FD-59 / APA-30 — **Instability and Transition** — **Crystal Ballroom M**

Chaired by: D. BRIDGES, Mississippi State University, Mississippi State, MS, and G. DALE, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

1300 AIAA-2010-1454 Receptivity and Transition of Supersonic Boundary Layers Over Swept Wings P. Balakumar, NASA Langley Research Center, Hampton, VA	1330 AIAA-2010-1455 Optimization of a Transition Calibration Body for Wind Tunnel Flow Quality Assessment J. Eppink, Tufts University, Medford, MA	1400 AIAA-2010-1456 Study of Mechanism of Ring- Like Vortex Formation in Late Flow Transition C. Liu, University of Texas, Arlington, Arlington, TX					

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Session 265-FD-60 — **Multiphysics Simulations** — **Crystal Ballroom N**

Chaired by: F. LIU, University of California, Irvine, Irvine, CA, and D. YODER, NASA Glenn Research Center, Cleveland, OH

1300 AIAA-2010-1460 Sharp Interface Simulations of High Speed Multimaterial Impact and Penetration Mechanics S. Sambasivan, University of Iowa, Iowa City, IA	1330 AIAA-2010-1461 Conjugate Design/Analysis Procedure for Film-Cooled Turbine Airfoil Sections R. Davis, University of California,, Davis, CA	1400 AIAA-2010-1462 Multiphysics Coupling for Reentry Flows P. Bauman, University of Texas, Austin, Austin, TX	1430 AIAA-2010-1463 Three Dimensional Compressible Multi-Material Flows A. Kapahi, University of Iowa, Iowa City, IA	1500 AIAA-2010-1464 Material Point Method Applied to Fluid-Structure Interaction (FSI)/Aeroelasticity Problems P. Hu, Advanced Dynamics, Inc., Lexington, KY			

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Session 266-FD-61 — **Overview of AVT-136: Flight Experiment Assessment via Ground Test and CFD** — **New York**

Chaired by: J. SCHMISSEUR, U.S. Air Force, Arlington, VA, and J. MUYLAERT, ESA, Noordwijk, The Netherlands

1300 AIAA-2010-1465 Shock Interactions Investigations Associated with AVT-136 D. Knight, Rutgers - State University of New Jersey , New Brunswick , NJ	1330 AIAA-2010-1466 Summary of Hypersonic Transition Research Coordinated Through NATO RTO AVT- 136 S. Schneider, Purdue University, West Lafayette, IN	1400 AIAA-2010-1467 Modeling Approaches for Gas- Surface Interactions G. Herdrich, Institut fur Rawmfahrtsysteme (IRS) , Stuttgart, Germany	1430 AIAA-2010-1468 Base Flow Investigation of the Apollo Command Module in the Frame of AVT- 136 L. Walpot, Advanced Operations and Engineering Services Group, Leiden, The Netherlands				

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Session 267-FD-62 — **Theoretical and Computational Fluid Flow Problems** — **Crystal Ballroom P**

Chaired by: W. LIOU, Western Michigan University, Kalamazoo, MI

1300 AIAA-2010-1469 Transition Flow Occurrence Estimation New Method P. Silisteanu, ETS - LARCASE, Montréal, Canada	1330 AIAA-2010-1470 DNS for Late Stage Structure of Flow Transition on a Flat-Plate Boundary Layer L. Chen, University of Texas, Arlington, Arlington, TX	1400 AIAA-2010-1471 DNS for Ring - Like Vortices Formation and Roles in Positive Spikes Formation X. Liu, University of Texas, Arlington, Arlington, TX	1430 AIAA-2010-1472 Towards Efficient Viscous Modeling Based on Cartesian Methods for Automated Flow Simulation H. Zhao, Advanced Dynamics, Inc., Lexington, KY	1500 AIAA-2010-1473 On the Sensitivity Analysis of Angle- of-Attack in a Model Reduction Setting A. Hay, Virginia Polytechnic Institute , Blacksburg, VA			

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Session 268-GPSE-7 — **Physics and Material Science II** — **Crystal Ballroom D**

Chaired by: J. HOCHSTEIN, University of Memphis, Memphis, TN, and S. TSE, Rutgers University, Piscataway, NJ

