Room Check-In at the Beaver Run Resort Front Desk 4 PM daily

Conference Registration
Daily 6:30 to 10 AM and
4 to 6 PM

WIRELESS ACCESS Conference Area via: GlobalMeetingWireless

Location:	**Peak 5**
Group/Company Name:	**AAS2014**
Passcode:	**beaver**

AAS / Rocky Mountain Section Website:
http://aas-rocky-mountain-section.org/

Registration Questions During the Conference contact:

Carolyn O'Brien	**720-277-5851**
Lis Garratt	**303-931-7622**

ALL PAPERS LOCATED AT

https://drive.google.com

Login: aasgnc2014@gmail.com

Password: AAS2014Breck

Friday, January 31, 2014

Classified Session 7 AM – 3 PM
Conference Registration 4 – 6 PM
Wine and Cheese Reception 6 – 9:30PM
(Welcome Talk at 7:30 PM)

Saturday, February 1 2014

Sessions: 7–10:30 AM
Astronaut Talk for Children: 4 – 5 PM
Technical Exhibits: 5 – 8 PM

Sunday, February 2, 2014

Sessions: 7–10 AM & 2 – 4 PM
Analytical Graphics presents: Spacecraft Simulation in STK 10:30 AM–1:30 PM

Monday, February 3, 2014

Sessions: 7–10 AM & 4 – 6 PM
Networking Event: 6 – 7:30 PM
Presentation of Student Awards
Keynote Speakers: Neil Dennehy, Goddard Space Flight Center, and Stephen "Phil" Airey, European Space Agency

Tuesday, February 4, 2014

Sessions: 7–10 AM & 4 – 7 PM

Wednesday, February 5, 2014

Session: 7–10 AM

POSTER SESSION
AVAILABLE EVERY DAY

The Poster Session is set up in the breakfast room and will be available for viewing every day. Authors will be on hand to discuss their projects and answer questions.

Poster Session 7:00-10:00 AM daily

Held in Break Room during Breakfast

The Poster Session provides a forum for authors and interested parties to discuss relevant topics.

Local Chairperson
Lisa Hardaway, Ball Aerospace & Technologies Corp. 303-939-4335
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14-002 **Unified Simulation and Analysis Framework for Deep Space Navigation Design**
Evan Anzalone (NASA)

14-003 **Spacecraft and GN&C Development in a Model-Based Systems Engineering Environment**
Christine Edwards-Stewart (LM/SSC)

14-004 **Green Propellant Infusion Mission Program Overview**
Amy Brown (Ball)

14-005 **Recent Work Within the Control Systems Design and Analysis Branch at NASA Marshall Space Flight Center**
Eric Gilligan (MSFC)

14-006 **Experimental Design of a Rigid-flexible Satellite Control System**
Luiz Carlos Gadelha de Souza (National Institute for Space Research–INPE-Brazil)

14-007 **Airborne Star Tracker Dynamic Simulator**
John Mastrangelo (Ball)

14-008 **The Minimum Fuel Guidance and Control of an Active Debris Removal Small Satellite**
Aaron Avery (USU)

14-009 **Iridium PRIME: The World's First Turnkey Hosted Payloads Solution**
David Anhalt (Iridium Communications)

SATURDAY, FEBRUARY 1st

7am Conference Opening
by Alexander May

Session I **7:00-10:30 AM**

Student Innovations in GN&C

This session embraces the wealth of research and innovative projects related to spacecraft GN&C being accomplished in the university setting. Papers in this session address hardware/ software research as well as component, system or simulation advances. Papers submitted must have a student as the primary author and presenter. Papers will be adjudicated based on level of innovation, complexity of problem solved, perceived technical readiness level, applicability and fieldability to near-term systems, clarity of written and verbal delivery, number of completed years of schooling and adherence to delivery schedule. Prizes will be awarded to the top 3 papers sponsored by: **Space X, Sierra Nevada Corp** and **Intuitive Machines, LLC**.

