Aerospace Testing Seminar

"Effective Testing for Mission Success"

Program

Sheraton Gateway Hotel, Los Angeles
March 29 – 31, 2011

TUTORIALS: MONDAY, MARCH 28

7:00 Registration and Continental Breakfast

8:00 Full-Day Sessions Part I (8:00–11:30 a.m.) and Part II (1:00–4:30 p.m.)

Software Testing, Parts I and II
D. J. Buettner and S. Eslinger, The Aerospace Corporation

Test Like You Fly (TLYF), Parts I and II
J. White and L. Tilney, The Aerospace Corporation

Keys to Space Vehicle Integration and Testing, Parts I and II
B. Arnheim, The Aerospace Corporation and
C. Belsick, Lockheed Martin Space Systems Company

8:00 Morning Sessions (8:00–11:30 a.m. with a break at 9:35 a.m.)

Force Limiting Vibration Testing
T. Scharton and A. Kolaini, NASA Jet Propulsion Laboratory, California Institute of Technology

Pyroschock Testing
V. Bateman, Mechanical Shock Consulting

Applied High Frequency Structural Dynamics, Shock and Acoustics
R. Foss, Lockheed Martin Space Systems Company

9:35 BREAK

11:30 LUNCH (on your own)

1:00 Afternoon Sessions (1:00–4:30 p.m. with a break at 2:35 p.m.)

Detecting, Retaining, and Preventing Failures
B. Sande, Lockheed Martin Space Systems Company

Introduction to MIL-STD-1540E, *Test Requirements for Launch, Upper-stage and Space Vehicles, Rev B*
J. Snyder and A. Peterson, The Aerospace Corporation

Thermal Testing and Verification
J. Welch, The Aerospace Corporation

2:35 BREAK

4:30 Tutorials Conclude

6:30 Speakers Dinner (5:30 p.m. cocktail reception on patio)

8:00 Presenter's Meeting—Recap of Logistics

TUESDAY, MARCH 29

7:00 Registration and Continental Breakfast

8:00 Welcome/Opening Remarks
Erwin Perl, The Aerospace Corporation

Keynote Introduction
Dr. Wanda Austin, President and CEO, The Aerospace Corporation

Keynote Speaker
Col. Joan Sandene, Acting Vice Commander, U.S. Air Force, Space and Missile Systems Center

8:35 BREAK

9:00 TRACK A
SESSION 1: Test Effectiveness and Standards

***Status of DOD Specs and Standards**
D. Davis, Space and Missile Systems Center

Status of a NASA Standard and Three NASA Handbooks
D. Kern, NASA Jet Propulsion Laboratory, California Institute of Technology

JAXA Test Standard Reconstruction Activity
H. Uchikawa, S. Qinzhong, Japan Aerospace Exploration Agency (JAXA)

10:20 BREAK

*not included in proceedings.

10:35 Improvements in the European Testing Standard (E-ST-10-03)
P. Giordano, Thales Alenia Space Italia SpA; D. Pin, Thales Alenia Space France; R. Jegou, European Space Agency

Test Effectiveness of SMC-S-016 Unit Acceptance Thermal Testing
C. Wright, The Aerospace Corporation

Verification of the Thermal Uncertainty Margin from Comparison of Flight Temperature with Predicted Temperature
M. Ando, Japan Aerospace Exploration Agency (JAXA)

9:00 TRACK B
SESSION 2: Strategies and Methodologies

The Taxonomy and Allocation of Testbeds and Simulators in the Successful Space Vehicle Program
M. Horner, Ball Aerospace and Technologies Corporation; M. Phillips, Lockheed Martin Space Systems Company; T. Metodi, The Aerospace Corporation, M. Amirriazi, Lockheed Martin Space Systems Company; A. Weichbrod, Northrop Grumman Aerospace Systems; K. Pryor, Orbital Sciences Corporation; D. Gianetto, Raytheon Space and Airborne Systems; K. Suh, The Boeing Company; D. Wangerin, The Aerospace Corporation