1300 AIAA-2010-1476 Liquid Plugs in Rectangular Channels Under a Transverse Gravity Field R. Manning, Purdue University, West Lafayette, IN	1330 AIAA-2010-1477 Simulation of Microgravity Diffusion Flames Using Sub-Atmospheric Pressures N. Panek, University of Toronto, Toronto, Canada	1400 AIAA-2010-1478 Nanoparticle Agglomeration Payloads for Microgravity Experimentation S. Lösch, Fraunhofer Institute for Manufacturing Technology and Applied Materials Research (IFAM), Bremen, Germany	1430 AIAA-2010-1480 Scaling Parameters in Buoyancy Flows J. Kizito, North Carolina A&T State University, Greensboro, NC	1500 AIAA-2010-1481 The Constrained Vapor Bubble Experiment for the ISS – Earth's Gravity and Mu Gravity Results A. Chatterjee, Rensselaer Polytechnic Institute, Troy, NY	1530 AIAA-2010-1482 Bubble Evolution and Growth in Fluids under Vacuum J. Kizito, North Carolina A&T State University, Greensboro, NC	1600 AIAA-2010-1483 Capillary Stability in Tilted Square Cylinders S. Collicott, Purdue University, West Lafayette, IN

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Session 269-GT-10 — **Test Facilities** — **Crystal Ballroom G1**

Chaired by: I. PHILIPSEN, German-Dutch Wind Tunnels (DNW), Marknesse, The Netherlands, and D. WISHART, Pratt & Whitney, A United Technologies Company, Stuart, FL

1300 AIAA-2010-1484 Modification of a Transonic Blowdown Wind Tunnel to Produce Oscillating Freestream Mach Number K. Gompertz, Ohio State University, Columbus, OH	1330 AIAA-2010-1485 A Mach 4 Wind Tunnel for Plasma / Boundary Layer Interaction Studies B. DeBlauw, University of Illinois, Urbana-Champaign, Urbana, IL	1400 AIAA-2010-1486 Facility for Shock and Detonation Wave Interaction with a Reactive Turbulent Field F. Lu, University of Texas, Arlington, Arlington, TX	1430 AIAA-2010-1487 Lessons Learned during Recent Upgrade: The Rejuvenation of the Wichita State University's Walter H. Beech 7x10 foot Low Speed Wind Tunnel at the National Institute for Aviation Researc E. Irani, Wichita State University, Wichita, KS	1500 AIAA-2010-1488 WITHDRAWN New Altitude Combustion Stand Facility B. Rosenthal, NASA Glenn Research Center, Cleveland, OH	1530 AIAA-2010-1489 Ground Testing Technical Committtee Wind Tunnel Database Demonstration (Invited) R. White, ViGYAN, Inc., Hampton, VA	1600 AIAA-2010-1490 Characteristics of the Mars Wind Tunnel at Tohoku University in CO2 Operation Mode M. Anyoji, Tohoku University, Sendai, Japan

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Session 270-GT-11 — **NASA New Millenium Program Technology and Ground Testing** — **Grand Ballroom 14**

Chaired by: J. STOCKY, Jet Propulsion Laboratory, Pasadena, CA, and J. NORRIS, Aerospace Testing Alliance, Silver Spring, MD

1300	1330	1400	1430	1500	1530	1600	1630
AIAA-2010-1491 Validation of SAILMAST Technology and Modeling by Ground Testing of a Full- Scale Flight Article M. McEachen, ATK, Goleta, CA	AIAA-2010-1492 Confirmation of Non-Dimensionalized (Scalable) Closed- Form Analytics for Modeling Slender Truss Behavior under Combined Loading T. Trautt, ATK, Goleta, CA	AIAA-2010-1493 Multi- Evaporator Miniature Loop Heat Pipe for Small Spacecraft Thermal Control, Part I: New Technologies and Validation Approach J. Ku, NASA Goddard Space Flight Center, Greenbelt, MD	AIAA-2010-1494 Multi- Evaporator Miniature Loop Heat Pipe for Small Spacecraft Thermal Control, Part II: Validation Results J. Ku, NASA Goddard Space Flight Center, Greenbelt, MD	AIAA-2010-1495 NMP ST8 Dependable Multiprocessor: Technology and Technology Validation Overview J. Samson, Honeywell International, Inc., Clearwater, FL	AIAA-2010-1496 NMP ST8 Dependable Multiprocessor: Technology Validation Approach and Results E. Grobelny, Honeywell International, Inc., Clearwater, FL	AIAA-2010-1497 ST8 Validation Experiment:Ultraflex- 175 Solar Array Technology Advance: Deployment Kinematics and Deployed Dynamics Ground Testing and Model Validation D. Eacret , ATK, Goleta, CA	AIAA-2010-1498 ST8 Ultraflex- 175 Solar Array- Deployed Dynamics Analytical Modeling and Comparison to Validation Criteria T. Trautt, ATK, Goleta, CA