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14-011 **Hardware-in-the-Loop Testing of a CubeSat's Attitude Determination and Control System**

Meghan Prinkey (USAF/MIT)

14-012 **Developing Three Degree of Freedom Air Bearing Small Satellite Simulator as Testbed for Attitude Determination and Control Using Momentum Wheels and as a Hardware Implementation of Nonlinear Control Strategies**

Marina A. Samuels, Jan Sommer, Mariana Barbosa, Landon Terry, Rees Fullmer (Utah State University)

14-013 **General-Use SIMULINK Hardware and Environment Models and Applications in Control Simulation and Analysis**
Nicholas Ravago (University of Colorado/ Boulder)

14-014 **Density Model Corrections at Low Altitudes Derived from ANDE Orbit Data**
Travis Lechtenberg (University of Kansas)

14-015 **Vision-Based Relative Navigation Filter for Asteroid Rendezvous**
Dylan Conway, Brent Macomber, Kurt A. Cavalieri, John L. Junkins (Texas A&M University)

14-016 **Closed-Loop GN&C Linear Covariance Analysis for Mission Safety**
Alex Perez (Utah State University)

14-017 **A New Solution for the General Lambert Problem**
Robyn M. Woollands, John L. Junkins (Texas A&M University)

14-018 **Mission Considerations for Direct Transfers to a Distant Retrograde Orbit**
Chelsea Welch (University of Colorado/ Boulder)

Special Event for Children
at 4 PM in Rm. Peak 11

NASA Astronaut, Joe Tanner

This presentation will inspire our next generation of engineers by offering kids the opportunity to interact with an astronaut who flew four STS missions including the mission for the Hubble Space Telescope

Session II **5:00-8:00 PM**

Technical Exhibits

The Technical Exhibits Session is a unique opportunity to observe displays and demonstrations of state-of-the-art hardware, design and analysis tools, and services applicable to advancement of guidance, navigation, and control technology. The latest commercial tools for GN&C simulations, analysis, and graphical displays are demonstrated in a hands-on, interactive environment, including lessons learned and undocumented features. Associated papers not presented in other sessions are also provided and can be discussed with the author. Come enjoy an excellent complimentary buffet and interact with the technical representatives and authors. This session takes place in a social setting and family members are welcome!

Local Chairpersons

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Rick Jackson, Lockheed Martin (Retired)
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BEI Precision Systems & Space Company, Inc.
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dSPACE Inc.
Jena-Optronik GmbH
Left Hand Design Corp.
Lockheed Martin Space Systems Company
Monarch High School
NASA Marshall Spaceflight Center

SELEX ES
Sierra Nevada Corporation
SODERN
Surrey Satellite Technology
Texas A&M University
United Launch Alliance, LLC
University of Colorado / Boulder
Utah State University Space Dynamics Lab

SUNDAY, FEBRUARY 2nd

PARALLEL MORNING SESSIONS

Advances in GN&C Software..... Peak 4

Advances in GN&C Hardware..... Peak 5

Session III **7:00-10:00 AM**

Advances in GN&C Software (parallel session)

The GN&C hardware is often dependent on or successful due to GN&C software. This session is open to all GN&C software ranging from on orbit software used to drive or process data, ground software used for operations or simulation software used to test, validate or develop GN&C systems. This session highlights GN&C software from all aspects. *Note: Advances in hardware applications are covered in Session IV.*

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Kyle Miller, Ball Aerospace & Technologies Corp.
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14-032 **Distributed GN&C Flight Software Simulation for Spacecraft Cluster Flight**.
Shaun M. Stewart, Lucas Ward (Emergent Space Technologies, Inc.)

