13th International Conference on Space Operations

# SpaceOps 2014

5–9 May 2014 • Pasadena, California

## *Explore Innovation*

## FINAL PROGRAM

www.spaceops2014.org
#spaceops2014

Sponsored By

sansa SOUTH AFRICAN NATIONAL SPACE AGENCY

ViaSat

Hosted by

NASA Jet Propulsion Laboratory
California Institute of Technology

Organized by

AIAA
*Shaping the Future of Aerospace*

14-271

# Get Your Conference Info on the Go!

## Download the FREE SpaceOps 2014 Conference Mobile App

MY ITINERARY FROM SCHOLARONE

*Compatible with iPhone/iPad, Android, and BlackBerry!*

## FEATURES

**Browse Program**
*View the program at your fingertips*

**My Itinerary**
*Create your own conference schedule*

**Conference Info**
*Including special events*

**Take Notes**
*Take notes during sessions*

**City Map**
*See the surrounding area*

**Connect to Twitter**
*Tweet about what you're doing and who you're meeting with #spaceops2014*

## HOW TO DOWNLOAD

The MyItinerary app is available as both a native iOS (iPhone/iPad) app through the iTunes App Store, or as an HTML5 Web app for all major mobile devices (iPhone/iPad, Android, Blackberry 7 and above). Once either version is downloaded to your device, it can be run without the need for an active Internet connection. In addition, you can sync an itinerary that you created online with the app by entering your unique itinerary name.

### MyItinerary Mobile App

For optimal use, we recommend iPhone 3GS, iPod Touch (3rd generation), iPad iOS 4.0, or later

Download the MyItinerary app by searching for "ScholarOne" in the App Store directly from your mobile device. Alternatively, you can access the link below or scan the QR code to access the iTunes page for the app.
**http://itunes.apple.com/us/app/scholarone-my-itinerary/id497884329?mt=8**

Once the MyItinerary app is downloaded, select the meeting "SpaceOps 2014"

### MyItinerary Web App

For optimal use, we recommend: iPhone 3GS, iPod touch (3rd generation+), iPad iOS 4.0 or later

Most mobile devices using Android 2.2 or later with the default browser

Blackberry Torch or later device using Blackberry OS 7.0 with the default browser

Download the MyItinerary app by accessing the link below or scanning the QR code
**http://download.abstractcentral.com/aiaa-msops14/index.htm**

Once downloaded, you can bookmark the site to access it later or add a link to your home screen

THOMSON REUTERS™

AIAA

## Table of Contents



www.twitter.com/aiaa

www.facebook.com/AIAAfan

www.youtube.com/wwwaiaaorg

www.linkedin.com/companies/aiaa

www.flickr.com/aiaaevents

**Join the conversation!**
**#spaceops2014**

# Conference Overview

The capability of our space missions and the supporting ground infrastructure is growing, fueled by exciting new technologies, but with that growth comes increased complexity, and daunting reliability and security challenges. And like most complex enterprises, space operations are being asked to do more with less. In order to deliver cost-effective space operations services we must explore innovative ways to build and operate our systems, and integrate operations personnel into the space operations equation. Innovation is the engine that drives progress in today's high-tech global economy.

SpaceOps 2014 provides the opportunity for you to share your experiences, challenges, and innovative solutions with colleagues from around the globe, and take home new ideas and new connections. Be it civil or military applications, educational, scientific, or commercial objectives, space segments or ground segments, the space operations community greatly values, and benefits from, collaboration and the sharing of ideas. To this end, we enthusiastically invite you to Explore Innovation!

Hosted by the NASA Jet Propulsion Laboratory (JPL) and organized by the American Institute of Aeronautics and Astronautics (AIAA), SpaceOps 2014 will bring together the space operations community to address state-of-the-art operations principles, methods, and tools. Held biennially since 1990, the conference attracts technologists, scientists, and managers from space agencies, industry, and academia, and fosters managerial and technical interchange on all aspects of space mission operations, including robotic and human spaceflight, Earth orbit and deep space missions, lunar and planetary missions, and orbital and surface operations.

## Technical Program

The SpaceOps 2014 Conference contains the leading topic areas of prior conferences, with additional new concepts for the upcoming era of exploration.

- **Mission Design and Management**
- **Operations Concepts, Methods, Systems, and Automation**
- **Flight System Monitor and Control**
- **Planning and Scheduling**
- **Guidance, Navigation, and Control**
- **Human Systems and Operations**
- **Communications, Data Management and Processing**
- **Cross-Support, Interoperability, and Standards**
- **Launcher, Rocket, and Balloon Operations**
- **Small Satellite Operations**
- **Commercial Space Operations**

AIAA is the world's largest technical society dedicated to the global aerospace profession. With more than 35,000 individual members worldwide, and one hundred corporate members, AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense.

www.aiaa.org

# Conference Organizers

## SpaceOps 2014 Conference Organizing Committee

The SpaceOps 2014 Organizing Committee is staffed by representatives from NASA JPL and AIAA. The SpaceOps 2014 Technical Program Committee (TPC) is staffed by volunteers from the agencies and industry partners of the SpaceOps Organization. More information about these committees is available on our website at **www.spaceops2014.org.**

### Organizing Committee

**Organizing Committee Chair**
David Nichols
*NASA Jet Propulsion Laboratory (JPL)*

**Technical Program Committee Chair**
William Weber
*NASA Jet Propulsion Laboratory (JPL)*

**Highlight Talks Chair**
Jeffrey Norris
*NASA Jet Propulsion Laboratory (JPL)*

**Plenary Panels Chair**
Andrew Dowen
*NASA Jet Propulsion Laboratory (JPL)*

**Local Events Chair**
Navid Dehghani
*NASA Jet Propulsion Laboratory (JPL)*

**Conference Book Lead Editor**
Craig Cruzen
*NASA Marshall Space Flight Center (MSFC)*

### SpaceOps 2014 Technical Program Committee

**Technical Program Committee Chair**
William Weber
*NASA Jet Propulsion Laboratory (JPL)*

**Mission Design and Mission Management**
Arthur Amador (JPL)
Thierry Levoir (CNES)

**Operations Concepts, Methods, Systems, and Automation**
Michael Schmidt (ESA)
Takanori Iwata (JAXA)
Sean Burns (Eumetsat)

**Flight System Monitor and Control**
Helene Pasquier (CNES)
Nestor Peccia (ESA)

**Planning and Scheduling**
Martin Wickler (DLR)
Shinichi Nakamura (JAXA)
Vladimir Nazarov (IKI)

**Guidance, Navigation, and Control**
Al Cangahuala (JPL)
Ok-chul Jung (KARI)
Giovanni Valentini (ASI)

**Human Systems and Operations**
Vern Hall (JSC)
Joachim Kehr (DLR)

**Communications, Data Management and Processing**
Rolf Kozlowski (DLR)
Patrick Hogan (CSA)
Mariella Spada (ESA)

**Cross-Support, Interoperability, and Standards**
Mike Kearney (MSFC)
Jean-Marc Soula (CNES)

**Launcher, Rockets, and Balloon Operations**
Craig Cruzen (MSFC)
Julio Monreal (ESA)

**Small Satellite Operations**
Pierre Lods (CNES)
James Cutler (U of Michigan)
Zeina Mounzer (Telespazio VEGA)

**Commercial Space Operations**
Zeina Mounzer (Telespazio VEGA)
Dave LaVallee (APL)

**Traditional Posters and E-posters**
Michael Schmidhuber (DLR)
Polly Estabrook (JPL)

## About the SpaceOps Organization

The International Committee on Technical Interchange for Space Mission Operations and Ground Data Systems (SpaceOps Organization, also known as the SpaceOps Committee) is a spacecraft operations oriented international association consisting of representatives from most of the spacefaring nations. SpaceOps was founded in 1990 to foster continuous technical interchange on all aspects of space mission operations and ground data systems, and to promote and maintain an international community of space operations experts.

