

# 35<sup>th</sup> ANNUAL AAS GUIDANCE & CONTROL CONFERENCE

Breckenridge, Colorado

February 3-8, 2012

Sponsored by the American Astronautical Society  
Rocky Mountain Section



*Please see our website for additional information on the Conference:*

<http://aas-rocky-mountain-section.org>

*Conference Location: Beaver Run Resort:* <http://www.beaverrun.com/>

*Town of Breckenridge & Recreational Activities:* <http://www.townofbreckenridge.com/>

## REGISTRATION

**Friday, February 3, 2012:** Early Conference registration 5:00 to 8:00 pm  
Room check-in at the Beaver Run Resort front desk 4:00 pm daily.  
Conference registration 6:30 to 10:00 am and 4:00 to 6:00 pm daily.

**Daily Poster Session, Feb 4 – 8, 2012  
Held in Break Room during Breakfast**

**Organizer:**

Kyle Miller, Ball Aerospace & Technologies Corp, kbmiller@ball.com, 303-939-5505

## Saturday, February 4, 2012

### Morning: 7:00-10:00 PM Session I – “Space Debris Tracking, Characterization & Mitigation”

**THEME:** A safe space environment without substantial debris threats is crucial for scientific, defense, and commercial needs. Debris mitigation is a topic of global concern and has international attention. An improved understanding of what debris is up there, where it is, and how it is moving is important to characterize what actions we must take. Methods to help prevent satellite collisions and breakups are continuously being refined and employed in operations, and innovative ways to actively remove debris are gaining more traction. This session covers these topics to ensure that space debris will not obstruct our future in space.

#### Organizers:

Alex May, Lockheed Martin Space Systems, [alexander.j.may@lmco.com](mailto:alexander.j.may@lmco.com), 303-977-6620  
Cheryl Walker, TASC, [Cheryl.walker@tasc.com](mailto:Cheryl.walker@tasc.com), 719-393-8487

#### National Chairpersons:

Moriba Jah, AFRL, [moriba.jah@kirtland.af.mil](mailto:moriba.jah@kirtland.af.mil), 505-853-2629  
Scott Daw, TASC, [Scott.Daw@TASC.com](mailto:Scott.Daw@TASC.com), 719-393-8387

### Afternoon: 5:00-8:00 PM Session II – “Technical Exhibits”

**THEME:** 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!

#### Organizers

Kristen Francis, Lockheed Martin Space Systems, [kristen.francis@lmco.com](mailto:kristen.francis@lmco.com), 303-971-7450  
Zach Wilson, Lockheed Martin Space Systems, [zachary.s.wilson@lmco.com](mailto:zachary.s.wilson@lmco.com), 303-971-4799

## Sunday, February 5, 2012

### Morning: 7:00-10:00 AM Session III – “Space Weather Tutorial”

**THEME:** Understanding near-Earth space and atmospheric effects are critical to satellite design and effective on-orbit operation of spacecraft and payload systems (including RF and scientific payloads). Atmospheric density impacts orbital determination (OD) in the low earth orbit (LEO) regime. Ionospheric and proto-ionospheric physics result in RF signal delays and scintillation. The spacecraft in-situ environment will drive on-orbit impacts that include electrostatic discharge events, single event upsets and other effects resulting from trapped radiation and other solar particle events. This session will include a tutorial of the current state of space and upper-atmospheric physics along with an overview of current measuring systems and available data sources.

#### Organizers:

Shawn McQuerry, Lockheed Martin Space Systems, [shawn.c.mcquerry@lmco.com](mailto:shawn.c.mcquerry@lmco.com), 303-971-5264  
Lee Barker, Lockheed Martin Space Systems, [lee.a.barker@lmco.com](mailto:lee.a.barker@lmco.com); 408-742-4679

**National Chairpersons:**

Tim Walsh, NOAA/GOES-R, [timothy.j.walsh@nasa.gov](mailto:timothy.j.walsh@nasa.gov), 301-286-1739

Bob Rutledge, NOAA/Space Weather Prediction Center, [Robert.Rutledge@noaa.gov](mailto:Robert.Rutledge@noaa.gov), 303-497-3029

**Afternoon: 2:00-4:00 Session IV – “Space Weather Tutorial (Continued)”****Organizers:**

Shawn McQuerry, Lockheed Martin Space Systems, [shawn.c.mcquerry@lmco.com](mailto:shawn.c.mcquerry@lmco.com), 303-971-5264

Lee Barker, Lockheed Martin Space Systems, [lee.a.barker@lmco.com](mailto:lee.a.barker@lmco.com); 408-742-4679

**National Chairperson:**

Doug Biesecker, NOAA, [Doug.Biesecker@noaa.gov](mailto:Doug.Biesecker@noaa.gov), (303) 497-4474

**Monday, February 6, 2012****Morning: 7:00-10:00 AM Session V – “Advances in GN&C”**

**THEME:** Many programs depend on heritage, but the future is advanced by those willing to design and implement new and novel architectures, technologies, and algorithms to solve the GN&C problems. This session is open to papers with topics 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.