14-033 **Ionospheric Delay Modeling for Single Frequency GPS Space Users**
Lee Barker (LM/SSC), Chuck Frey (LM/IS&GS)

14-034 **Elastic Model Transitions: A Hybrid Approach Using Quadratic Inequality Constrained Least Squares / (LSQI) and Direct Shape Mapping (DSM)**
Robert J. Jurenko (Leidos), Jason Bush (TriVector Services, Inc.), John Ottander (Dynamic Concepts, Inc.)

14-035 **Prediction of Limit Cycles Using Describing Function Analysis and the LuGre Friction Model**
Ashley Moore, Russel W. Benson, Alison S. Kremer, Richard M. Dolphus (The Aerospace Corp).

14-036 **Vehicle Dynamic Modeling Assisted State Estimation for Planetary Exploration Applications**
Joseph Nsasi Bakambu, Adam Philip, Andrew C.M. Allen, Raja Mukherji (MDA Corp)

14-037 **Model-Based Guidance and Control for Atmospheric Guided Entry**
Enrico Canuto (Politecnico di Torino), Marcello Buonocore (Thales Alenia)

14-038 **Space Launch System Ascent Flight Control Design**
Jeb S. Orr (Draper), John H. Wall (Dynamic Concepts), Tannen S. VanZwieten, Charles E. Hall (NASA/ Marshall)

Session IV **7:00-10:00 AM**

Advances in GN&C Hardware (parallel session)

Many programs depend on heritage, but the future is advanced by those willing to design and implement new and novel architectures and technologies to solve the GN&C problems. This session is open to papers with topics concerning GN&C hardware ranging from theoretical formulations to innovative systems and intelligent sensors that will advance the state of the art, reduce the cost of applications, and speed the convergence to hardware, numerical, or design trade solutions.

14-041 **ASTRIX™ 1000 Series: The Best of the FOG Technology for Satellites**
Gilbert Cros (Astrium SAS), Jean-Jacques Bonnefois (IXSPACE), Steeve Kowaltschek (ESA), Guillaume Delavoipiere (CNES)

14-042 **Target Relative Navigation Results from Hardware-in-the-Loop Tests Using the SINPLEX Navigation System**
Stephen Steffes, Stephan Theil, Michael Dumke, David Heise, Marco Sagliano, Malak A. Amaan (DLR), Erik Laan, Murat Durkut, Han Oosterling, Erik Boslooper (TNO), Jan Schulte, Stefan Söderholm, Daniel Skaborn (ÅAC Microtec AB), Yuriy Yanson, Joris Berkhout, Marco Esposito, Simon Continello (Cosine Research B.V.), Richard Visee, Bert Monna, Frank Stelwagen (SystematiC design B.V.)

14-043 **BRRISON Fine Steering System Design and Performance**
Jed Diller, Kevin Dinkel, Zach Dischner, Nick Truesdale, Eliot Young (Southwest Research Institute)

14-045 **Technology Development of Backside Illuminated CMOS Image Sensors for Medium Accuracy Star Tracker Applications**
R. Winzenread, R. Jerome, S. Hong, D. Price, (On Semiconductor), J.R. Zhu, P. Levine, J. Tower (SRI International), M. Sileo, E. Tchilian (Ball)

14-047 **Miniature Control Moment Gyroscope Development**
Erik Mumm (Honeybee Robotics)

Educational Workshop **10:30AM-1:00PM**
Peak 4 & 5

Presented by:

Analytical Graphics, Inc.

A spacecraft simulation environment in STK: Including full rotational dynamics; attitude determination and control; sensor and actuator models; and power and payload modeling. Learn how spacecraft design engineers can rapidly evaluate system trade-offs and ensure that spacecraft capabilities and constraints are being met. After an accelerated design and analysis cycle, the resulting flight software configuration can be targeted for actual flight avionics at the touch of a button. The modular flight software architecture provides rapid spacecraft development, assembly, test and integration, as well as autonomous on-board operations and enhances integration and test with its high-fidelity “test like you fly” capabilities.