The forum for discussing state-of-the-art operations principles, methods, and tools are the SpaceOps biennial symposia held at varying locations and hosted and organized by a selected space agency.

## Sponsors

We would like to thank the following sponsors for their support of the SpaceOps 2014 conference:

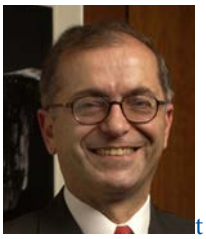
sansa SOUTH AFRICAN NATIONAL SPACE AGENCY

ViaSat®

# Special Sessions

## Monday, 5 May 2014

**0900–1100 hrs** **Ballroom D&E**



### Welcome Messages and Opening Session

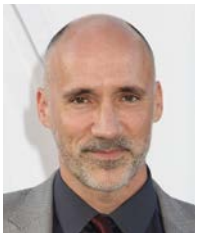
**Charles Elachi,** Director, NASA JPL, California Institute of Technology

**William Gerstenmaier,** Associate Administrator for Human Exploration and Operations, NASA Headquarters

**Sandy Magnus,** Executive Director, American Institute of Aeronautics and Astronautics

### Highlight Talks

**Jeff Norris,** Manager, Mission Operations Innovation Office, NASA JPL



**Neville Page,** Film and Television Creature and Concept Designer

## Tuesday, 6 May 2014

**0830–1000 hrs** **Ballroom D&E**

### Plenary Panel

*Control Center of the Future*

The Control Center, a combination of networks, computers, software, and people, is central to the conduct of space operations. New technologies such as human-computer interfaces, information representation, modeling and simulation, immersive displays and higher levels of interconnectedness promise to transform the Control Center and open up innovative ways of maintaining knowledge of our remote assets. This panel will explore the transformational technologies and resulting new operational paradigms that we might see in the Control Center of the next two decades.

**Moderator: Jeff Norris,** Manager, Mission Operations Innovation Office, NASA JPL

**Panelists**

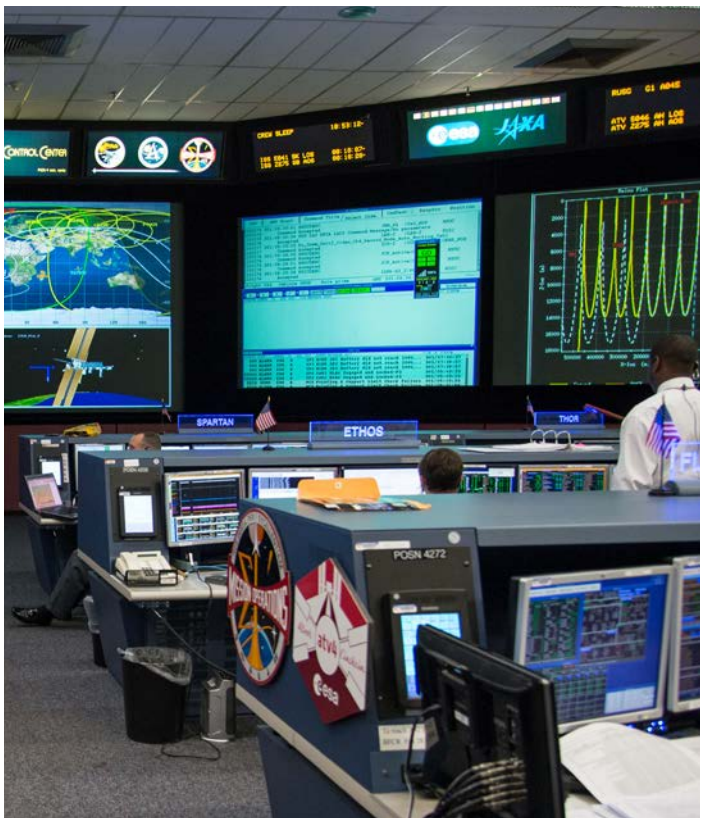
**Jean-Luc Froeliger,** VP of Satellite Operations and Engineering, Intelsat

**Chris Kettering,** Director, Product Development Services and Support, The Boeing Company

**Bill Possel,** Director of Mission Operations and Data Systems Laboratory for Atmospheric and Space Physics (LASP), University of Colorado at Boulder

**John Muratore,** SpaceX

**Martin Wickler,** DLR Deputy Head of the Mission Operations Department



# Special Sessions

## Wednesday, 7 May 2014

**0830–1000 hrs** **Ballroom D&E**

### Plenary Panel

*Smallsat Operations*

In the last few years miniaturization took a quantum leap and with that the utility of smaller satellites considerably increased. It is commonly believed that even now and certainly in the near future, the small satellites including Cubesats will perform most, if not all the functions that larger satellites perform presently. Since many CubeSats and SmallSats are being built and operated by non-governmental entities including academia, this panel will explore the opportunities for innovation that lower cost and easier access to space affords. It will also address Operational Challenges for near Earth and Interplanetary missions.

**Moderator: Manfred Bester,** Director of Operations, Space Science Lab, University of California, Berkeley

**Panelists**

**Peter Allan,** Head of the Space Data Division, Deputy Director of RAL Space Rutherford Appleton Laboratory

**Chris Boshuizen,** Co-founder, Planet Labs, Inc.

**James Cutler,** Department of Aerospace Assistant Professor, University of Michigan

**William Devereux,** Supervisor, Engineering and Technology Branch Space Department, Johns Hopkins University Applied Physics Lab

**Hakan Kayal,** Professor of Computer Science, Universität Würzburg

**Trevor Sorensen,** Specialist/Project Manager, Hawaii Space Flight Laboratory

## Thursday, 8 May 2014

**0830–1000 hrs** **Ballroom D&E**

### Plenary Panel

*Commercial Space*

Space is no longer only accessible to governments, but many in the private sector are eyeing or are becoming major players in space-related ventures. This panel will explore the new and innovative business models for profitable ventures into space and the the associated operations challenges. Space tourism, commercial spaceports, commercial space transportation (launching of satellites), reusable launch vehicles (RLV), commercial cargo and commercial crew, commercialization of space activities and commercial space exploration (e.g.,asteroid mining) are only few examples of things to come.

