

MONDAY, AUGUST 8, 2005

TECHNICAL SESSION I

Concepts in Modularity—Systems or subsystems that provide a measurable increase in small satellite utility across of range of mission performance requirements with emphasis on: Techniques and methods that could eliminate the “T” in I&T; Standards for component size or form factors to better enable multi-source spacecraft designs; Constellation Standards—Cross-links, Autonomy, Command and Control Techniques, etc.

Chair: Stan Kennedy, Lockheed Martin Space Systems Center

- 3:15 PM** Modular Thermal Design Concepts: Thermal Design of a Spacecraft on a Module Level for LEO Missions
Mark Barton, Jon Miller—AeroAstro, Inc.
- 3:30 PM** Modular Platform Architecture for Small Satellites: Evaluating Applicability and Strategic Issues
Quinn Young—Space Dynamics Laboratory
- 3:45 PM** A Universal Interface for Modular Spacecraft
Lennon Rodgers, Nicholas Hoff, Elizabeth Jordan, Michael Heiman, David Miller—Space Systems Laboratory, Massachusetts Institute of Technology
- 4:00 PM** Using a Distributed Wiring Harness
Steve Wichman—Space Gadgets Corporation; Adeel Baig, Andrew Crahan, Micah Dowty—Colorado Space Grant Consortium
- 4:15 PM** Modular Architecture and Product Platform Concepts Applied to Multipurpose Small Spacecraft
Jenny Kingston—Cranfield Space Research Centre
- 4:30 PM** C-SMARTS: Colorado Students and Mentors Applying Research and Technology in Space
Chris Kochler—Colorado Space Grant Consortium

TUESDAY, AUGUST 9, 2005

TECHNICAL SESSION II

Defining How Standards Should be Implemented—

What matters and what doesn't in adopting design, interface, interoperability, and system standards?

Chair: Craig Day, American Institute of Aeronautics and Astronautics (AIAA)

- 8:45 AM** A Plug-and-Play System for Spacecraft Components Based on the USB Standard
James Lyke—Air Force Research Laboratory; Scott Cannon—Utah State University; Don Fronterhouse—Scientific Simulation Inc.; Denise Lanza, Tony Byers—Science Applications International Corp.
- 9:00 AM** Pros and Cons of Standard Interfaces and Components
Victor Matricardi—The Aerospace Corporation; Lt. Col. Randy Ripley—Space Test Program Det12/Space & Missile Systems Center
- 9:15 AM** Internet Protocol (IP) as a Standard for Command and Control of Satellites
Jeff Janicik—Innoflight; Jay Heberle—Universal Space Network
- 9:30 AM** The Standardization Process: What Works; What Doesn't
Douglas Caldwell—Ecliptic Enterprises Corporation
- 9:45 AM** Development and Demonstration of a Small Satellite Bus Standard: Another Step Toward an Operational Responsive Space System
Andy Lewin, Cheryl Reed, Patrick Stadter, Eric Finnegan—Johns Hopkins University/Applied Physics Laboratory; Mike Hurley, Charles Merk, Chris Garner, Paul Jaffe, Tom Kawecki—Naval Research Laboratory; Col. Jay Raymond, CDR Greg Glaros—OSD Office of Force Transformation
- 10:00 AM** The Intelligent Application of Quality Management to Smallsat Programs
Brian Cox, Rolf Seiler, Metin Aktik—MacDonald Dettwiler and Associates
- 10:15 AM** Finding the Balance in Standard Bus Design
Stacy Garfield, Stanley Kennedy, Jr.—Lockheed Martin Space Systems Company; Quinn Young—Space Dynamics Laboratory
- 10:30 AM** The Impact of Standard Architectures and Product Platforms on Spacecraft Development
Robert Caffrey—NASA Goddard Space Flight Center; Martin Fraerman—Johns Hopkins University/Applied Physics Laboratory

TUESDAY, AUGUST 9, 2005

TECHNICAL SESSION III

Panel Discussion

The McLogan Group: Standards—Myth or Magic Potion?

11:15 AM Panelists will be challenged to offer and defend their opinions on the efficacy of adopting standards at all levels within the design of small satellite systems—payload interfaces, bus subsystems and at the board-level within subsystems. Panelists will also be asked to comment on the concept of modular satellites that employ plug-and-play adaptability as a technique to enable lower-cost and more rapidly fielded missions.

Conference attendees are encouraged to submit topical questions, which will be used to form panel questions. Questions should be emailed to Jaimie Kandler at jaimie.kandler@usurf.usu.edu.

