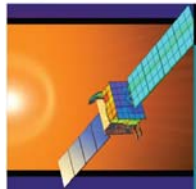


Spacecraft Thermal Control Workshop



Program

The Aerospace Corporation
El Segundo, Calif.
March 9–11, 2010

Tuesday, March 9

7:30 Registration and continental breakfast

8:30 Opening Remarks

Dr. Charles L. Gustafson
General Manager of the Vehicle Systems Division, The Aerospace Corporation

Dr. Tung T. Lam
Director, Spacecraft Thermal Department, The Aerospace Corporation

Session I: Technology Roadmaps

9:00 NASA/Goddard Thermal Control Technology Overview – 2010
Ted Swanson and Dan Butler, NASA/Goddard Space Flight Center

9:45 JPL Advanced Thermal Control Technology Roadmap – 2010
Gaj Birur and Jose Rodriguez, Jet Propulsion Laboratory

10:30 Break

10:45 Air Force Research Laboratory, Space Vehicles Directorate Thermal Control Technology Roadmap – 2010
Andy Williams, Air Force Research Laboratory

Session II: Advanced Analysis and Design

11:30 Thermal Control System for a Small, Extended Duration Lunar Surface Science Platform
David Bugby, ATK Space; Jeffery Farmer, Brian O'Conner, NASA Marshall Space Flight Center; Melissa Wirzburger, Elisabeth Abel, John Hopkins University Applied Physics Laboratory; Chuck Stouffer, ATK Space

12:00 Lunch on own

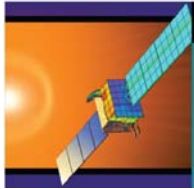
1:15 Integrated Thermal-Mechanical Architecture for Responsive Small Satellites
David Bugby, ATK Space; W. R. Zimbeck, Technology Assessment & Transfer, Inc.; J. C. Preble, SpaceWorks, Inc.; Edward Krolczek, B&K Engineering; Andy Williams, Air Force Research Laboratory

1:45 Thermal Design, Analysis and Testing of the Bepicolombo Laser Altimeter
Gabriele Messina, German Aerospace Center; Nicholas Thomas, University of Bern; Tilman Spohn, German Aerospace Center; Thomas Beck, University of Bern; Simone Del Torno, German Aerospace Center; Guillaume Deuchst, RUAG Space; Reinald Kallenbach, Max Planck Institute for Solar System Research; Boris Trefzger, Carl Zeiss Optronics; Riccardo Nadalini, Active Space Technologies

2:15 Venus Lander Thermal Technology Developments
Mike Pauken, Jet Propulsion Laboratory

2:45 Break

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Tuesday, March 9 (continued)

- 3:00 ST7 DRS Sensor Design Assembly Thermal Design and Analysis
Stuart Clark, Jet Propulsion Laboratory
- 3:30 Thermal Designs of Similar UV/VIS Spectrometers on Two Different Missions: O/OREOS and LADEE
Cassandra Allison, Millan Diaz-Aquado, NASA Ames Research Center
- 4:00 Thermal Control of Small Spacecraft at NASA Ames Research Center
Millan Diaz-Aguado, Cassandra Allison, NASA Ames Research Center
- 4:30 Adjourn

Wednesday, March 10

- 8:00 Registration and Continental Breakfast
- 8:30 Low Temperature Thermal Control for the Astrometric Beam Combiner Test
Robert Krylo, Melanie Fisher, Juan Cepeda-Rizo, Jet Propulsion Laboratory; David Bugby, ATK Space

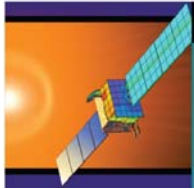
Session III: Advanced Space Hardware, Materials and Design Technologies