**Moderator: Alex MacDonald,** Commercial Space Specialist, National Space Technology Applications Office, JPL

**Panelists**

**Ryan Johnson,** President and CEO, The BlackBridge Group

**Jeffrey Manber,** Managing Director, NanoRacks LLC

**John Olsen,** Vice-President, Space Systems, Sierra Nevada Corporation

**Arno Wielders,** Mars-One

**James Wolff,** Co-founder, Deep Space Industries

## Friday, 9 May 2014

**1030–1230 hrs** **Ballroom D&E**

### Closing Session

**Michael Moses,** Vice President of Operations for Virgin Galactic

**Yongseung Kim,** Executive Director of Satellite Information Research Laboratory, Korea Aerospace Research Institute (KARI)

**Eunsup Sim,** Vice President, Korea Aerospace Research Institute

# Special Events

## Welcome Reception and Exhibit Hall Lunches

### Reception

**Monday, 5 May 2014**

A Cinco de Mayo-themed welcome reception will be held on Monday, 5 May, 1800–1930 hrs, in the Exhibit Hall. Take this opportunity to engage new contacts and refresh old ones. A ticket for the reception is required, and is included in the registration fee where indicated. Additional tickets may be purchased upon registration or on site, as space is available.

### Lunches

**Monday–Thursday, 5–8 May**

Reception-style lunches will be held Monday-Thursday, 5–8 May, 1230–1330 hrs, in the Exhibit Hall. Lunch tickets are included in the registration packages where indicated. Additional tickets may be purchased upon registration or on site, as space is available.

## Awards Ceremony and Dinner

**Wednesday, 7 May 2014**

The Conference Awards Dinner will be held at the California Science Center, where we will dine under the Endeavour Shuttle in the Samuel Oschin Pavilion. The event is from 1845 to 2200 hrs. This year's SpaceOps awards recipients will be recognized. Tickets are included in the registration fee where indicated. Additional tickets may be purchased for $215 at the registration desk while supplies last. Transportation is included in the ticket price. You are encouraged to take the buses. Buses will depart from the Pasadena Convention Center starting at 1805 hrs, with the last bus departing at 1830 hrs. Buses will return to two locations: Pasadena Convention Center/Sheraton and Hilton.

**Highlight Talk: Gerhard Thiele**

Head of the Strategy and Outreach Office in the Directorate of Human Spaceflight and Operations, European Space Agency

# General Information

## Registration and Information Center

| | |
|---|---|
| **Sunday, 4 May** | 1500–1900 hrs |
| **Monday, 5 May–Thursday, 8 May** | 0700–1800 hrs |
| **Friday, 9 May** | 0700–1200 hrs |

## Exhibit Hall Hours

| | |
|---|---|
| **Monday, 5 May** | 1100–1600 hrs<br>1800–1930 hrs |
| **Tuesday, 6 May–Wednesday, 7 May** | 1000–1600 hrs |
| **Thursday, 8 May** | 1000–1400 hrs |

## Networking Coffee Breaks

Complimentary coffee will be available for attendees in the Exhibit Hall and the main conference foyer during the following times:

**Monday**

| | |
|---|---|
| **Ballroom Foyer** | 0830–0900 hrs |
| **Exhibit Hall** | 1100–1130 hrs<br>1530–1600 hrs |

**Tuesday–Thursday**

| | |
|---|---|
| **Ballroom Foyer** | 0800–0830 hrs |
| **Exhibit Hall** | 1000–1030 hrs<br>1530–1600 hrs |

Tuesday coffee break sponsored by ViaSat

**Friday**

| | |
|---|---|
| **Ballroom Foyer** | 0800–0830 hrs |

## Cyber Café/Wireless Internet Information

There will be computers with complimentary Internet access in the Ballroom Foyer for conference attendees during the hours of Registration and Information.

| | |
|---|---|
| **Sunday, 4 May** | 1500–1900 hrs |
| **Monday, 5 May–Thursday, 8 May** | 0700–1800 hrs |
| **Friday, 9 May** | 0700–1200 hrs |

Wi-Fi Internet Access On Site: Conference attendees will be provided limited Wi-Fi service in the Ballroom areas. To keep this service available and optimized for all attendees, please do not download files larger than 2MB, create multiple sessions across multiple devices, or download multiple files in one session. Wi-Fi passcode: **spaceops2014**

## Private Conference Room

Attendees wishing to conduct meetings during the conference may do so in Conference Room 215 (located across the plaza in the conference center). A signup sheet will be posted on the door.

## Conference Proceedings

Proceedings for the conference will be available online. The cost is included in the registration fee where indicated. Online proceedings will be available on 5 May 2014. Attendees who register in advance for the online proceedings will be provided with instructions on how to access them. Those registering on site will be provided with instructions at that time.

**Proceedings:**

1. Visit www.aiaa.org > ARC > Meeting Papers and log in using your email address as user name and your password (AIAA membership number or self-created)

   a. Select the appropriate conference from the list.

   b. Search for individual papers with the Quick Search toolbar in the upper right corner of the page:

      i. By paper number: Click the "Paper Number" link, select the conference year, and enter the paper number.

      ii. Use the Search textbox to find papers by author, title, or keyword. The Advanced Search link provides additional search information and options.

2. All manuscript files submitted by four days prior to the conference are currently in the proceedings. Files submitted after that date, both original and revised manuscripts, will not be available until the final proceedings update, which may take up to 15 business days after the last day of the conference.

3. AIAA provides limited Wi-Fi service for attendees to use while on site. To keep this service available and optimized for all attendees, please do not download files larger than 2MB, create multiple sessions across multiple devices, or download multiple files in one session. If you receive an error message that an AIAA server is blocking your current IP address, please inform the AIAA registration desk.

4. Direct any questions concerning access to proceedings and/or ARC to **arcsupport@aiaa.org.**

**Manuscript Revisions:**

1. To request access to submit a revision, email AIAA at revisions@aiaa.org no later than seven business days after the last day of the conference. Include the name of this conference as well as your paper number in the body of the email.

2. Revisions submitted for manuscripts already online will not refresh until after the proceedings have been updated, which may take up to 15 business days after the last day of the conference.

## Certificate of Attendance

Certificates of Attendance are available for attendees who request documentation at the forum itself. Please request your copy at the AIAA Registration and Information Center beginning on Wednesday. AIAA offers this service to better serve the needs of the professional community. Claims of hours or applicability toward professional education requirements are the responsibility of the participant.

## Nondiscriminatory Practices

AIAA accepts registrations irrespective of race, creed, gender, color, sexual orientation, physical handicap, and national or ethnic origin.

## Restrictions

Photography or the video or audio recording of sessions or exhibits, as well as the unauthorized sale of AIAA-copyrighted material, is prohibited.

## International Traffic in Arms Regulations (ITAR)

SpaceOps speakers and attendees are reminded that some topics discussed at the forum could be controlled by the International Traffic in Arms Regulations (ITAR). U.S. nationals (U.S. citizens and permanent residents) are responsible for ensuring that technical data they present in open sessions to non-U.S. nationals in attendance or in conference proceedings are not export restricted by the ITAR. U.S. nationals are likewise responsible for ensuring that they do not discuss ITAR export-restricted information with non-U.S. nationals in attendance.

# General Information

## Poster Sessions

Electronic Posters (e-Poster) and Traditional Posters will be displayed in the Ballroom Foyers. Presenters will be present between 1500–1720 hrs daily.