Panelists

Lt. Col. Daniel Griffith—Director, Space Test Program (SMC Det-12)

John Mankins—NASA Headquarters

Alok Das—Chief Scientist, Air Force Research Laboratory, Space Vehicles Directorate

Amnon Ginati—Head, Earth Observation Future Programs, European Space Agency

TUESDAY, AUGUST 9, 2005

TECHNICAL SESSION IV

The Year in Retrospect—Mission summaries where design reusability has been a key mission success factor.

Chair: Hugh Cook, ATK

- 2:00 PM** The Huygens Mission to Explore the Saturnian Moon Titan
Klaus Schilling—Bayerische Julius-Maximilians-Universität Würzburg
- 2:15 PM** Review of a Small Satellite Hyper-Spectral Mission
Mike Cutter—Sira Technology Ltd.
- 2:30 PM** Adopting Internet Standards for Orbital Use
Lloyd Wood, Dan Shell—Cisco Systems; Dave Stewart, Will Ivancic—NASA Glenn Research Center; Alex da Silva Curiel, Chris Jackson, Dave Hodgson—Surrey Satellite Technology Ltd.
- 2:45 PM** Disaster Monitoring Constellation (DMC)—Success Based on Small Satellite Technologies
Lee Boland, Sir Martin Sweeting, Alex da Silva Curiel—Surrey Satellite Technology Ltd; Paul Stephens, Dave Hodgson—DMC International Imaging (DMCii) Limited
- 3:00 PM** Joint Warfighting Space Demonstration—1 Lessons Learned
Terrance Yee—MicroSat Systems, Inc.
- 3:15 PM** TopSat—High Resolution Imaging from a Low Cost Satellite
J. Dewhurst, W. Levett, J. Laycock, A. Rogoyski—QinetiQ
- Alternate** Seven-Year Flight Testing of the Gurwin-Techsats Microsatellite
Moshe Guelman, Fred Ortenberg, Alexander Shiryayev, Roni Waler—Asher Space Research Institute

TUESDAY, AUGUST 9, 2005

TECHNICAL SESSION V

Forecast for the Future—New missions that will adopt standard interfaces as an integral element of the mission objectives.

Chair: Maj. Mark Davis, United States Air Force Headquarters Space Acquisition

4:30 PM Multiple Payload Ejector for Education, Science and Technology Payloads

Gary Letchworth—NASA Goddard Space Flight Center

4:45 PM The Future of the Microsatellite Program in Canada

Simon Grocott—Dynacon Inc.

5:00 PM The GeneSat-1 Test Demonstration Project:
A Unique Use of Smallsats

Bruce Yost—Defouw Engineering; David Engelbert—San Jose State University; John Hines, Elwood Agasid—NASA Ames Research Center; Antonio Ricco—NCSBT, Stanford University; Christopher Kitts—Santa Clara University

5:15 PM Mission and System Design of a Venus Entry Probe and Aerobot

Andy Phipps, Adrian Woodroffe, Dave Gibbon, Peter Alcindor, Mukesh Joshi, Jeff Ward, Sir Martin Sweeting, Alex da Silva Curiel—Surrey Satellite Technology Ltd.; Marcel van den Berg, Peter Falkner—European Space Agency; John Underwood, Steve Lingard—Vorticity Ltd.

5:30 PM Lunette: Lunar Farside Gravity Mapping by Nanosat

Henry Spencer—SP Systems; Kieran Carroll—Gedex Inc.; Jafar Arkani-Hamed—McGill University; Robert E.Zee—University of Toronto Institute for Aerospace Studies/Space Flight Laboratory

5:45 PM SmallSat Lessons Learned on THEMIS:
Approaches to Standard Interfaces that Succeeded or Failed

Thomas Ajluni—Swales Aerospace

WEDNESDAY, AUGUST 10, 2005

TECHNICAL SESSION VI

University Programs—University-led small satellite programs that have adopted standards as an integral element of the mission objectives.

Chair: Hans Carlson, National Reconnaissance Office

- 8:45 AM** Extensible Boom-Based Optical System for Nano-Scale Remote Sensing Satellite “PRISM”
Yuya Nakamura, Shinichi Nakasuka, Ryu Funase, Masaki Nagai, Yuta Nojiri, Tsukasa Funane, Fumiki Sasaki, Akito Enokuchi—University of Tokyo
- 9:00 AM** Implementation of a Modern Internet Protocol-Based Communications System and Error Detection and Correction System for Commercial Memory within a Radiation Hardened FPGA for a Low-Earth-Orbit Satellite
Brendan Surrusco, Sven Bilén, Dillon M. Collins, Charles Croskey—Penn State University; Anthony Jordan, Ron Lake—Aeroflex, Inc.
- 9:15 AM** Standard Testing Methods for Satellite Communication Systems
Jerry Stoner—Iowa State University
- 9:30 AM** The *.Sat CubeSat Bus: When Three Cubes Meet
Eric Lee, Belgacem Jaroux, Stevan M. Spremo, Matt D’Ortenzio—Space Systems Development Laboratory, Stanford University; Ignacio Mas, Dan Saldana—Space Technology Center, NASA Research Center
- 9:45 AM** The Design and Test of a Compact Propulsion System for CanX Nanosatellite Formation Flying
Stephen Mauthe, Freddy Pranajaya, Robert Zee—University of Toronto Institute for Aerospace Studies/Space Flight Laboratory
- 10:00 AM** A Standardized, Distributed Computing Architecture: Results from Three Universities
Michael Swartwout—Washington University in St. Louis; Christopher Kitts—Santa Clara University; E. Glenn Lightsey—University of Texas
- Alternate** MEMSSat: A TestBed of MEMS Technologies for Space
Junming Fu, Zheng You—Tsinghua University