- 9:00 Innovative Thermal Control Method for High Current Wire Bundles
Juan Rodriguez-Ruiz, NASA/Goddard Space Flight Center
- 9:30 High Temperature MLI Efficiency
Gayle Knutzen, Douglas Mehoke, Johns Hopkins University
- 10:00 Break
- 10:15 MLI Layup Optimization Test
Leslie Buchanan, Steve Buerger, Aerospace and Technologies Corporation
- 10:45 6 K Solid State and 60K Triple-Point Energy Storage Units
Ricardo Patricio, Active Space Technologies; I. Catarino, Gregoire Bonfait, Cefitec
- 11:15 Analysis of Four-Year, One-Year MISSE Flight Data and Space Simulation Tests on Newly Developed and Heritage Thermal Control Coatings
Michael Kenny and Robert McNulty, Alion Science & Technology; Miria Finckenor, NASA/Marshall Space Flight Center
- 11:45 Lunch on own

Session IV: Two-Phase Thermal Technology

- 1:00 Multi-Evaporator Miniature Loop Heat Pipe for Small Spacecraft Thermal Control Part 1: Technology Overview
Jentung Ku, Laura Ottenstein, Donya Douglas, NASA/Goddard Space Flight Center; Triem Hoang, TTH Research, Inc.

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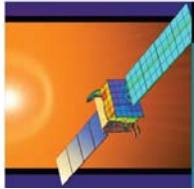
Wednesday, March 10 (continued)

- 1:30 Multi-Evaporator Miniature Loop Heat Pipe for Small Spacecraft Thermal Control Part 2: Validation Results
Jentung Ku, Laura Ottenstein, Donya Douglas, NASA/Goddard Space Flight Center; Triem Hoang, TTH Research, Inc.
- 2:00 Cryogenic Heat Pipe Thermal Transport and Switching System
David Bugby, ATK Space; Juan Cepeda-Rizo, Jet Propulsion Laboratory
- 2:30 Development of Loop Heat Pipes in Japan
Atsushi Okamoto, JAXA Tsukuba Space Center
- 3:00 Break
- 3:15 Pressure-Controlled Heat Pipe
David Sarraf, Peter Dussinger, Advanced Cooling Technologies; Hossein Jula, Penn State Harrisburg
- 3:45 Pressure-Controlled Heat Pipe Solar Receiver for Oxygen Production from Lunar Regolith
John Hartenstine, William Anderson, Kara Walker, Calin Tarau, Advanced Cooling Technologies
- 4:15 SBIRS GEO Space Vehicle Model Correlation
Ken Price, Hamid Haque, The Aerospace Corporation; Joseph Yee, Henry Change, Lockheed Martin Space Systems Corporation
- 4:45 SBIRS GEO Payload/Space Vehicle Lessons Learned
Ken Price, Hamid Haque, The Aerospace Corporation; Joseph Yee, Henry Change, Lockheed Martin Space Systems Corporation
- 5:15 Adjourn

Thursday, March 11

- 8:00 Registration and continental breakfast
- 8:30 Innovative Evaporators for Lunar Lander Thermal Control System
Tadej Semenic, Advanced Cooling Technologies
- 9:00 Study of Low-Heat-Load LHP Startup Using Internal Visualization
B. d'Entremont and Jay Ochterbeck, Clemson University
- 9:30 An Experimental Facility for the Study of Oscillating Heat Pipes
Brenton Taft, Air Force Research Laboratory; Greg Nellis, John Pfothenauer, University of Wisconsin-Madison; Andy Williams, Air Force Research Laboratory
- 10:00 Break
- 10:15 Testing of a High-Heat Flux Two-Phase Nitrogen Jet Impingement Cooling System
Ike Hsu, Ezra Takara, Bobby Evtimov, Lockheed Martin Space Systems Corporation

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Thursday, March 11 (continued)

10:45 Loop Heat Pipe Utilization for Temperature Control of Electronics Deck
Deborah Zakar, Robert Baldauff, Triem Hoang, Denis Mahony, Naval Research Laboratory

Session V: Thermal Testing and Lessons Learned

11:15 Cable Heating Thermal Vacuum Test Data and Lessons Learned
Andrew Davenport, Lockheed Martin Space Systems Corporation

11:45 Satellite Thermal-Vacuum Test Facilities at Sandia National Laboratories
Ron Akau, Larry Bruskas, Allen Riddle and Peter Geib, Sandia National Laboratories; Eric Weaver, ARES Corporation

12:15 Conference-Sponsored Lunch

2:00 Adjourn