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Session 272-MDO-4 — **Optimization Applications II** — **Crystal Ballroom C**

Chaired by: T. TAKAHASHI, Northrop Grumman Corporation, Torrance, CA, and Y. KO, AVID LLC, Blacksburg, VA

1300	1330	1400	1430	1500			
AIAA-2010-1505 Application of a Technology Screening Methodology for Rotorcraft Alternative Power Systems M. Strauss, Sikorsky Aircraft Corporation, Stratford, CT	AIAA-2010-1506 Boom Minimization Framework for Supersonic Aircraft Using CFD Analysis I. Ordaz, NASA Langley Research Center, Hampton, VA	AIAA-2010-1508 A Knowledge- Based Geometry Repair System for Robust Parametric CAD Models D. Li, University of Southampton, Southampton, Great Britain	AIAA-2010-1509 Response Surface Based Aerodynamic Shape Optimization of High Speed Train Nose V. Vytla, Wright State University, Dayton, OH	AIAA-2010-1510 Design Optimization of Composite Wing Box for Flutter and Stiffness N. Chang, Northwestern Polytechnical University, Xi'an, China (prc)			

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Session 24-MVC-2 — **Solution Adaptive Meshing** — **Crystal Ballroom B**

Chaired by: S. ALTER, NASA Langley Research Center, Hampton, VA, and T. MICHAL

1300	1330	1400	1430				
AIAA-2010-0168 Turbulent Output- Based Anisotropic Adaptation M. Park, NASA Langley Research Center, Hampton, VA	AIAA-2010-0169 Anisotropic Adaptive Simulations in Aerodynamics A. Loseille, Center for Coputational Fluids Dynamics, George Mason University, Fairfax, VA	AIAA-2010-0170 Output- Driven Anisotropic Mesh Adaptation for Viscous Flows Using Discrete Choice Optimization M. Ceze, University of Michigan, Ann Arbor, MI	AIAA-2010-0171 Feature- Driven Adaptive Mesh Refinement in the Helios Code S. Kamkar, Stanford University, Stanford, CA				

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Session 273-PC-18 — **Chemical Kinetics** — **Los Angeles**

Chaired by: F. GOULDIN, Cornell University, Ithaca, NY, and R. ANTHENIEN, Army Research Office, Research Triangle Park, NC

1300	1330	1400	1430	1500			
AIAA-2010-1511 The Oxidative Cracking of Hydrocarbon Fuels W. Tsang, National Institute of Standards and Technology, Gaithersburg, MD	AIAA-2010-1512 Ignition and Oxidation of Ethylene- Air Mixtures at Elevated Pressures M. Kopp, Texas A&M Univversity, College Station, TX	AIAA-2010-1514 Alkane Kinetics Reduction Consistent with Turbulence Modeling using Large Eddy Simulation K. Harstad, Jet Propulsion Laboratory, Pasadena, CA	AIAA-2010-1515 A Study on Detonation of Jet- A Using a Reduced Mechanism K. Ajmani, ASRC Aerospace, Cleveland, OH	AIAA-2010-1516 Soot Modeling in Partially Premixed C2H4/Air Flames T. Blacha, German Aerospace Center (DLR), Institute of Combustion Technology, Stuttgart, Germany			

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Session 274-PC-19 — **Combustion Instabilities** — **Denver**

Chaired by: D. TALLEY, U.S. Air Force Research Laboratory, Palmdale, CA, and J. DELAAT, NASA Glenn Research Center, Cleveland, OH

1300	1330	1400	1430	1500	1530		
AIAA-2010-1517 Thermoacoustic Instability in Solid Rocket Motor: Non-Normality and Nonlinear Instabilities S. Mariappan, Indian Institute of Technology, Madras, Chennai, India	AIAA-2010-1518 Modeling Combustion Instability in Small MMH-NTO Liquid Rocket Engines Using CFD: Injector- Chamber Coupling M. Nusca, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD	AIAA-2010-1519 Time Delay and Noise Coupling in Limiting Control Effectiveness in Unstable Combustors J. Crawford, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-1522 On the Flame and Vorticity Characteristics of a Fluidically Stabilized Premixed Turbulent Flame D. Forliti, State University of New York, Buffalo, Buffalo, NY	AIAA-2010-1523 Simulation of Acoustically Forced H2-O2 Shear- Coaxial Model Injector D. Gers, University of Maryland, College Park, MD	AIAA-2010-1524 Instability Suppression in a Swirl- Stabilized Combustor Using Microjet Air Injection Z. LaBry, Massachusetts Institute of Technology, Cambridge, MA		