Testing of a Single Shaft Turbopump
R. Grabowski, Pratt and Whitney Rocketdyne

[*] **Characterization of Turbine High Frequency Rotor Blade Resonance and Associated Critical Speed (Presentation Only)**
R. Foss, Jr., Lockheed Martin Space Systems Company

10:20 BREAK

10:35 Test Considerations for Hardware Refresh Projects
C. Murphy, Raytheon Systems Company

Pleiades Mechanical and Thermal Qualification and Acceptance Tests
S. Mary, R. Redondo, J. Gayrard, CNES, France

[*] not included in proceedings.

*Command, Control and Telemetry—Verification and Validation for Mission Success (Presentation Only)**
D. Balderston, The Aerospace Corporation

11:50 LUNCH

12:50 Otto Hamberg Best Paper Award—25th ATS Winner:
Effective Data Validation Methodology for Pyrotechnic Shock Testing
Charles P. Wright, The Aerospace Corporation

1:00 Keynote Introduction
Anthony Pirozzi, The Boeing Company

Keynote Address
Marshall Short, Vice President of Lab Test Operations, The Boeing Company

1:30 BREAK

1:50 TRACK A
SESSION 1: Test Effectiveness and Standards (cont'd)

MIL-STD-1540E Thermal Test Requirement Rationale as Specified in MIL-HDBK-340
J. Welch, The Aerospace Corporation

MATED—The User's Perspective
O. Brunner, European Space Agency, The Netherlands

MATED Recent Project Feedback and Lessons Learned for the Next Challenges
P. Messidoro, M. Pasquinelli, V. Basso, S. Voglino
Thales Alenia Space Italia S.p.A., Turin, Italy

Evolution of Complexity Index Methodology for a Preliminary Assessment The Test Philosophy at System Level
M. Pasquinelli, P. Messidoro, V. Basso, S. Voglino
Thales Alenia Space Italia, Turin, Italy and Paolo Maggiore, Politecnico di Torino, Turin, Italy

3:35 BREAK

*not included in proceedings.

3:55 SESSION 3: Test and People Management (TRACK A)

Optimal Planning in End-to-End Testing of System-of-Systems Interoperability
B. V. Le, Space and Naval Warfare Systems Center Pacific
T. V. Huynh, Naval Postgraduate School

AIT Management of a Multi-National, Multi-Cultural Team
C. Schlosser, Astrium GmbH, Munich, Germany

Spacecraft Testing Programs: Adding Value to the Systems Engineering Process
K. J. Britton, NASA, Kennedy Space Center
D. M. Schaible, NASA, Langley Research Center

TRACK B
SESSION 2: Strategies and Methodologies (cont'd)

1:50 The Assembly, Integration and Test Approach of the Intermediate eXperimental Vehicle (IXV) Re-entry Demonstrator
V. Ancona, Thales Alenia Space Italia S.p.A, Strada Antica di Collegno 253,
J. M. G. Sanz, ESA, Policy and Future Programmes Department, Headquarters,

Statistically-based Test Optimization
N. Mackertich and P. Kraus, Raytheon Integrated Defense Systems

2:40 TRACK B
SESSION 4: Instrumentation, Data Acquisition, and Evaluation

Detection of Data Corruption by Out-of-Band Noise Using Higher Order Spectral Analysis
T. S. Edwards, Sandia National Laboratories

3D Reconstruction of Thermal Images
L. Acampora, SUN, Second University of Naples, Aversa, Italy; F. De Filippis,
A. Martucci, L. Sorgi, CIRA, Italian Centre of Aerospace Research, Capua, Italy

3:35 BREAK

Shape Measurement and Control of an Active Panel Under Thermal Loads
S. C. Bradford, G. S Agnes, Ari P Miller; NASA Jet Propulsion Laboratory, California Institute of Technology; and W. K. Wilkie, NASA Langley Research Center

Measuring Fluctuating Pressure Levels and Vibration Response in a Jet Plume
D. J. Osterholt, D. M. Knox, ATA Engineering, Inc., San Diego, California

Trained Network Force Measurement Approach for Aircraft/Store Interfaces
H. M. Matt, M. Schlosser, K. Napolitano, ATA Engineering, Inc.