**Organizers:**

Dave Chart, Lockheed Martin Space Systems, [david.a.chart@lmco.com](mailto:david.a.chart@lmco.com), 303-977-6875

Ian Gravseth, Ball Aerospace & Technologies Corp., [igravseth@ball.com](mailto:igravseth@ball.com), 303-939-5421

**National Chairpersons:**

Brent Robertson, NASA/GSFC, [brent.p.robertson@nasa.gov](mailto:brent.p.robertson@nasa.gov), 301-286-9639

Tim Crain, NASA/JSC, [tim.crain-1@nasa.gov](mailto:tim.crain-1@nasa.gov), 281-244-5077

**Afternoon: 4:00-6:00 PM Session VI – “GN&C – The Future”**

**THEME:** Advances in technology and engineering capabilities have continued to facilitate increasingly-sophisticated space-based platforms for a variety of purposes. However it is clear that new GN&C concepts, architectures, systems, algorithms, and components, will be required to meet the emerging needs of the more demanding, complex and highly dynamic missions currently envisioned for Earth observation, space science, human exploration beyond low Earth orbit, and national defense. Some of the GN&C functions driven by advanced mission concepts and payload requirements include autonomy, adaptability, high stability, rapid slew and settle times, high-accuracy pointing and precise vehicle position/attitude knowledge. This session considers foreseeable system requirements and their flow to future GN&C requirements.

**Organizers:**

Michael Drews, Lockheed Martin Space Systems, [michael.e.drews@lmco.com](mailto:michael.e.drews@lmco.com), 303-971-3622

Bill Frazier, Ball Aerospace & Technology Corp., [wfrazier@ball.com](mailto:wfrazier@ball.com), 303-939-4986

**National Chairpersons:**

Neil Dennehy, NASA/GSFC, [cornelius.j.dennehy@nasa.gov](mailto:cornelius.j.dennehy@nasa.gov), 301-286-5696

David Richie, Air Force Academy, [David.richie@usafa.edu](mailto:David.richie@usafa.edu), 719-333-6734

**BANQUET ACTIVITIES**  
**SOCIAL HOUR.....6-7 PM**  
**DINNER.....7-9 PM**  
**DINNER SPEAKER.....8-9 PM**

**Tuesday, February 7, 2012**

**Morning: 7:00-10:00 AM Session VII – “Current & Future Advanced European Programs”**

**THEME:** This session, which has been a recurring topic at the conference during the last 20 years, provides a forum for candid sharing of insights gained through innovations in the international G&C community. Past conferences have shown this session to be most interesting and informative.

**Organizers:**

Jim Chapel, Lockheed Martin Space Systems, [jim.d.chapel@lmco.com](mailto:jim.d.chapel@lmco.com), 303-977-9462  
James McQuerry, Ball Aerospace & Technology Corp., [jmcquerry@ball.com](mailto:jmcquerry@ball.com), 303-939-6102

**National Chairpersons:**

Stephen Airey, ESA TEC-ECC, [Stephen.Airey@esa.it](mailto:Stephen.Airey@esa.it), +31 (0)71 565 5295  
Jacques Busseuil, Thales Alenia Space, [jacques.busseuil@thalesaleniaspace.com](mailto:jacques.busseuil@thalesaleniaspace.com), 33 (0) 4 92 92 30 06

**Afternoon: 4:00-7:00 PM Session VIII - “INR from UAV’s”**

**THEME:** This session will focus on hardware and software systems for the Image Navigation and Registration (INR) from Unmanned Aerial Vehicles (UAV’s). Talks will cover UAV systems that can be used for INR of sensors installed on the UAV platform and will also report on instruments with an autonomous INR capability. Applications will include both defense and civilian applications and will apply both to the remote collection of image data and to image guidance systems for the UAV.

**Organizers:**

Bill Emery, University of Colorado, [William.Emery@colorado.edu](mailto:William.Emery@colorado.edu), 303-492-8591  
Scott Francis, Lockheed Martin Space Systems, [scott.francis@lmco.com](mailto:scott.francis@lmco.com), 303-977-8253

**National Chairpersons:**

Gary Bullock, Naval Surface Warfare Center, [gary.bullock@navy.mil](mailto:gary.bullock@navy.mil), 812-854-6744  
Matt Fladeland, NASA/Ames, [matthew.fladeland@nasa.gov](mailto:matthew.fladeland@nasa.gov), 650-604-3325

**Wednesday, February 8, 2012**

**Morning: 7:00-10:00 AM Session IX – “Recent Experiences”**

**THEME:** Lessons learned through experience prove most valuable when shared with others in the GN&C community. This session, which is a traditional part of the conference, provides a forum for candid sharing of insights gained through successes and failures. Past conferences have shown this session to be most interesting and informative.

**Organizers:**

Brian Clapp, Lockheed Martin Space Systems, [brian.clapp@lmco.com](mailto:brian.clapp@lmco.com), 303-971-4994  
Larry Germann, Left Hand Design, [lgermann@lefthand.com](mailto:lgermann@lefthand.com), 303-652-2786

**National Chairpersons:**

Kyle Henderson, AFRL, Benjamin.Henderson@kirtland.af.mil, 505-853-6712

MiMi Aung, NASA JPL, mimi.aung@jpl.nasa.gov, 818-354-6987

Fred Leve, AFRL, Fred.Leve@kirtland.af.mil, 505-853-7476

Special note: Because we are emphasizing a 'paperless' method for collecting and distributing papers, it will be valuable if you can bring a laptop computer to the meeting. We will provide wireless in the conference area for distribution of papers. If you cannot bring a laptop, we will provide you with an electronic version of the papers on premises either by CD or copies placed on your personal 'thumb drive'.