Local Chairperson
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Session V **2:00-4:00 PM**

Adaptive & Optimal Control

This session focuses on novel applications of adaptive or optimal control. When seeking to apply adaptive or optimal control approaches to a specific application, an algorithm must be selected, tailored, and/or re-designed such that it is suitable for the system under consideration and can meet or exceed industry standards with respect to performance and robustness. Session topics focus on the development and/or application of adaptive and optimal control concepts for real systems demonstrating appreciable improvements over the baseline design. Authors are encouraged to provide comprehensive analysis and discussion supported by test data in a laboratory or field environment.

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14-051 **Space Launch System Implementation of Adaptive Augmenting Control**
John H. Wall (Dynamic Concepts, Inc.), Jeb S. Orr (Draper Laboratory), Tannen S. VanZwieten (NASA / MSFC)

14-052 **Adaptive Augmenting Control Flight Characterization Experiment on an F/A-18**
Tannen S. VanZwieten, Eric Gilligan (NASA / MSFC), John H. Wall (Dynamic Concepts, Inc.), Jeb S. Orr (Draper Laboratory)

14-056 **Toward Practical Implementation of Optimal Orbital Pursuit Evasion Maneuvers**
Will Hafer, James D. Turner, Helen Reed (Texas A&M University), Khanh Pham (Air Force Research Laboratory)

14-057 **A* Pathfinding for Continuous-Thrust Trajectory Optimization**
Nathan Parrish, Jeffrey S. Parker (University of Colorado, Boulder)

MONDAY, FEBRUARY 3rd

Session VI **7:00-10:00 AM**

CubeSats & SmallSats

Cubesats and smallsats range in mass from less than 1kg up to 180kg, and are gaining in popularity and utility. At the high end of this mass range, 100 to 180kg ESPA-class spacecraft are now trusted platforms for missions and offer pointing accuracy, pointing stability, and position knowledge that is compatible with Earth science missions. At the cubesat end of the spectrum the GN&C capabilities are advancing quickly in an effort to support science and technology development missions. This session is open to papers covering both hardware and software aspects of smallsat and cubesat GN&C. Papers on technology development for GN&C and mission GN&C experience are also included.

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14-061 **Three-Degree-of-Freedom Testing of Attitude Estimation and Control Algorithms on ExoplanetSat**
Christopher M. Pong, Sara Seager, David W. Miller (MIT)

14-062 **Formulation of Small Spacecraft Avionics Testbed**
Matt Sorgenfrei (SGT), Matt Nehrenz (Jacobs Technology), Robert Edwards, Sanjay Joshi (University of California, Davis)

14-063 **Aerodynamic Attitude and Orbit Control Capabilities of the ΔDSAT Cubesat**
Josep Virgili, Peter C.E. Roberts, Zhou Hao (Space Research Center, Cranfield University)

14-064 **Pointing Stability for the Doppler Wind and Temperature Sounder Microsatellite Demonstration Mission**
William Frazier, Reuben R. Rohrschneider, Shane Roark (Ball), Larry L. Gordly (GATS, Inc)

14-065 **Advantages of Small Satellite Carrier Concepts for LEO/GEO**
David K. Geller, Derick Crocket (Utah State University), Randy Christensen, Adam Shelly (Space Dynamics Laboratory)

14-066 **Prox-1: Automated Image-Based Guidance and Control for On-Orbit Inspection**
Sean Chait, David Spencer (Georgia Institute of Technology)

14-067 **Smallsat Spin-Assisted Angles-Only Navigation and Control**
Randy Christensen (Space Dynamics Laboratory), David Geller (Utah State University)

14-068 **DICE: Challenges of Spinning CubeSats**
Tim Neilsen (Space Dynamics Laboratory)

PARALLEL AFTERNOON SESSIONS

Hosted Payloads ..... Peak 4

Saving the Spacecraft: Rescues, Fault Protection & Life Extensions ..... Peak 5

Session VII **4:00-6:00 PM**

Hosted Payloads
(parallel session)

This session provides an overview of the emerging paradigm for delivering and operating payloads on rides of opportunity. Both the DoD and NASA have major initiatives focused on leveraging hosted payload opportunities to enhance access and affordability. The session covers the players, the benefits and challenges, the technical requirements, experiences, and the GN&C considerations.