WEDNESDAY, MARCH 30

7:00 Registration and Continental Breakfast

8:00 Welcome/Opening Remarks
Erwin Perl, The Aerospace Corporation

Keynote Introduction
Ed Strong, NASA

8:10 Keynote Speaker
Michael Ryschkewitsch, Chief Engineer, Headquarters NASA

8:20 Keynote Introduction
John Rehard, National Technical Systems

8:25 Keynote Speaker
Ken Bowersox, Vice President of Astronomy Safety and Mission Assurance, SpaceX

TRACK A
9:30 SESSION 5: Flight Software System Integration and Test

An Increase in Software Testing Robustness: Enhancing the Software Development Standard for Space Systems
K. L. Owens, S. Eslinger, The Aerospace Corporation

Development of Space Vehicle Integration Laboratory (SVIL)
M. J. Phillips and M. A. Dean, A. W. Jaynes, K. C. Payne, Lockheed Martin Space Systems Company

How to Estimate the Test Duration of Flight Software
D. Houston and M. Lieu, The Aerospace Corporation

10:50 BREAK

TRACK A (cont'd)
SESSION 5: Flight Software System Integration and Test

11:05 Applying the Rapid Application Development (RAD) Process to Satellite Payload Test Software
B. J. Johnson and A. Y. Lin, Boeing Space and Intelligence Systems

Calculation of Test Times to Qualify COTS Software for Space Systems in Accordance with Civil Aviation Standards
M. Hecht and E. Nguyen, The Aerospace Corporation

Utilizing Design of Experiments to Reduce IT System Testing Cost
K. M. Phadke and M. S. Phadke, Phadke Associates, Inc.

TRACK B

9:30 SESSION 6: Testing Challenges for Space Exploration

9:35 BREAK

Tailoring of ISS Verification Approach to Challenging Space System Commercial Initiatives such as CYGNUS PCM
P. Messidoro, M. Grande, F. Bandini, Thales Alenia Space Italia S.p.A., Torino, Italy

Testing Strategies and Methodologies for the Max Launch Abort System
D. M. Schaible, D. E. Yuchnovicz, NASA Engineering and Safety Center

Affordable Final Assembly and Test Facilities for the Orion Program at Kennedy Space Center Operations and Checkout Building
J. A. Stalder, R. M. DaSilva, Lockheed Martin Space Systems Company

10:50 BREAK

TRACK B
SESSION 6: Testing Challenges for Space Exploration (cont'd)

ExoMars Program Planetary Protection and Cleanliness and Contamination Requirements Implementation for System Testing Activities
S. Sferlazza, Assembly Integration and Test Competence Center, Thales Alenia Space Italia, Torino

Optical Tracking System (OTS) as ExoMars Test Support
V. Basso and G. L. Fava, Thales Alenia Space Italia S.p.A., Torino, Italy

ExoMars Mission Verification Approach
F. Gilardi and C. Cassi, Thales Alenia Space Italia, Torino, Italy
B. Bethge, European Space Agency, Noordwijk, The Netherlands

HTV Environmental Test Campaign
Hideaki Uchikawa, Tsutomu Fukatsu, Hiroshi Sasaki, HTV project team, Japan Aerospace Exploration Agency

12:45 LUNCH

1:45 Keynote Introduction
Kevin Zanellato, Orbital Sciences Corporation

1:50 Keynote Speaker
James Judd, Vice President, Orbital Sciences Corporation

2:10 Keynote Introduction
Laura Fechete, Space Systems Loral

2:15 Keynote Speaker
Eric Spittle, Vice President of U.S. Government Programs Acquisitions, Space Systems Loral

