

# **24th Space Simulation Conference 2006**

**Annapolis, Maryland, USA  
6-9 November 2006**

**ISBN: 978-1-62276-947-6**

**Printed from e-media with permission by:**

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



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

Copyright© (2006) by IEST  
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact IEST  
at the address below.

IEST  
Arlington Place One  
2340 South Arlington Heights Road, Suite 100  
Arlington Heights, IL 60005-4516

Phone: (847) 981-0100  
Fax: (847) 981-4130

[iest@iest.org](mailto:iest@iest.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## SESSION 1 – DATA ACQUISITION AND ANALYSES

|   |    |
|---|----|
| <b>Educating New Engineers and Technicians in Environmental Testing</b> ..... | 1  |
| <i>Marc Lamparelli</i>  |    |
| <b>Goddard Space Flight Center’s Dynamic Analysis Software</b> .....          | 19 |
| <i>Christopher McLeod</i>   |    |
| <b>Calibration of a Large Channel Count Data Acquisition System</b> .....     | 36 |
| <i>Jim Fallon, Eric Olson</i>   |    |

## SESSION 2 – CONTAMINATION

|   |     |
|---|-----|
| <b>Ground Simulation Studies of Outgassing Parameters for Commercially Available Black Paints</b> ..... | 55  |
| <i>Alex Laikhtman, Ronen Verker, Yoram Noter, Eitan Grossman, Irina Gouzman</i>                         |     |
| <b>Investigation of Organic Molecule Kinetics in Thermal Vacuum Environment</b> .....                   | 79  |
| <i>Hideki Saruwatari, Naoko Baba, Mikio Saitoh</i>  |     |
| <b>QTGA Analysis with Concurrent Deposition</b> (oooooooooooooooooooo).....0.....                       | 100 |
| <i>David W. Hughes</i>  |     |

## SESSION 3 – NEW CAPABILITIES AND FACILITIES

|  |     |
|--|-----|
| <b>Pan &amp; Tilt Platform for a Thermal Vacuum Video Camera</b> .....                                 | 116 |
| <i>Yan Lui</i>   |     |
| <b>GN<sub>2</sub> Vaporizer</b> .....  | 136 |
| <i>William R. Bond</i>   |     |
| <b>The Space Systems Test Facility at Arnold Engineering Development Center</b> .....                  | 144 |
| <i>Dustin Crider, Heard Lowry, Randy Nicholson, John Prebola, Albert Dawbarn</i>                       |     |
| <b>Modernizing Older Thermal/Vacuum Test Facilities</b> .....  | 157 |
| <i>Chris Martin, Paul Calvi, Bill Wilkinson</i>  |     |
| <b>The Good, the Bad and the Toasty in New Facilities</b> .....  | 181 |
| <i>Andrew T. Webb</i>  |     |
| <b>Cryogenic Test Capability at Marshall Space Flight Center’s X-Ray Cryogenic Test Facility</b> ..... | 202 |
| <i>Jeff Kegley, Mark Baker, Jay Carpenter</i>  |     |
| <b>Development of a Plasma Chamber for Solar Panel Testing</b> .....                                   | 220 |
| <i>Masashi Miyamoto, Mikio Saitoh, Kumi Nitta</i>  |     |

## SESSION 4 – THERMAL VACUUM TESTING

|   |     |
|---|-----|
| <b>Measurement of the New Horizons High Gain Antenna during Thermal/Vacuum testing using Photogrammetry</b> ..... | 244 |
| <i>John Troll</i>   |     |
| <b>New IR Technology Used During Radarsat-2 Thermal Testing</b> .....   | 255 |
| <i>Chris Olsen, Alex Golob, Geoff Collins, Elie Choueiry</i>  |     |

## SESSION 5 – SIMULATIONS AND SPECIAL TOPICS

|  |     |
|--|-----|
| <b>Testing of the STEREO Spacecraft Solar Array Subsystem: Engineering Model Testing to Spacecraft Integration</b> ..... | 274 |
| <i>Jennifer R. Tanzman</i>   |     |
| <b>Science Technology 5 Spacecraft Level Testing Utilizing the Renovated Goddard Magnetic Test Facility</b> .....        | 312 |
| <i>Todd Bonalsky</i>   |     |
| <b>Variable Gravity Simulation by Maglev</b> .....   | 335 |
| <i>Yuanming Liu, Donald Strayer, Shawna Hollen, Charles Hays, Jason Zan, Eri J. Cohen</i>                                |     |
| <b>Comparison of Surface Operation Temperatures to Prelaunch Testing Results for Mars Exploration Rovers</b> .....       | 344 |
| <i>Alan R. Hoffman, Christine T. Farguson, Kin F. Man, Charles D. Porter, Keith S. Novak</i>                             |     |

## SESSION 6 – STRUCTURAL DYNAMICS TESTING

|  |     |
|--|-----|
| <b>Extending the Qualification Limits of the General Purpose Heat Source - Radioisotope Thermoelectric Generator (GPHS-RTG) for the New Horizons Mission</b> ..... | 366 |
| <i>Edward D. Schaefer, Douglas S. Mehoke, Hadi Navid</i>   |     |
| <b>HST Super Light Weight Interchangeable Carrier (SLIC) Tiger Team Coupon Combined Thermal/Pull Test Design</b> .....   | 394 |
| <i>William V. Chambers</i>   |     |
| <b>Vacuum Testing Goddard’s Mass Properties Measurement System</b> .....   | 412 |
| <i>Christopher McLeod, Onur Atabek</i>   |     |
| <b>The Third Dimension of Random Vibration Control</b> .....   | 427 |
| <i>John Van Baren, Philip Van Baren</i>  |     |
| <b>Modal Correlation of the Solar Terrestrial Relations Observatory</b> .....  | 469 |
| <i>Teresa M. Betenbaugh</i>  |     |
| <b>Mechanical Verification of the Solar TERrestrial RELations Observatory High Gain Antenna</b> .....  | 496 |
| <i>Teresa M. Betenbaugh</i>  |     |
| <b>Novel Guided Head Expander Design Uses Close Coupled Inertial Masses And Hydrostatic Bearings To Minimize Cross Axis Motion</b> .....                           | 525 |
| <i>Douglas Lund, Robert Crawford</i>   |     |
| <b>Author Index</b>  |     |