## Author and Session Chair Information

### Speakers' Briefings in Session Rooms

Authors who are presenting papers will meet with session chairs and co-chairs in their session rooms for a short 20-30-minute briefing on the day of their sessions to exchange bios and review final details prior to the session. Please attend on the day of your session(s). Laptops preloaded with the Speakers' Briefing preparation slides will be provided in each session room. Speakers' Briefing schedule is as follows

**Monday Morning Sessions**
1100–1130 hrs

**Monday–Thursday Afternoon Sessions**
1310–1330 hrs

1530–1600 hrs

**Tuesday–Thursday Morning Sessions**
1000-1030 hrs

**Friday Morning Sessions**
0800-0830 hrs

### Speakers' Practice Room

Speakers who wish to practice their presentations may do so in the Conference Room 205 (located across the plaza in the Conference Center). A sign-up sheet will be posted on the door. In consideration of others, please limit practice time to 30-minute increments.

### Session Chair Reports

All session chairs are asked to complete a session chair report to evaluate their session for future planning. AIAA has partnered with Canvas Solutions to provide an electronic Session Chair Report form. You can download the FREE mobile app in your App Store, AppWorld, or Marketplace by searching for "Canvas Solutions, Inc." The mobile app is free, so please be sure to download it. Detailed instructions will be provided in the session rooms. If you do not have a tablet or a smartphone, simply use the report form as a guide and enter your session chair report information at the session chair reporting computer station located on site near the AIAA registration area. Report data will be collected and used for future planning purposes, including session topics and room allocations. Please submit your session chair report electronically by 9 May 2014.

### Audiovisual

Each session room will be preset with the following: one laptop computer, one LCD projector, one screen, one microphone and sound system, and one laser pointer. You may also use your own computer. Any additional audiovisual equipment requested on site will be at cost to the presenter. Please note that AIAA does not provide security in the session rooms and recommends that items of value not be left unattended.

### "No Paper, No Podium" and "No Podium, No Paper" Policy

If a written paper is not submitted by the final manuscript deadline, authors will not be permitted to present the paper at the forum. Also, if a paper is not presented at the forum, it will be withdrawn from the proceedings. It is the responsibility of those whose papers or presentations are accepted to ensure that a representative attends the conference to present the paper. These policies are intended to improve the quality of the program for attendees.

# Awards and Recognitions

The following awards will be presented during the **Wednesday, 7 May 2014**, Conference Awards Dinner, 1845–2200 hrs, at the California Science Center.

## International SpaceOps Award for Outstanding Achievement


### The TerraSAR-X and TanDEM-X Mission Operations Team

| | | |
|---|---|---|
| Alessandro Codazzi | Ralph Kahle | Falk Mrowka |
| Jaap Herman | Wilfried Kruse | Heinz Wacker |
| Harald Hofmann | Edith Maurer | Steffen Zimmermann |

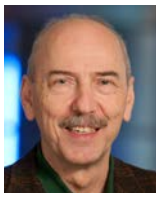
*For their outstanding and unique achievements during more than four years of operations.*

## International SpaceOps Distinguished Service Medal

### Genevieve Campan (CNES)

*In appreciation for involvement in the SpaceOps Organization and many valuable contributions to its activities in various functions for more than ten years.*

## International SpaceOps Exceptional Achievement Medal

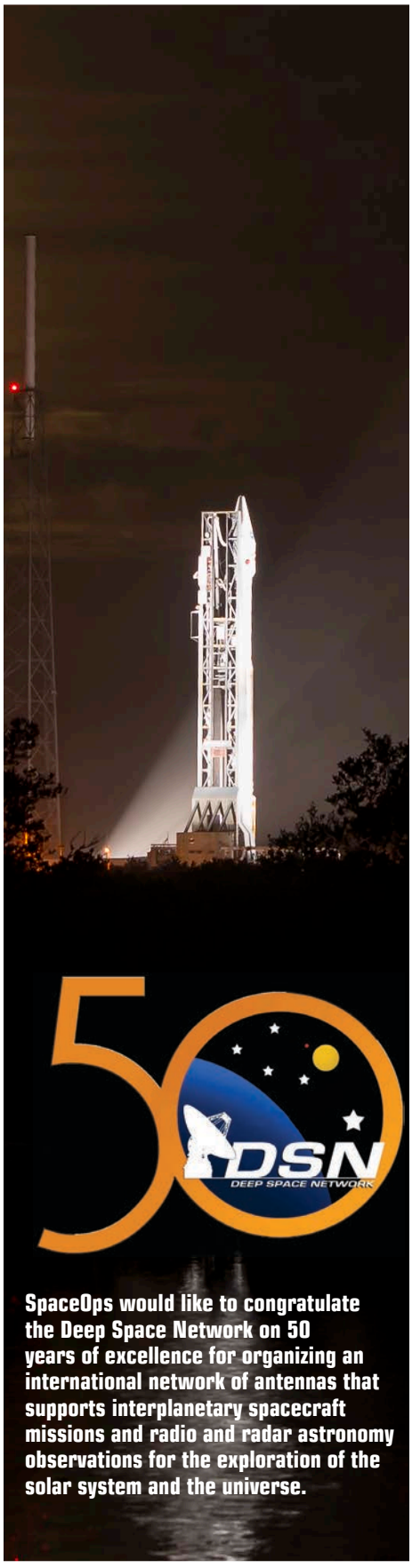


### Manfred Warhaut (ESA, Retired)

*For always emphasizing the importance of operations in a project, ensuring that operations get the appropriate appreciation, and being a strong supporter of cross-support between space agencies.*

## Best Student Paper

The winner of the Best Student Paper will be announced on Wednesday, 7 May, prior to the Plenary Panel. Please join us in congratulating this student on their achievement.



# Exhibit Hall

The exhibit hall is the hub of activity during this event. Networking coffee breaks, luncheons, and welcome reception, are all held in the exhibit hall to give attendees and exhibitors an opportunity to celebrate technical excellence and connect with partners, industry-thought leaders, and collaborators who can help move your business forward.

## Exhibit Hall Hours

| | |
|---|---|
| **Monday, 5 May** | 1100–1600 hrs<br>1800–1930 hrs |
| **Tuesday, 6 May–Wednesday, 7 May** | 1000–1600 hrs |
| **Thursday, 8 May** | 1000–1400 hrs |

## Networking Coffee Breaks

Complimentary coffee will be available for attendees in the Exhibit Hall and the main conference foyer during the following times:

**Monday**

| | |
|---|---|
| **Ballroom Foyer** | 0830–0900 hrs |
| **Exhibit Hall** | 1100–1130 hrs<br>1530–1600 hrs |