National Chairpersons

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N/A **The Common Instrument Interface (CII)**
Nikzad Toormarian (NASA/JPL)

14-071 **Hosted Payload Movement Overview**
Dave Anhalt (Hosted Payload Alliance)

14-072 **Earth Observations from the International Space Station: The Teledyne "Multiple User System for Sensing" (MUSES)**
Mark Whorton (Teledyne Brown)

14-073 **The TEMPO Mission: It's About Time!**
Brian Baker, Laura Hale, Dennis Nicks, Kenton Lee (Ball), Kelly Chance, Ziong Liu, Raid Sulieman (Smithsonian Astrophysical Observatory), Jim Carr

(Carr Astro), David Flittner, Jassim Al-Saadi, Wendy Pennington, Alan Little, David Rosenbaum (NASA/LRC)

14-075 **Hosting the Deep Space Atomic Clock (DASC) on the Orbital Test Bed (OTB-1) Satellite**
Brent Abbott (Surrey), Todd Ely (NASA/JPL)

Session VIII **4:00-6:00 PM**

Saving the Spacecraft: Rescues, Fault Protection & Life Extensions (parallel session)

Throughout the history of space missions, well-crafted automation and human ingenuity have saved and extended missions. One of the inspirations for this session is the Apollo 13 mission in which the team united to solve a critical problem that rescued the crew. The goal of this session is to gather both historic and modern stories about spacecraft rescues, fault protection design, and life extension efforts.

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14-083 **Simple Safe Site Selection: Hazard Avoidance Algorithm Performance at Mars**
Andrew E. Johnson (NASA/JPL), Amit Mandalia (Georgia Tech)

14-084 **Verification of Mars Odyssey Flight Software Ten Years after Launch**
Dave Gingerich (LM/SSC)

14-085 **HAYABUSA - Asteroid Sample Return through Hardships during Its Seven Years Round-Trip Voyage**
Junichiro Kawaguchi (JAXA)

14-086 **Fault Detection and Isolation for Autonomous Parafoils**
Matthew Stoeckle, Amer Fejzic, Louis Breger, (Charles Stark Draper Laboratory), Jonathan How (MIT)

NETWORKING EVENT 6:00-7:30 PM
in the Imperial Ballroom

In lieu of a formal banquet as in past years, this event offers a new opportunity for conference attendees and guests to network with each other while enjoying the complimentary appetizer buffet. This event will also include the presentation of the student paper awards plus remarks by our keynote speakers. Continued networking after the formal event is encouraged!

Student Paper Awards:

Grand Prize $1,000
sponsored by **Space X**

2nd Place $500
sponsored by **Sierra Nevada Corp.**

3rd Place $250
sponsored by **Intuitive Machines, LLC**

KEYNOTE SPEAKERS

Neil Dennehy
Goddard Space Flight Center
and
Stephen "Phil" Airey
European Space Agency

Discuss: "Issues Concerning the GN&C Community"

TUESDAY, FEBRUARY 4th

PARALLEL MORNING SESSIONS

Mixed Actuator Attitude Control ..... Peak 4

ORION Multi-Purpose Crew Vehicle Guidance, Navigation & Control ..... Peak 5

Session IX **7:00-10:00 AM**

ORION Multi-Purpose Crew Vehicle Guidance, Navigation & Control (parallel session)

This session will highlight the recent Guidance, Navigation & Control developments for the Orion Multi-Purpose Crew Vehicle (MPCV) from the Exploration Flight Test 1 (EFT-1), scheduled to launch in September 2014, and demonstrate the system capability to perform a high-energy entry, to the Exploration Missions that will take the Orion MPCV and Crew beyond earth orbit. The papers in this session will overview the Orion system from the launch abort capabilities and navigation systems to future exploration mission concepts and design references.