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Session 275-PC-20 — **Practical Aspects of Combustor Design** — **New Orleans**

Chaired by: I. LEYVA, U.S. Air Force Research Laboratory, Edwards AFB, CA, and E. LYNCH, Pratt & Whitney, A United Technologies Company, Canoga Park, CA

1300	1330	1400	1430	1500	1530		
AIAA-2010-1525 Turbulence- Chemistry Interaction and Heat Transfer Modeling of H2/O2 Gaseous Injector Flows E. Sozer, University of Michigan, Ann Arbor, MI	AIAA-2010-1526 Supersonic Mixing Enhancement and Optimization Using Fin-Guided Fuel Injection C. Aguilera, University of Maryland, College Park, MD	AIAA-2010-1527 Asymmetric Injector Distribution for Passive Control of Liquid Rocket Engine Combustion Instabilities J. Bennewitz, Georgia Institute of Technology, Atlanta, GA	AIAA-2010-1529 On Initiating 3rd Generation of Correlations for Gaseous Emissions of Aero- Propulsion Engines H. Mongia, Purdue University, West Lafayette, IN	AIAA-2010-1530 Correlations for Gaseous Emissions of Aero- Propulsion Engines from Sea- Level to Cruise Operation H. Mongia, Purdue University, West Lafayette, IN	AIAA-2010-1532 Combustion in a Ramjet Combustor with Cavity Flame Holder O. Tuncer, Istanbul Technical University, Istanbul, Turkey		

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Session 276-PDL-16 — **Reentry Plasmas** — **Grand Ballroom 1**

Chaired by: R. MILES, Princeton University, Princeton, NJ, and S. BOBASHEV, Russian Academy of Sciences, Saint Petersburg, Russia

1300 AIAA-2010-1534 Simulation of Magnetic Field Impact on Wall Heat Flux in Plasma Flows S. Bobashev, Russian Academy of Sciences, Saint Petersburg, Russia	1330 AIAA-2010-1535 Thermochemical Nonequilibrium Flow Computation of Drag Reduction by Pulsed Laser M. Tate, Tohoku University, Sendai, Japan	1400 AIAA-2010-1536 Effects of Water Vapor Presence in Martian Atmospheric Entry Plasma D. Drake, Old Dominion University, Norfolk, VA	1430 AIAA-2010-1537 Effects of a Conducting Sphere Moving Through a Gradient Magnetic Field A. Giffin, Princeton University, Princeton, NJ	1500 AIAA-2010-1538 Simulations of Thermal Phenomena in Nanosecond Pulsed Plasma Discharges in Supersonic Flow D. Breden, University of Texas, Austin, Austin, TX			

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Session 277-SOS-2 — **Public Safety in Launch and Reentry Operations** — **Grand Ballroom 13**

Chaired by: D. MURRAY and E. GONZALES, Federal Aviation Administration, Washington, DC

1300 AIAA-2010-1540 FAA's Approaches to Ground and NAS Separation Distances for Commercial Rocket Launches E. Gonzales, Federal Aviation Administration, Washington , DC	1330 AIAA-2010-1541 Application of Kernel Density Estimation to Impact Probability Density Determination for Risk Analysis E. Larson, ACTA, Torrance, CA	1400 AIAA-2010-1542 Aircraft Protection Standards and Implementation Guidelines for Range Safety P. Wilde, FAA, Washington , DC	1430 AIAA-2010-1543 A Safe Explosive Site Plan for Suborbital RLVs D. Nolek, Reynolds, Smith & Hills, Inc., Merritt Island, FL	1500 AIAA-2010-1544 Risk Considerations for Random Reentry of Space Debris S. Millard, Federal Aviation Administration, Washington, DC			

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Session 278-SRU-3 — **Unit Operations in Lunar Resource Extraction** — **Atlanta**

Chaired by: D. LINNE, NASA Glenn Research Center, Cleveland, OH, and L. SIBILLE, ASRC Aerospace Corporation, Huntsville, AL