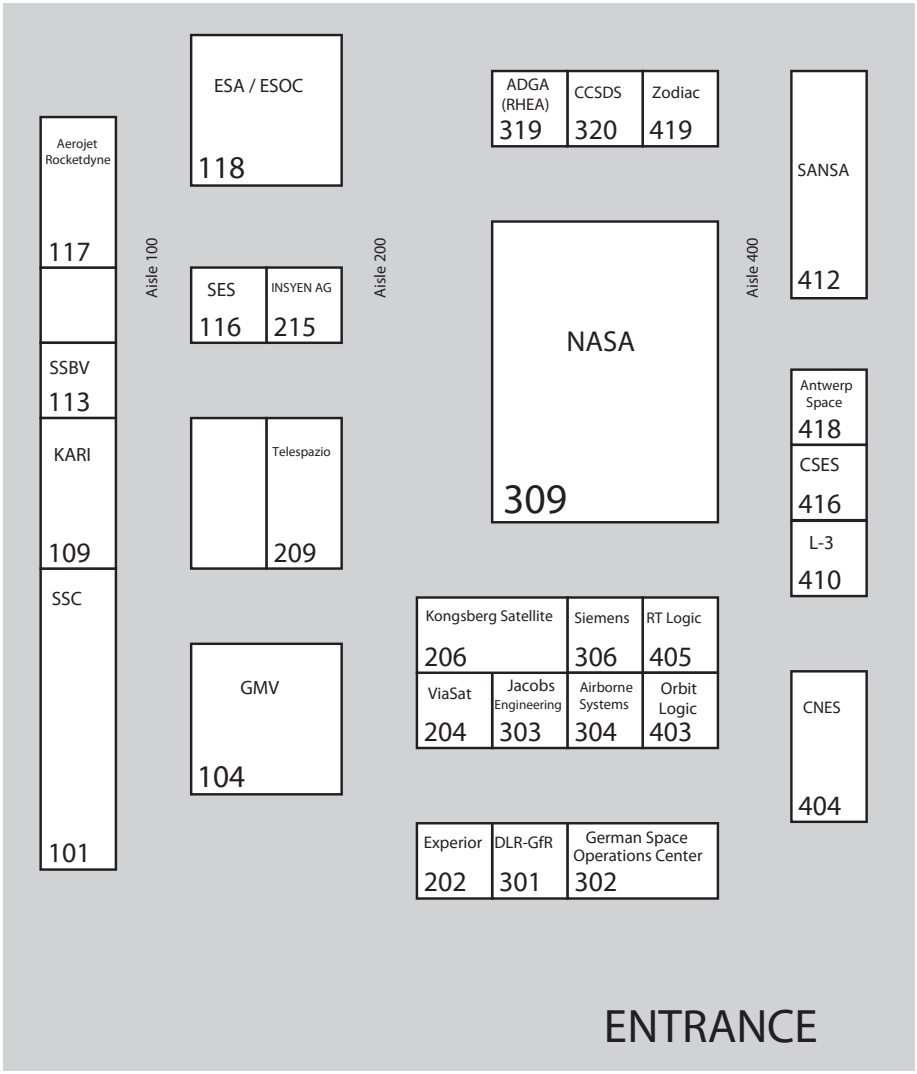
**Tuesday–Thursday**

| | |
|---|---|
| **Ballroom Foyer** | 0800–0830 hrs |
| **Exhibit Hall** | 1000–1030 hrs<br>1530–1600 hrs |

Tuesday coffee break sponsored by ViaSat

**Friday**

| | |
|---|---|
| **Ballroom Foyer** | 0800–0830 hrs |




## Exhibitors by Booth Number

| | |
|---|---|
| **319** | **ADGA RHEA Group of Companies** |
| **117** | **Aerojet Rocketdyne** |
| **304** | **Airborne Systems** |
| **418** | **Antwerp Space** |
| **416** | **California Space Enterprise Center** |
| **404** | **Centre National d'Etudes Spatiales (CNES)** |
| **320** | **The Consultative Committee for Space Data Systems** |
| **302** | **DLR-German Space Operations Center** |
| **301** | **DLR Gesellschaft Fur Raumfahrtanwendungen (GfR) mbH** |
| **118** | **European Space Agency (ESA)** |
| **202** | **Experior Laboratories** |
| **104** | **GMV** |
| **215** | **INSYEN AG** |
| **303** | **Jacobs** |
| **206** | **Kongsberg Satellite Services-KSAT** |
| **109** | **Korea Aerospace Research Institute (KARI)** |
| **410** | **L-3 Communications** |
| **309** | **National Aeronautics and Space Administration (NASA)** |
| **403** | **Orbit Logic** |
| **405** | **RT Logic** |
| **116** | **SES Techcom S.A.** |
| **306** | **Siemens Convergence Creators GmbH** |
| **412** | **South African National Space Agency (SANSA)** |
| **113** | **SSBV Aerospace and Technology Group** |
| **101** | **Swedish Space Corporation (SSC)** |
| **209** | **Telespazio Vega Deutschland GmbH** |
| **204** | **ViaSat, Inc.** |
| **419** | **Zodiac Data Systems** |

# Exhibitors


## ADGA RHEA Group of Companies 319

**Avenue Pasteur 23**
**Wavre, 1300**
**Belgium**
**http://www.rheagroup.com/**
**info@rheagroup.com**

The ADGA RHEA Group of Companies provides solutions across the global space and security sectors. We contribute to the operations of more than 80 missions, providing MOIS, the leading suite of tools for operations preparation and automation; and the Concurrent Design Platform (CDP™), an innovative, multidisciplinary approach to system engineering.

## Aerojet Rocketdyne 117

**2001 Aerojet Road**
**Rancho Cordova, CA 95742-6418**
**www.rocket.com**
**comments@rocket.com**

Aerojet Rocketdyne is a world-recognized aerospace and defense leader providing propulsion and energetics to the domestic and international space, missile defense and strategic systems, tactical systems and armaments areas, and transformational energy technology solutions to address the world's energy needs. Additional information about Aerojet Rocketdyne can be obtained by visiting the company website at www.Rocket.com.

## Airborne Systems 304

**3000 West Segerstrom Avenue**
**Santa Ana, CA 92704**
**www.airborne-sys.com**
**kurt.hempe@airborne-sys.com**

Airborne Systems is a world leader in the design, development, fabrication, test and integration of Entry Descent and Landing Systems (EDLS), including parachutes systems, Air Bag Landing Attenuation systems, and Inflatable Aerodynamic Decelerators. Airborne Systems provide EDLS systems for various aircraft and spacecraft and is leading the development of new technologies including Inflatable Aerodynamic Decelerators.

## Antwerp Space 416

**Berkenrodelei 33**
**B-2660 Antwerp**
**Belgium**
**www.antwerpspace.be**
**sales@antwerpspace.be**

Antwerp Space, part of the OHB Group, is specialized in Satellite Communication with a track recoard of 50 years in the following fields: Ground Station Equipment (Satellite modems for Earth Observation, telecom. TM/TC), Satellite Ground Facilities (Ground Stations and Satellite check-out Equipment, SCOE EGSE), Secure Satellite communication networks, Satellite Flight Equipment, Electronic modules and Communication Engineering.

## California Space Enterprise Center 416

**P.O. Box 285**
**Santa Barbara, CA 93102**
**www.green2gold.org**
**alan@green2gold.org**

California Space Enterprise Center is the project for fostering private space enterprise among individual inventors, innovators, entrepreneurs and small business. The space enterprise campus features an incubator and conference center and provides virtual space entrepreneurship services.

## Centre National d'Etudes Spatiales (CNES) 404

**18 avenue Edouard Belin**
**Toulouse 31401 Cedex 9**
**France**
**www.cnes.fr**
**pierre.lods@cnes.fr**

Founded in 1961, the Centre National d'Etudes Spatiales (CNES) is the governmental French Space Agency responsible for shaping and implementing France's space policy in Europe. Its task is to invent the space systems of the future, bring space technologies to maturity and guarantee France's independent access to space.

