

7th AIAA Atmospheric and Space Environments Conference 2015

Held at the AIAA Aviation Forum 2015

**Dallas, Texas, USA
22-26 June 2015**

ISBN: 978-1-5108-0817-1

Printed from e-media with permission by:

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



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

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers. Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at 1801 Alexander Bell Drive, Reston, VA 20191, USA.

TABLE OF CONTENTS

NUMERICAL WEATHER PREDICTION (INVITED)

Challenges and Opportunities in Modeling of the Global Atmosphere (AIAA 2015-2888)	1
<i>Zavisa Janjic, Vladimir Durdevic, Ratko Vasic, Tom Black</i>	
Well-Balanced Formulation of Gravitational Source Terms for Conservative Finite-Difference Atmospheric Flow Solvers (AIAA 2015-2889)	11
<i>Debojyoti Ghosh, Emil M. Constantinescu</i>	
Use of Numerical Weather Prediction Models for NextGen ATC Wind Impact Studies (Invited) (AIAA 2015-2890)	27
<i>Seth Troxel, Tom Reynolds</i>	
Simulations of Orographic Flows Using Unstructured and Structured Meshes (Invited) (AIAA 2015-2891)	43
<i>Joanna Szmelter, Piotr K. Smolarkiewicz, Andrzej A. Wyszogrodzki</i>	

AIRCRAFT ICING AND ATMOSPHERIC HAZARDS

A Model for In-flight Ice Accretion Based on the Exact Solution of the Unsteady Stefan Problem (AIAA 2015-3019)	49
<i>Giulio Gori, Marta Zocca, Alberto Guardone, Gianluca Parma</i>	
Quasi-Unsteady Icing Simulation of an Oscillating Airfoil (AIAA 2015-3020)	68
<i>Habibollah Fouladi, Cristhian N. Aliaga, Wagdi G. Habashi</i>	
Convective Enhancement of Icing Roughness Elements in Stagnation Region Flows (AIAA 2015-3021)	79
<i>Michael T. Hughes, Stephen T. McClain, Mario M. Vargas, Andy P. Broeren</i>	
Sensor Suite Development for a Weather UAV (AIAA 2015-3022)	95
<i>Alyssa S. Avery, Jacob D. Hathaway, Jamey D. Jacob</i>	
Sensitivity Analysis of Wake Vortex Parameters Measured by Doppler Lidar (AIAA 2015-3023)	108
<i>Takashi Misaka, Shigeru Obayashi, Anton Stephan, Frank N. Holzäpfel, Thomas Gerz</i>	

AIRCRAFT WAKE TURBULENCE I (INVITED)

Use of Simple Models to Determine Wake Vortex Categories for New Aircraft (Invited) (AIAA 2015-3172)	119
<i>James N. Hallock, George C. Greene, Jeffrey Tittsworth, Paul Strande, Frank Y. Wang</i>	
Multi-Model Ensemble Wake Vortex Prediction (Invited) (AIAA 2015-3173)	130
<i>Stephan Koerner, Nashat N. Ahmad, Frank N. Holzäpfel, Randal L. Vanvalkenburg</i>	
Wind Impact on Single Vortices and Counter-Rotating Vortex Pairs in Ground Proximity (Invited) (AIAA 2015-3174)	152
<i>Frank N. Holzäpfel, Nikola Tchipev, Anton Stephan</i>	
Sensitivity Analysis of Aircraft Encounters with Deformed Wake Vortices (Invited) (AIAA 2015-3175)	165
<i>David Bieniek, Robert Luckner</i>	
Assessment of WakeMod 4: A New Standalone Wake Vortex Algorithm for Estimating Circulation Strength and Position (Invited) (AIAA 2015-3176)	195
<i>Don Jacob, David Y. Lai, Matthew J. Pruis, Donald P. Delisi</i>	
Observations of Wake Vortices from Upward Looking Pulsed Doppler Lidar Data (Invited) (AIAA 2015-3177)	206
<i>Matthew J. Pruis, Donald P. Delisi, Don Jacob</i>	

AIRCRAFT WAKE TURBULENCE II (INVITED)

Effect of Atmospheric Sheets and Layers Near the Ground on Wake Vortex Transport and Decay (Invited) (AIAA 2015-3315)	218
<i>Matthew J. Pruis, Donald P. Delisi, Don Jacob</i>	

Fast-time Wake Vortex Model Predictions Compared with Observations Behind Landing Aircraft Near the Ground (Invited) (AIAA 2015-3316)	225
<i>Matthew J. Pruis, Donald P. Delisi, Don Jacob, David Y. Lai</i>	
Wind and EDR Measurements with Scanning Doppler LIDARs for Preparing Future Weather Dependent Separation Concepts (Invited) (AIAA 2015-3317)	241
<i>Ludovic P. Thobois, Raghavendra Krishnamurthy, Sophie Loaec, Jean Pierre Cariou, Agnès Dolfi-Bouteyre, Mathieu Valla</i>	
Evaluation of Fast-Time Wake Models using Denver 2006 Field Experiment Data (AIAA 2015-3318)	254
<i>Nashat N. Ahmad, Matthew J. Pruis</i>	
Aerodynamic Simulation of Wake Encounter for Aircraft Close Formation Operations (Invited) (AIAA 2015-3319)	263
<i>Anpeng He, Z Charlie Zheng</i>	

ATMOSPHERIC AND SPACE ENVIRONMENTS

Lightning Protection for the Orion Space Vehicle (AIAA 2015-3320)	271
<i>Robert C. Scully</i>	
Advanced Spacecraft Systems Emulation for Space Environment Qualification Testing (AIAA 2015-3321)	281
<i>Hildebrand A. Rumann</i>	
Investigation of the Impact of Surface Blending and Ultraviolet Radiation Exposure on Elastomer Seal Leak Rate Performance for Space Seal Applications (AIAA 2015-3322)	285
<i>Shawn C. Taylor, Janice Mather, Christopher C. Daniels</i>	
Elastomer Seal Performance after Terrestrial Ultraviolet Radiation Exposure (AIAA 2015-3323)	296
<i>Christopher C. Daniels, Janice Mather, Heather A. Oravec, Shawn C. Taylor, Patrick H. Dunlap</i>	
Ride Quality Within Trail Aircraft In Formation Flight (AIAA 2015-3325)	305
<i>Wendy Okolo, Atilla Dogan, William Blake</i>	
Mathematical Modelling for Carbon Dioxide Equivalent Prediction of Greenhouse Gases Emitted from a Small Scale Turbojet Engine (AIAA 2015-3326)	320
<i>Yasin Söhret, Tahir H. Karakoc, Nimet Karakoç</i>	
Author Index	