2:35 BREAK

3:00 SESSION 7: Ground Segment Test/TRACK A

Reducing the Risk During Requirements Verification
C. D. Kennell, Raytheon Company

Testing "Above" the Box
P. E. Farmer, Raytheon Company—Intelligence and Information Systems

3:55 BREAK

SESSION 7: Ground Segment Test/TRACK A (cont'd)

Applying Test Automation to Ground Station Control System Interfaces
M. E. Gray, Raytheon Company

There is COTS and Reuse Code in this System! How am I Going to Test That?
M. Whitney, Raytheon Company

Performing Verification Testing in a Virtual Computing Environment
K. P. Fertel, Raytheon Corporation

3:00 SESSION 8: Integrated Developmental and Operational Test and Evaluation
TRACK B

***Like You Fly Testing: Identifying, Assessing, and Allocating Candidate Tests**
J. White, The Aerospace Corporation

***Architecting and Designing Like You Fly Testing**
J. White, The Aerospace Corporation

3:55 BREAK

On-Orbit Radiation Characterization Approach For a Wide Field of View (WFOV) Sensor at GEO
R. Ewart, A. Levi, AF SMC/XR and R. Lowell, SAIC

***Space OT&E Model (SOTEM) (PRESENTATION ONLY)**
Lt. Col. L. Hamilton, Air Force Operational Test and Evaluation Center (AFOTEC), Kirtland Air Force Base, New Mexico

6:30 Interactive Technical Interchange
Posters and Vendor Displays

THURSDAY, MARCH 31

7:00 Registration and Continental Breakfast

8:00 Welcome/Opening Remarks
E. Perl, The Aerospace Corporation
D. Shelton, Lockheed Martin Space Systems

Keynote Introduction
E. Perl, The Aerospace Corporation

Keynote Address
C. Kunstadter, Sr. Vice President, Space XL Insurance

8:30 BREAK

*not included in proceedings.

8:35 Room breakdown—Software Test Workshop runs concurrently

9:00 TRACK A
SESSION 9: Modeling, Analysis, and Simulation

Analytical Modeling of the Acoustic Field during a Direct Field Acoustic Test
J. W. Rouse, M. Mesh, and E. C. Stasiunas, Sandia National Laboratories

Acoustic Testing of Flight Hardware Using Loudspeakers: How Much Do We Know About This Method of Testing?
A. R. Kolaini and D. L. Kern, NASA Jet Propulsion Laboratory, California Institute of Technology

Spatial Variability Caused by Acoustic Wave Interference in Single Drive Direct Field Acoustic Testing
M. B. Van Dyke and P. R. Peters, The Aerospace Corporation

Structure Acoustic Analysis and Comparison with Experimental Measurements
Z. Bo, K. C. Jiang, J. Mullen, J. Zaine, Space Systems/Loral

10:45 BREAK

9:00 TRACK B
SESSION 10: Innovations in Test Facilities and Equipment

Upgrade of ESA Large Space Simulator for Providing Mercury Environment
A. Popovitch, R. Messing, A. Tavares, S. Sablerolle, ESA/ESTEC

Space Propulsion Research Facility (B-2), an Innovative, Multi-Purpose Test Facility
G. M. Hill, H. F. Weaver, M. T. Kudlac, R. K. Evans, NASA Glenn Research Center at Plum Brook Station; and Christian T. Maloney, Gilcrest-TFOME, Plum Brook Station

Small Direct Field Acoustic Noise Test Facility
N. Saggini, D. Tiani, Environmental Test Facility Engineers, Thales Alenia Space Italia, Rome, Italy