# Exhibitors

## The Consultative Committee for Space Data Systems 316

**1801 Alexander Bell Drive, Suite 500 (Secretariat)**
**Reston, VA 20191**
**www.ccsds.org**
**secretariat@mailman.ccsds.org**

Founded in 1982 by the major space agencies of the world, CCSDS is a multi-national forum for the development of communications and data systems standards for spaceflight. Today, leading space communications experts from 26 nations collaborate in developing the most well-engineered space communications and data handling standards in the world.

## DLR-German Space Operations Center 302

**Muenchener Strasse 20**
**82234 Wessling**
**Germany**
**www.dlr.de/rb**
**Thomas.kuch@dlr.de**

The German Space Operations Center in Oberpfaffenhofen near Munich is DLR's center for space operations, currently operating 8 satellites in geostationary and low-earth orbits. Those and other missions are supported by DLR's ground station in Weilheim with more than 150 antennas. For the ISS GSOC also operates the Columbus Control Center and the European communication network and coordinates European payload activities.

## DLR Gesellschaft Fur Raumfahrtanwendungen (GfR) mbH 301

**Muenchner Strasse 20**
**82234 Wessling**
**Germany**
**www.dlr.de/rb**
**Thomas.kuch@dlr.de**

DLR GfR mbH is fully owned by the German Aerospace Center DLR. DLR GfR mbH has its core business in the area of space operations and application services but is also offering Antenna and Hosting Services. DLR GfR operates the Galileo satellites from the Galileo Control Center in Oberpfaffenhofen and has implemented a highly sophisticated and most reliable technical infrastructure.

## European Space Agency (ESA) 118

**ESA/ESTEC-Keplerlaan 1**
**Pennsauken, NJ 08109**
**www.airborne-sys.com**
**kurt.hempe@airborne-sys.com**

The European Space Agency (ESA) is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver the benefits to the citizens of Europe and the world. ESA is an international organization with 20 Member States. By coordinating the financial and intellectual resources of its members, it can undertake programmes and activities far beyond the scope of a single European country.

## Experior Laboratories, Inc. 202

**1635 Ives Avenue**
**Oxnard, CA 93033**
**www.experiorlabs.com**
**roger@experiorlabs.com**

Experior Laboratories is a third party, independent test service provider and test laboratory. Specializing in environmental testing, Experior provides services to component manufacturers, military contractors, integrators and system providers within the space, aerospace, industrial, telecom, and defense markets. Experior Labs' extensive test facility has the capability to conduct a wide-range of services, from structural and subassembly assessment to material evaluation, utilizing environmental and mechanical tests such as vibration, shock, temperature/humidity, altitude, corrosion, and many more. Experior's provided testing services are in accordance with IEEE, MIL, SAE, AS, RTCA and other standard bodies.

## GMV 104

**C/Isacc Newton, 11**
**Tres Cantos, Madrid 28760**
**www.gmv.com**
**mamolina@gmv.com**

GMV is a trusted partner of leading Satellite Operators, Satellite Manufacturers and Space Agencies worldwide. Since 1984, we provide engineering, software development and systems integration in the areas of mission analysis, GNC, satellite control, flight dynamics, data processing, navigation, on board software and applications. Involved in more than 300 satellite missions and having a GMV's portfolio of flight proven products for satellite operations, today running in more than 150 satellites.

## INSYEN AG 416

**Muenehner Strasse 20**
**82234 Wessling**
**Germany**
**www.insyen.com**
**info@insyen.com**

At INSYEN we are inspired by transforming complex engineering challenges into exciting products and reliable services that exceed our customers' expectations. Our space portfolio ranges from operations services to systems engineering and software development. Moreover, we develop and manufacture hardware and software products including simulators and emulators for the aerospace industry.

## Jacobs 303

**P.O. Box 21046**
**Kennedy Space Center, FL 32815-0046**
**www.jacobstechnology.com**
**peter.montgomery@jacobs.com**

Jacobs is one of the nation's largest engineering and technical services-only companies. With 70+ years of experience supporting government and commercial clients, we have earned a reputation for excellence and outstanding technical and managerial achievements in quality, performance, and safety. Our clients include DOD, NASA, the U.S. Special Operations Command, the DOE and dozens of commercial clients.

# Exhibitors

## Kongsberg Satellite Services-KSAT 206

**Prestvannveien 38**
**Tromso, Troms, 9291 Tromso**
**Norway**
**www.ksat.no**
**ksat@ksat.no**

Kongsberg Satellite Services (KSAT) is a Norwegian company, uniquely positioned to provide ground station and earth observation services for polar orbiting satellites. KSAT operates ground stations in Tromso at 69°N, Svalbard at 79°N and Antarctic troll at 72°S which in combination with its mid-latitude network, ensure world-leading ground station services..

## Korea Aerospace Research Institute (KARI) 109

**www.kari.re.kr**

As a prestigious Korean institute dedicated to aerospace research, KARI ensures safer and higher quality of life for Korean people through aerospace technology development while incorporating their aspirations and values for the sky and the universe through aerospace expansion.

## L-3 Communications 410

**9020 Balboa Avenue**
**San Diego, CA 92123**
**www.L-3com.com/TW**
**Sales.TW@L-3com.com**

L-3 Telemetry-West (L-3 TW) is a premier provider of flight hardware and systems solutions for telemetry, tracking, command & control; flight termination; and secure mission data transmission in the satellite, launch vehicle, weapons, aircraft and UAV markets. L-3 TW's products are utilized across a uniquely diverse applications set, including spacecraft command and control, on-orbit operations, launch support and monitoring, missile defense, flight testing, weapons test and development, surveillance and detection, and general-purpose data acquisition. To learn more about L-3 TW, please visit the company's website at www.L-3com.com/TW.

## National Aeronautics and Space Administration (NASA) 309

**NASA Headquarters**
**300 E Street S.W. (between 3rd and 4th Streets)**
**Washington, D.C. USA**
**www.nasa.gov**
**Michael.Tankenson@jpl.nasa.gov**

NASA is an agency of the United States government that is responsible for the nation's civilian space program and for aeronautics and aerospace research. Contributors to the NASA exhibit include the Goddard Space Flight Center (GSFC), Jet Propulsion Laboratory (JPL), Johnson Space Center (JSC), and Marshall Space Flight Center (MSFC).

## Orbit Logic 403

**7852 Walker Drive, Suite 400**
**Greenbelt, MD 20770**
**www.orbitlogic.com**
**info@orbitlogic.com**

Orbit Logic specializes in mission planning, scheduling, and space situational awareness. Orbit Logic's operationally proven software products – Collection Planning & Analysis Workstation, STK Scheduler, SpyMeSat Mobile App, Collection Feasibility Tool, and Sibyl Satellite Tasking Mobile App – create better plans faster with fewer resources, more insight, and less risk.

## RT Logic 405

**www.rtlogic.com**
**mreising@rtlogic.com**

RT Logic's innovative signal processing products provide field-proven capabilities for communication with satellites and spacecraft. From factory test to flight, from ground data networking to space-ground RF Links - the defense, civil, and commercial space community trusts RT Logic to solve its mission's most difficult test and communication problems.