1300 AIAA-2010-1546 Heating- Rate Coupled Model for Hydrogen Reduction of JSC- 1A U. Hegde, National Center for Space Exploration Research, Cleveland, OH	1330 AIAA-2010-1547 Evolution of Regilith Feed Systems for Lunar ISRU O2 Production Plants R. Mueller, NASA Kennedy Space Center, Cape Canaveral, FL	1400 AIAA-2010-1548 Lunar Underground Mining and Construction: A Terrestrial Vision Enabling Space Exploration and Commerce G. Baiden, Penguin ASI, Sudbury, Canada	1430 AIAA-2010-1549 Effect of Regolith Compaction on Ripping Efficiency M. Iai, Missouri University of Science and Technology, Rolla, MO	1500 Oral Presentation Performance Testing of Molten Regolith Electrolysis and Transfer of Molten Material for Oxygen and Metals Production on the Moon L. Sibille, ASRC Aerospace Corporation, Cape Canaveral, FL	1530 AIAA-2010-1551 Creating Methane from Plastics: Recycling at a Lunar Outpost J. Captain, NASA Kennedy Space Center, Cape Canaveral, FL	1600 AIAA-2010-1552 Self- Contained and Self- Powered Condensation System for Reclamation of Water from Lunar Regolith Processing P. Sforza, University of Florida, Gainesville, FL	

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Thursday Afternoon / 07 January 2010

Session 280-TP-19 — High Speed Flows — Crystal Ballroom Q

Chaired by: R. GOSSE, U.S. Air Force Research Laboratory, Beavercreek, OH, and X. ZHONG, University of California, Los Angeles, Los Angeles, CA

1300	1330	1400	1430	1500	1530	1600	1630
AIAA-2010-1557 On the (In)Validation of a Thermochemical Model with EAST Shock Tube Radiation Measurements K. Miki, The University of Texas, Austin, Austin, TX	AIAA-2010-1558 Investigation of the Interactions of Reaction Control Systems with Mars Science Laboratory Aeroshell E. Reed, University of Virginia, Charlottesville, VA	AIAA-2010-1559 Experimental Investigation of Helium Injection in a Hypersonic Turbulent Boundary Layer D. Sahoo, Princeton University, Princeton, NJ	AIAA-2010-1560 Stabilized Finite Element Scheme for High Speed Flows with Chemical Non-Equilibrium S. Bova, Sandia National Laboratories, Albuquerque, NM	AIAA-2010-1561 Simulation of Flow Separation and Reattachment on a Re-Entry Capsule Afterbody Frustum K. Sinha, Indian Institute of Technology, Bombay, Mumbai, India	AIAA-2010-1562 Numerical and Experimental Characterization of High Enthalpy Flow in an Expansion Tunnel Facility M. MacLean, CUBRC, Buffalo, NY	AIAA-2010-1563 WITHDRAWN Development of a Pilot Model of Hypersonic Rarefied Wind- Tunnel K. Fujita, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	AIAA-2010-1564 Characterization of the New LENS Expansion Tunnel Facility A. Dufrene, CUBRC, Buffalo, NY

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Session 281-TP-20 — Non-Equilibrium Flows II — Crystal Ballroom E

Chaired by: E. JOSYULA, U.S. Air Force Research Laboratory, Wright-Patterson AFB, OH

1300	1330	1400	1430	1500			
AIAA-2010-1566 Expansion Tube Investigation of Shock Stand- Off Distances in High- Enthalpy CO2 Flow Over Blunt Bodies M. Sharma, University of Illinois, Urbana, IL	AIAA-2010-1567 Development of a Mach 5 Nonequilibrium Wind Tunnel M. Nishihara, Ohio State University, Columbus, OH	AIAA-2010-1568 Influences of Molecular Rotation on Vibrational Kinetics and Dissociation of N2 K. Fujita, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	AIAA-2010-1569 Evaluation of a Hybrid Boltzmann- Continuum Method for High Speed Nonequilibrium Flows J. Burt, University of Michigan, Ann Arbor, MI	AIAA-2010-1570 Analysis of Chemistry-Vibration Coupling in Diatomics for High Enthalpy Nozzle Flows S. Doraiswamy, University of Minnesota, Minneapolis, MN			

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Session 282-TP-21 — Orbiter Entry Aerothermo Flight Experiments: Ground Testing and Analyses — Crystal Ballroom F

Chaired by: E. RESHOTKO, Case Western Reserve University, Cleveland, OH, and S. SCHNEIDER, Purdue University, West Lafayette, IN