WEDNESDAY, AUGUST 10, 2005

TECHNICAL SESSION VII

13th Annual Frank J. Redd Student Scholarship Competition

Co-Chair: Doug Freesland, The ACS Engineering Corporation

Co-Chair: Gwynne Shotwell, Space Exploration Technologies

- 10:45 AM** Introduction to Student Scholarship Competition
Doug Freesland—Technical Co-Chair
Gwynne Shotwell—Scholarship Co-Chair
- 11:00 AM** Real-Time Attitude Determination of a Nanosatellite Using GPS Signal-to-Noise Ratio Observations
Shaun Stewart, Greg N. Holt—The University of Texas at Austin
- 11:15 AM** A Gossamer Structures Technology Demonstrator for De-Orbiting Pico-Satellites
Dante Buckley, Thomas Cowan, Jim VanPelt II—University of Florida
- 11:30 AM** System-Level Mitigation of SEFIs in Data Handling Architectures, A Solution for Small Satellites
Shazia Maqbool—University of Surrey
- 11:45 AM** The Attitude Control System Concept for the Joint Australian Engineering Micro-Satellite (JAESat)
Aaron Dando—Queensland University of Technology
- 12:00 PM** Three Corner Sat: Mission Review and Lessons Learned
Erik Henrikson—Arizona State University
- 12:15 PM** Formation Flying Demonstration Missions Enabled by CanX Nanosatellite Technology
Eric Caillibot, C. Cordell Grant, Daniel Kekez—University of Toronto Institute for Aerospace Studies

WEDNESDAY, AUGUST 10, 2005

TECHNICAL SESSION VIII

Advanced Technologies I—Individual components that measurably contribute to the performance of small satellites or are innovations in small satellites.

Chair: Aaron Rogers, AeroAstro, Inc.

- 2:00 PM** **Electrochromic Radiators for Microspacecraft Thermal Control**
Anthony Paris, Kevin Anderson—Jet Propulsion Laboratory/California Institute of Technology; Prasanna Chandrasekhar, Brian Zay, Terrance McQueeney—Ashwin-Ushas Corporation, Inc.
- 2:15 PM** **A Common Data Link (CDL) for Space-Based Communications: Migration of Airborne Hardware to Space**
Richard Galindez, Brent Ovard, Darren Morrow, Tom Kamlowsky, Todd Wilstead—L-3 Communications/CSW; Alex Hailu, John Fairbanks, Ron Reeves, Myron Moore—L-3 Communications/TW
- 2:30 PM** **Low Power, High-Speed Radiation Tolerant Computer**
David Czajkowski, David Strobel, Manish Pagey, Praveen Samudrala, Murat Goksel—Space Micro, Inc.
- 2:45 PM** **A Novel Design of MEMS-Based Solid Propellant Micro Propulsion Array for Micro Satellites**
Lin Yang, Gaofei Zhang, You Zheng—Tsinghua University
- 3:00 PM** **Micro Sun Sensor with CMOS Imager for Small Satellite Attitude Control**
Keisuke Yoshihara, Hidekazu Hashimoto, Toru Yamamoto, Hirobumi Saito, Eiji Hirokawa, Makoto Mita—Japan Aerospace Exploration Agency; Kota Magoshi—Magoshi Corp.
- 3:15 PM** **An FPGA-Based JPEG 2000 Demonstration Board**
Tom Woolston, Gail Bingham, Niel Holt, Glen Wada —Space Dynamics Laboratory

WEDNESDAY, AUGUST 10, 2005

TECHNICAL SESSION IX

Advanced Technologies II—Individual components that measurably contribute to the performance of small satellites or are innovations in small satellites.

Chair: Terrance Yee, MicroSat Systems, Inc.