National Chairpersons

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Local Chairpersons

Daniel G. Kubitschek, Lockheed Martin Space Systems 303-971-8150
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14-091 **Full-Envelope Launch Abort System Performance Analysis Methodology**
Vanessa Aubuchon (NASA/LRC)

14-092 **Orion Exploration Flight Test 1 Absolute Navigation Design**
Jastesh Sud (LM/SSC), Renato Zanetti (Charles Stark Draper Laboratory), Greg Holt (NASA/JSC)

14-093 **Translation Between Dissimilar IMU Error Models to Enable Proper EKF Testing and Validation,**
Robert W. Gillis (Emergent Space Technologies), Harvey Mamich (LM/SSC)

14-094 **Definition of the Design Trajectory and Entry Flight Corridor for the NASA Orion Exploration Mission 1 Entry Trajectory Using an Integrated Approach and Optimization**
Luke W. McNamara (NASA/JSC), Robert D. Braun (Georgia Institute of Technology)

14-095 **Navigation Design and Analysis for the Orion Cislunar Exploration Missions**
Chris D'Souza, Greg Holt, Robert Gay (NASA/JSC), Renato Zanetti (Charles Stark Draper Laboratory)

14-096 **Trajectory Design Analysis over the Lunar Nodal Cycle for the Multi-Purpose Crew Vehicle (MPCV) Exploration Mission 2**
Jeff Gutkowski, Tim Dawn, Richard Jedrey (NASA/JSC)

14-097 **Orion Sample Capture and Return (OSCAR)**
John Ringelberg, Reid Hamilton, Chris Norman (LM/SSC)

Session X **7:00-10:00 AM**

Mixed Actuator Attitude Control (parallel session)

This session will explore the recent renewed community interest in the design and development of spacecraft attitude control systems employing mixed control torque actuators. Such 'hybrid' attitude control systems are of potential utility in cases where, for example, a spacecraft has lost the use of one or more of their reaction wheel set such that there are less than three functional operating reaction wheels remaining. Typically mixed actuator/hybrid attitude control modes are ones in which thrusters or, in some

mission applications, magnetic torquers, are operated in tandem with the two remaining healthy reaction wheels to provide three-axis attitude control torques. Mixed actuator attitude control techniques have been successfully implemented in the past on such spacecraft as FUSE and TIMED. To extend their productive mission life several currently flying spacecraft are currently considering the use of mixed actuator modes for contingency attitude control in the face of reaction wheel failures suffered on-orbit. The papers in this session will review the community's historical experience (lessons learned) with contingency mixed actuator/hybrid spacecraft attitude control using only two reaction wheels. The results of more recent mixed actuator design and development work will also be addressed by the papers in this session.

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14-101 **Spacecraft Hybrid Control at NASA: A Historical Look Back, Current Initiatives, and Some Future Considerations**
Neil Dennehy (NASA/GSFC)

14-102 **Hybrid Control Architecture for the Kepler Spacecraft**
Dustin Putnam, Doug Wiemer (Ball)

14-103 **Pointing and Maneuvering a Spacecraft with a Rank-Deficient Reaction Wheel Complement**
Eric Stoneking (NASA/GSFC), Ken Lebsock (Orbital Sciences Corporation)

14-104 **Precision Pointing for a Skewed 2-Reaction Wheel Control System**
M. Ross, W. Kang, M. Karpenko, R. Proulx (Naval Postgraduate School)

14-105 **A Cold Gas Micro Propulsion System as Actuator of Fine Pointing and Attitude Control Missions on Science and Earth Observation Satellites**
G. Matticari, G. Noci, L. Ceruti, L. Fallerini, F. Boldrini (Selex ES)