## SES Techcom S.A. 116

**Chateau de Betzdorf**
**L-6815 Betzdorf**
**Luxembourg**
**http://www.ses.com**
**info.techcom@ses.com**

SES Techcom provides turnkey teleport solutions and managed communication services specifically designed for your satellite communication projects. SES Techcom stands for sharing technical competences between industry partners. We provide independent world-class engineering expertise and project management for the global satellite industry.

## Siemens Convergence Creators GmbH 306

**Autokaderstr. 29**
**1210 Vienna**
**Austria**
**http://siemens.com/cvc/**
**info-cvc.at@siemens.com**

Siemens Convergence Creators provide turnkey solutions and services to the space industry. The SIECAMS family of products is a highly sophisticated automated RF and content monitoring platform for the continuous monitoring of satellite carriers. Siemens has helped many satellite operators commence operations and develop their capacity management and customer technical support infrastructure.

# Exhibitors

## South African National Space Agency (SANSA) 412

**Farm No. 502JQ**
**District Krugersdorp, SA**
**South Africa**
**www.sansa.org.za**
**spaceops-info@sansa.org.za**

Stationed at Harteesthoek, SANSA Space Operations specializes in all aspects of space mission support, satellite operations, ground segment construction and hosting. The directorate provides state-of-the-art ground station facilities and services including satellite tracking, telemetry and command, as well as launch support, in-orbit testing, mission control and space navigation.

## SSBV Aerospace and Technology Group 113

**Huygensstraat 44**
**Noordwijk, ZH, 2201DK**
**Netherlands**
**www.ssbv.com**
**marketing@ssbv.com**

SSBV is a Dutch-headed, technology driven company, active in the domains of (aero)Space, Remote Sensing & Monitoring, Defence & Security, and the development of High-Tech Systems. Based on in-house technology, engineering, assembly and test skills, SSBV is a product-based solution provider at unit, subsystem, and system level.

## Telespazio Vega Deutschland GmbH 209

**Europaplatz 5**
**Darmstadt, 64293**
**Germany**
**www.telespazio-vega.de**
**marketing@telespazio-vega.de**

Telespazio VEGA Deutschland is a well-established engineering services, technology development and consulting business. Over the past 30 years, it has built up a first-class reputation in high-technology markets, where quality and reliability are essential. Its roots lie in the Space market and the experience it has developed there brings benefits to its other core markets of Aviation and Defence.

## ViaSat, Inc. 204

**1725 Breckinridge Plaza**
**Duluth, GA 30096**
**http://www.viasat.com/antenna-systems**
**fullmotionantennas@viasat.com**

ViaSat Antenna Systems designs, integrates and delivers high-performance "RF to archive" tracking antenna systems that support LEO, MEO and GEO satellites from UHF to Ka-band. Spanning the globe from pole-to-pole, we have delivered over 150 commercial remote sensing antennas and upgrades in more locations than any other major manufacturer.

## Zodiac Data Systems 419

**5 Avenue Des Andes – Cs90101**
**91978 Courtaboeuf Cedex**
**France**
**www.zodiacaerospace.com**
**isite@zodiacaerospace.com**

Zodiac Data Systems is a high technology company that designs, manufactures and supplies a broad range of products and solutions for airborne & ground telemetry, mission video and flight test recorders, satellite command control, data collection from observation satellites and products and solutions for satellite communications QoS monitoring.

# Program Overview

| | MONDAY 5 May | | TUESDAY 6 May | |
|---|---|---|---|---|
| 0800 hrs | | | Networking Coffee Break | |
| 0830 hrs | Networking Coffee Break | | | |
| 0900 hrs | Opening Session | | Plenary Sessions | |
| 0930 hrs | | | | |
| 1000 hrs | | | Networking Coffee Break/Speakers' Briefing | |
| 1030 hrs | | | Technical Sessions | Exhibit Hall Open |
| 1100 hrs | Networking Coffee Break/ Speakers' Briefing | Exhibit Hall Open | | |
| 1130 hrs | Technical Sessions | | | |
| 1200 hrs | | | | |
| 1230 hrs | Exhibit Hall Luncheon Speakers' Briefing 1310 hrs | | Exhibit Hall Luncheon Speakers' Briefing 1310 hrs | |
| 1300 hrs | | | | |
| 1330 hrs | Technical Sessions | Exhibit Hall Open | Technical Sessions | Exhibit Hall Open |
| 1400 hrs | | | | |
| 1430 hrs | | | | |
| 1500 hrs | | | | |
| 1530 hrs | Networking Coffee Break/Speakers' Briefing | | Networking Coffee Break/Speakers' Briefing | |
| 1600 hrs | Technical Sessions | Exhibit Hall Closed Reopens for Reception | Technical Sessions | |
| 1630 hrs | | | | |
| 1700 hrs | | | | |
| 1730 hrs | | | | |
| 1800 hrs | Exhibit Reception | | | |
| 1830 hrs | | | | |
| 1900 hrs | | | | |
| 1930 hrs | | | | |
| 2000 hrs | | | | |
| 2030 hrs | | | | |
| 2100 hrs | | | | |
| 2130 hrs | | | | |
| 2200 hrs | | | | |

# Program Overview

| | WEDNESDAY 7 May | THURSDAY 8 May | FRIDAY 9 May |
|---|---|---|---|
| 0800 hrs | Networking Coffee Break | Networking Coffee Break | Networking Coffee Break |
| 0830 hrs | Plenary Sessions | Plenary Sessions | Technical Sessions |
| 0900 hrs | | | |
| 0930 hrs | | | |
| 1000 hrs | Networking Coffee Break/Speakers' Briefing | Networking Coffee Break/Speakers' Briefing | |
| 1030 hrs | Technical Sessions / Exhibit Hall Open | Technical Sessions / Exhibit Hall Open | Closing Session |
| 1100 hrs | | | |
| 1130 hrs | | | |
| 1200 hrs | | | |
| 1230 hrs | Exhibit Hall Luncheon<br>Speakers' Briefing 1310 hrs | Exhibit Hall Luncheon<br>Speakers' Briefing 1310 hrs | |
| 1300 hrs | | | |
| 1330 hrs | Technical Sessions / Exhibit Hall Open | Technical Sessions / Exhibit Hall Closes at 1400 hrs | |
| 1400 hrs | | | |
| 1430 hrs | | | |
| 1500 hrs | | | |
| 1530 hrs | Networking Coffee Break/Speakers' Briefing | Networking Coffee Break/Speakers' Briefing | |
| 1600 hrs | Technical Sessions | Technical Sessions | |
| 1630 hrs | | | |
| 1700 hrs | | | |
| 1730 hrs | | | |
| 1800 hrs | | | |
| 1830 hrs | | | |
| 1900 hrs | Awards Ceremony and Dinner<br>California Science Center 1845 hrs<br>(Buses depart starting at 1805 hrs) | | |
| 1930 hrs | | | |
| 2000 hrs | | | |
| 2030 hrs | | | |
| 2100 hrs | | | |
| 2130 hrs | | | |
| 2200 hrs | | | |