- 4:30 PM** Central Thermal Bus for Micro and Small Satellites: Scaleability and Adaptability
John Wooldridge, Kim Wrenn, David Wolf, David Bugby, Steve Krein, Daniel Mark—Swales Aerospace
- 4:45 PM** Modelling of Damping in Small Satellite Structures Incorporating Bolted Joints
Rui Wang, A. Crocombe—University of Surrey; G. Richardson—Surrey Satellite Technology Ltd; C. Underwood—Surrey Space Centre
- 5:00 PM** Orbit Calculation and Doppler Correction Algorithm in a LEO Satellite Small Ground Terminal
El Bachir Zantou, Abdelhak Kherras, Adnane Addaim—Centre Royale d'Etudes et de Recherche Spatiales, Morocco
- 5:15 PM** Accurate Battery Performance Modeling: The Key to Accessing a Truly Responsive Modular Small-Cell Concept
Chris Pearson, Nick Russel, Carl Thwaite—AEA Technology
- 5:30 PM** Plug-and-Sense: An Enabling Onboard Networking Technology for Modular Spacecraft
Luis G. Jordán, Scott A. McDermott—AeroAstro, Inc.
- 5:45 PM** Integrated Hyperspectral, Multispectral and Video Imager for Microsatellites
Arnold Schoonwinkel—Stellenbosch University; Hendrik Burger, Sias Mostert—SunSpace and Information Systems (Pty) Ltd.

THURSDAY, AUGUST 11, 2005

TECHNICAL SESSION X

Launch Standards—An update on launch systems with emphasis on proven means of providing regular and predictable access to space for small spacecraft built to standard interfaces.
Chair: Scott Schoneman, Orbital Sciences Corp.

8:45 AM SLVR: A NASA Strategy for Leveraging Emerging Launch Vehicles for Routine, Small Payload Missions
Bruce Underwood—NASA Goddard Space Flight Center/ Wallops Flight Facility

9:00 AM Ongoing Nanosat Launch Vehicle Development for Providing Regular and Predictable Access to Space for Small Spacecraft
John Garvey—Garvey Spacecraft Corporation; Eric Besnard—California State University Long Beach

9:15 AM Gap Analysis of the Current Launch Paradigm and the Responsive Launch Paradigm
Hugh Cook—ATK

9:30 AM ASAP and Future Concepts
Serge Chartoire, Antonio Accettura—Arianespace

9:45 AM CASPAR: Low-Cost, Dual-Manifest Payload Adapter for Minotaur IV
Joseph Maly, Scott Pendleton—CSA Engineering; Lt. William Emmer—Space & Missile Systems Center Det 12/RPS; Eric Walsh—ATK Space Systems; Steven Buckley, John Higgins—Air Force Research Laboratory/Space Vehicles Directorate; Scott Schoneman—Orbital Sciences Corp.; Ryan Hevner—Planetary Systems Corporation

10:00 AM RocketPod™: A Method for Launching Cube-Sat-Class Payloads on ELVs and Spacecraft
Douglas Caldwell, Rex Ridenoure—Ecliptic Enterprises Corporation

Alternate A Suborbital Spaceship for Short Duration Space and Microsat Launch
Pat Bahn—TGV Rockets

THURSDAY, AUGUST 11, 2005

TECHNICAL SESSION XI

Advanced Technologies III—Individual components that measurably contribute to the performance of small satellites or are innovations in small satellites.

Chair: *Brian Gilliam, MDA*

- 11:00 AM** Arraying Technique for Enhanced Multiplexing of Interferometric Signals (ARTEMIS): An Enabling Technology for Long Range or High Data Rate Microspacecraft Communications
G. James Wells, Robert Zee—University of Toronto Institute for Aerospace Studies/Space Flight Laboratory
- 11:15 AM** Genetic Algorithm Based Charge Optimization of Lithium-Ion Batteries in Small Satellites
Saurabh Jain, Dan Simon—Cleveland State University
- 11:30 AM** Solid State Digital Propulsion “Cluster Thrusters” for Small Satellites, Using High Performance Electrically Controlled Extinguishable Solid Propellants
Wayne Sawka—Digital Solid State Propulsion; Arthur Katzakian, Charles Grix—ET Materials LLC
- 11:45 AM** Technology Demonstrator of a Standardized Deorbit Module Designed for CubeSat and RocketPod™ Applications
Nestor Voronka, Robert Hoyt, Jeff Slostad, Ian Barnes—Tethers Unlimited, Inc.; David Klumpar, Dylan Solomon—Montana State University; Doug Caldwell, Rex Ridenoure—Ecliptic Enterprises, Inc.
- 12:00 PM** Miniature Multiple Evaporator Multiple Condenser Loop Heat Pipe
Ahmed Habtour, Michael Nikitkin—Swales Aerospace Inc.
- 12:15 PM** The AeroAstro Fast-Angular-Rate Miniature Star Tracker: Algorithms and Simulation Results
Bill Seng, James Stafford, Vickie Kennedy, Ray Zenick—AeroAstro, Inc.