MSI Instrument (ESA Sentinel-2): from the Diffuser Procurement until the Test Instrument at CSL
I. Domken, J.-Y. Plesseria, E. Mazy, L. Rossi, M.-L. Hellin, S. Marcotte, S.Liebecq, I. Tychon, E. Renotte, C. Grodent, M. Thomé, A. Cucchiaro., Centre Spatial de Liege,Université de Liège

10:45 BREAK

TRACK A
SESSION 9: Modeling, Analysis and Simulation (cont'd)

10:50 Issues Related to Large Flight Hardware Acoustic Qualification Testing
A. R. Kolaini, D. C. Perry, and D. L. Kern, NASA Jet Propulsion Laboratory, California Institute of Technology

Simplified Method to Predict the Diffused Acoustical Field Induced Vibration of a Spacecraft Panel Using the Joint Acceptance
K. Yanagase, H. Akagi, S. Ando, Q. Shi, Japan Aerospace Exploration Agency

Preliminary Evaluation of Mass Loaded Vehicle Panel Response Estimates and Approaches Based on Acoustic Ground Test Results
A. Smith and Philip Harrison, NASA/MSFC/EV31; B. LaVerde, ERC Inc./Jacobs ESTS Contract; R. Hunt, Triumph Aerospace/Jacobs ESTS Contract; D. Teague, Jacobs Engineering/Jacobs ESTS Contract

Simulation of Shock Response and its Mitigation of V-section Band Clamps by a Simplified Mode Based Model
Q. Shi and Y. Wada, Japan Aerospace Exploration Agency

10:45 BREAK

TRACK B
SESSION 10: Innovations in Test Facilities and Equipment

10:50 JWST Cryogenic Test Facility Development and Thermal Prototype Testing
M. B. Ryan, Northrop Grumman Aerospace Systems, Space Systems Division

Indirect Heating Method for Thermal Vacuum/Balance Test
S.-H. Lee, H. Cho, H.-J. Seo, G.-W. Moon, Korea Aerospace, Yuseong-Gu, Daejeon Research Institute; S.-Y. Yoo, Chung-Nam National University

The Development of the Acoustic Design of NASA Glenn Research Center's New Reverberant Acoustic Test Facility
W. O. Hughes, M. E. McNelis, A. D. Hozman, A. M. McNelis, NASA Glenn Research Center

The Role of Absorption in Reverberant Acoustic Test Facility Design
J. E. Manning, Cambridge Collaborative, Inc.

12:30 LUNCH

1:35 TRACK A

SESSION 9: Modeling, Analysis, and Simulation (cont'd)

Dynamic Characterization of a Pyrotechnic Shock Test Fixture
E. Heyd, United Launch Alliance; J. Czajkowski, National Technical Systems

Environmental Testing and Data Analysis for Non-Linear Spacecraft Structures
B. Peeters, R. Van der Vorst, J. Debille, S. Manzato, LMS International

A Parametric Testing Environment for Finding the Operational Envelopes of Simulated Guidance Algorithms
A. C. Barrett, Jet Propulsion Laboratory, California Institute of Technology

Modeling, Analysis and Simulation Approaches Used in Development of the National Aeronautics and Space Administration Max Launch Abort System
D. E. Yuchnovicz, C. J. Dennehy, D. M. Schuster, NASA Engineering and Safety Center

TRACK B

SESSION 10: Innovations in Test Facilities and Equipment (cont'd)

1:35 Cryogenic and Thermal Control for Vacuum Facilities Development in KARI
P. Jamotton, C. Grodent, M. Guiot, Centre Spatial de Liege (CSL) Université de Liège; G.-W. Moon, H. Cho, H.-J. Seo, S.-H. Lee, Korean Aerospace Research Institute

Faster, Cheaper, Better Vibration Testing
W. Tustin, Equipment Reliability Institute

[*]6 Degrees of Freedom Vibration Testing of Spacecraft and Launch Vehicles
T. Reilly and D. Snyder, Data Physics Corporation

CONFERENCE ADJOURNS

[*]not included in proceedings.