1300	1330	1400	1430	1500	1530	1600	1630
AIAA-2010-1571 Orbiter BLT Flight Experiment Wind Tunnel Simulations: Nearfield Flowfield Imaging and Surface Thermography P. Danehy, NASA Langley Research Center, Hampton, VA	AIAA-2010-1572 Numerical Computations of Hypersonic Boundary-Layer over Surface Irregularities C. Chang, NASA Langley Research Center, Hampton, VA	AIAA-2010-1573 Simulations of High-Speed Flow Over an Isolated Roughness S. Yoon, NASA Ames Research Center, Moffett Field, CA	AIAA-2010-1574 Roughness- Induced Instability in a Laminar Boundary Layer at Mach 6 B. Wheaton, Purdue University, West Lafayette, IN	AIAA-2010-1575 LLaminar- Turbulent Transition behind Discrete Roughness Elements in a High-Speed Boundary Layer M. Choudhari, NASA Langley Research Center, Hampton, VA	AIAA-2010-1576 Experimental Studies of Space Shuttle Orbiter Boundary Layer Transition at Mach Numbers from 10 to 18 T. Wadhams, CUBRC, Buffalo, NY	AIAA-2010-1577 Transition Induced by Fence Geometries on Shuttle Orbiter at Mach 10 J. Everhart, NASA Langley Research Center, Hampton, VA	AIAA-2010-1578 Boundary Layer Transition Protuberance Tests at NASA JSC Arc-Jet Facility M. Larin, Jacobs Technology, Houston, TX

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Session 283-WE-8 **Wind Turbine Design and Loads** **Crystal Ballroom G2**

Chaired by: T. ASHWILL, Sandia National Laboratories, Albuquerque, NM, and C. CRAWFORD, University of Victoria, Victoria, Canada

1300 AIAA-2010-1579 The Influence of Blade Curvature and Helical Blade Twist on the Performance of a Vertical- Axis Wind Turbine F. Scheurich, University of Glasgow, Glasgow, Great Britain	1330 AIAA-2010-1580 Estimation of Wind Turbine Blade Forces with a State- Augmented Kalman Filter J. Berg, New Mexico Institute of Mining and Technology, Socorro, NM	1400 AIAA-2010-1581 Assessment of Load Extrapolation Methods for Wind Turbines H. Toft, Aalborg University, Aalborg, Denmark	1430 AIAA-2010-1582 Development of the Sweep- Twist Adaptive Rotor (STAR) Blade T. Ashwill, Sandia National Laboratories, Albuquerque, NM	1500 AIAA-2010-1583 The Impact of Airfoil Selection on the Design of Small Horizontal Axis Wind Turbines B. Kanya, Clarkson University, Potsdam, NY	1530 AIAA-2010-1585 Experimental and Numerical Studies of a High Solidity, Low Tip Speed Ratio DAWT M. Moeller, Clarkson University, Potsdam, NY		

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Session 284-WIG-9 / PDL-17 **Plasma Kinetics and Surface Discharges** **Grand Ballroom 2**

Chaired by: S. LEONOV, Russian Academy of Sciences, Moscow, Russia, and J. TISHKOFF, U.S. Air Force Office of Scientific Research, Arlington, VA

1300 AIAA-2010-1586 Mechanisms of Kinetic Combustion Enhancement by O2(a1(delta)g) T. Ombrello, U.S. Air Force Research Laboratory, Propulsion Directorate, Wright-Patterson AFB, OH	1330 AIAA-2010-1587 Surface Discharges: Possible Applications for Plasma- Assisted Ignition and Electric Field Measurements S. Starikovskaia, École Polytechnique, Palaiseau Cedex, France	1400 AIAA-2010-1588 Cracking of Selected Hydrocarbon Gases in Low- Power, Low-Pressure rf Plasma C. Jiao, UES, Inc., Dayton, OH	1430 AIAA-2010-1589 On Pulsed Discharge in Humid Air V. Bychkov, M.V. Lomonosov Moscow State University, Moscow, Russia	1500 AIAA-2010-1590 Kinetics of Low-Temperature Hydrogen Oxidation and Ignition by Repetitively Pulsed Nonequilibrium Plasmas I. Choi, Ohio State University, Columbus, OH	1530 AIAA-2010-1592 Discharges Over a Surface of Liquid Hydrocarbons V. Bychkov, M.V. Lomonosov Moscow State University, Moscow, Russia	1600 AIAA-2010-1593 Kinetics of Plasma Assisted Combustion at Low Reduced Electric Fields A. Starikovskii, Drexel University, Philadelphia, PA	