14-106 **High Efficiency Magnetic Torque Bars (MTBs)**
Jim Krebs, Eric Stromswold (Cayuga Astronautics)

14-107 **Dawn Spacecraft Operations with Hybrid Actuator Control: Inflight Performance and Ceres Applications**
Brett A. Smith (NASA/JPL)

Session XI **4:00-7:00 PM**

HWIL Testbeds and Demonstration Laboratories

As the complexity of aerospace flight systems continues to rise, increasingly more-elaborate means of system- and subsystem-level testing have become necessary to reduce programmatic risk, thus motivating development of advanced 'test-like-you-fly' HWIL testbeds. Many of these facilities accommodate modular testing of newly developed flight control algorithms, flight software, and flight hardware. In some cases, HWIL testbed laboratories enable a virtual fly-off to be held between competing designs. This session explores capabilities of existing sophisticated, high-fidelity, GN&C laboratories throughout the industry.

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14-112 **Honeywell's Momentum Control System Testbed**
Brian Hamilton (Honeywell)

14-113 **System Level Hardware-in-the-Loop Testing for CubeSats**
Bryan Bingham, Cameron Weston (Utah State University / Space Dynamics Laboratory)

14-114 **A 5DoF Experimental Platform for Research in Spacecraft Proximity Operations**
Panagiotis Tsiotras (Georgia Institute of Technology)

14-115 **LASR: A University-Based National Testbed for Space Proximity Operations in an Operationally Relevant Environment**
James Turner, John Junkins, John Hurtado (Texas A&M University)

14-116 **The Space Operations Simulation Center: A 6DOF Laboratory for Testing Relative Navigation Systems**
Sherri Ahlbrandt, Frank Moore, David Huish, Cory Burr, Reid Hamilton (LM/SSC)

14-117 **Spacecraft Hardware-in-the-Loop Testing at the Servicing Technology Center**
Matthew Strube, Brian Roberts (NASA/GSFC)

14-118 **Testing Facility for Spacecraft GNC Systems at West Virginia University**
Thomas Evans, John Christian (West Virginia University)

WEDNESDAY, FEBRUARY 5th

Session XII **7:00-10:00 AM**

Recent Experiences

This session focuses on recent experiences in spaceflight GN&C, providing a forum to share insights gained through successes and failures. Discussions include GN&C experiences ranging from Earth orbiters to interplanetary spacecraft. This session is a traditional part of the conference and has shown to be most interesting and informative.

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Jeff Parker, University of Colorado/Boulder
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14-121 **Reconstructed Flight Performance of the Mars Science Laboratory Guidance, Navigation, and Control System for Entry, Descent, and Landing**
A. Miguel San Martin, Paul B. Brugarolas, Frederick Serricchio, Gurkirpal Singh (NASA/JPL) Gavin F. Mendeck (NASA/JSC)

14-122 **Effects of Radioisotope Thermoelectric Generator on Dynamics of the New Horizons Spacecraft**
Gabe D. Rogers, Sarah H. Flanigan (APL)

14-123 **The Prisma Irides Rendezvous Experiment**
Thomas Karlsson, Björn Jakobsson, Per Bodin, Bengt Larsson (OHB Sweden)

14-124 **Bearing Noise Detection, Modeling and Mitigation Measures on ESA's X-ray Observatory XMM-Newton**
Marcus G. F. Kirsch, Jim Martin (ESA ESOC), Stephen Airey, Anders Elfving (ESA ESTEC), Patrick Chapman, Denis Di Filippantonio (Astrium Ltd), Rob Harris (Rhea Systems S.A.), Rainer Kresken, Alastair McDonald (CGI), Mauro Pantaleoni, Jeroen Vandersteen (RHEA System BV), Frederic Schmidt, Detlef Webert, Uwe Weissmann (Telespazio Vega), Tommy Strandberg (Astrium GmbH)

14-125 **Suomi NPP Commissioning**
Steve Stem, Meredith Larson, Scott Asbury (Ball)

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