*Schedule subject to change

# Program-At-A-Glance

| Abbreviation | Title | Start Time | End Time | Location |
|---|---|---|---|---|
| | **Monday, 5 May 2014** | | | |
| 2-PLNRY-1 | Opening Ceremony | 0900 hrs | 1100 hrs | Ballroom D&E |
| 5-CDMP-1 | CDMP - Advanced Ground Segment Technologies I | 1130 hrs | 1230 hrs | Ballroom B |
| 6-FSMC-1 | FSMC - Flight Control Systems & EGSE I | 1130 hrs | 1230 hrs | Ballroom C |
| 7-HSO-1 | HSO - Ops I | 1130 hrs | 1230 hrs | Ballroom I |
| 8-LBO-1 | LBO - Launch Operations Modeling--Cost and Availability | 1130 hrs | 1230 hrs | Ballroom H |
| 9-MDM-1 | MDM - Extended Mission Operations | 1130 hrs | 1230 hrs | Ballroom G |
| 10-MDM-2 | MDM - Mission Design | 1130 hrs | 1230 hrs | Ballroom F |
| 13-CDMP-2 | CDMP - Advanced Ground Segment Technologies II | 1330 hrs | 1530 hrs | Ballroom B |
| 14-CDMP-3 | CDMP - Network Operations and Management I | 1330 hrs | 1530 hrs | Ballroom C |
| 15-HSO-2 | HSO - Ops II | 1330 hrs | 1530 hrs | Ballroom I |
| 16-LBO-2 | LBO - Launch Vehicle Operations | 1330 hrs | 1530 hrs | Ballroom H |
| 17-MDM-3 | MDM - Mission System Design I | 1330 hrs | 1530 hrs | Ballroom F |
| 18-MDM-4 | MDM - Multi-Mission Operations | 1330 hrs | 1530 hrs | Ballroom G |
| 19-SSO-2 | SSO - Trimmed Communication Architectures | 1330 hrs | 1530 hrs | Ballroom A |
| 20-PSTR-1 | Posters I | 1500 hrs | 1600 hrs | Ballroom Foyer |
| 23-CDMP-4 | CDMP - Ground Network Implementation | 1600 hrs | 1800 hrs | Ballroom B |
| 24-CDMP-5 | CDMP - Network Operations and Management II | 1600 hrs | 1800 hrs | Ballroom C |
| 25-HSO-3 | HSO - Ops III | 1600 hrs | 1800 hrs | Ballroom I |
| 26-LBO-3 | LBO - Launch Vehicle Ground Facilities and Operations | 1600 hrs | 1800 hrs | Ballroom H |
| 27-MDM-5 | MDM - Cost & Risk Analysis | 1600 hrs | 1800 hrs | Ballroom G |
| 28-MDM-6 | MDM - Mission System Design II | 1600 hrs | 1800 hrs | Ballroom F |
| 29-SSO-3 | SSO - Advanced Operations Concepts | 1600 hrs | 1800 hrs | Ballroom A |
| | **Tuesday, 6 May 2014** | | | |
| 32-PLNRY-2 | Control Center of the Future Panel | 0830 hrs | 1000 hrs | Ballroom D&E |
| 35-CDMP-6 | CDMP - Ground Data Systems | 1030 hrs | 1230 hrs | Ballroom C |
| 36-CDMP-7 | CDMP - Space Communications I | 1030 hrs | 1230 hrs | Ballroom B |
| 37-HSO-4 | HSO - Training | 1030 hrs | 1230 hrs | Ballroom I |
| 38-LBO-4 | LBO - Balloon & Sounding Rocket Operations | 1030 hrs | 1230 hrs | Ballroom H |
| 39-MDM-7 | MDM - Crewed Operations in Cis-Lunar Space for Asteroid Exploration | 1030 hrs | 1230 hrs | Ballroom G |
| 40-MDM-8 | MDM - Science Operations I | 1030 hrs | 1230 hrs | Ballroom F |
| 41-SSO-4 | SSO - Operational Proofs & On-Going Initiatives I | 1030 hrs | 1230 hrs | Ballroom A |
| 44-CDMP-8 | CDMP - Data Management I | 1330 hrs | 1530 hrs | Ballroom C |
| 45-CDMP-9 | CDMP - Space Communications II | 1330 hrs | 1530 hrs | Ballroom B |
| 46-HSO-5 | HSO - Tools | 1330 hrs | 1530 hrs | Ballroom I |
| 47-MDM-9 | MDM - Science Operations II | 1330 hrs | 1530 hrs | Ballroom F |
| 48-OCMSA-1 | OCMSA - Operations Technologies I | 1330 hrs | 1530 hrs | Ballroom G |
| 49-PS-1 | PS - EO/S/W I | 1330 hrs | 1530 hrs | Ballroom H |
| 50-SSO-5 | SSO - Operational Proofs & On-Going Initiatives II | 1330 hrs | 1530 hrs | Ballroom A |
| 53-CDMP-10 | CDMP - Data Management II | 1600 hrs | 1800 hrs | Ballroom C |
| 54-CDMP-11 | CDMP - Space Communications III | 1600 hrs | 1800 hrs | Ballroom B |
| 55-FSMC-2 | FSMC - Flight Control Systems & EGSE II | 1600 hrs | 1800 hrs | Ballroom A |
| 56-GNC-1 | GNC - Debris/Collision Avoidance I | 1600 hrs | 1800 hrs | Ballroom I |
| 57-OCMSA-2 | OCMSA - Operations Concepts I | 1600 hrs | 1800 hrs | Ballroom F |
| 58-OCMSA-3 | OCMSA - Operations Technologies II | 1600 hrs | 1800 hrs | Ballroom G |
| 59-PS-2 | PS - EO/S/W II | 1600 hrs | 1800 hrs | Ballroom H |

# Program-At-A-Glance

| Abbreviation | Title | Start Time | End Time | Location |
|---|---|---|---|---|
| **Wednesday, 7 May 2014** | | | | |
| 61-PLNRY-3 | Smallsat Operations Panel | 0830 hrs | 1000 hrs | Ballroom D&E |
| 64-CDMP-12 | CDMP - Software Development and Maintenance I | 1030 hrs | 1230 hrs | Ballroom B |
| 65-CDMP-13 | CDMP - Space Cyber Security I | 1030 hrs | 1230 hrs | Ballroom C |
| 66-FSMC-3 | FSMC - Flight Control Systems & EGSE III | 1030 hrs | 1230 hrs | Ballroom A |
| 67-GNC-2 | GNC - Debris/Collision Avoidance II | 1030 hrs | 1230 hrs | Ballroom I |
| 68-OCMSA-4 | OCMSA - Operations Concepts II | 1030 hrs | 1230 hrs | Ballroom F |
| 69-OCMSA-5 | OCMSA - Operations Technologies III | 1030 hrs | 1230 hrs | Ballroom G |
| 70-PS-3 | PS - EO/S/W III | 1030 hrs | 1230 hrs | Ballroom H |
| 73-CDMP-14 | CDMP - Software Development and Maintenance II | 1330 hrs | 1530 hrs | Ballroom B |
| 74-CDMP-15 | CDMP - Space Cyber Security II | 1330 hrs | 1530 hrs | Ballroom C |
| 75-FSMC-4 | FSMC - FC Architectures & Design I | 1330 hrs | 1530 hrs | Ballroom A |
| 76-GNC-3 | GNC - Models and Capabilities I | 1330 hrs | 1530 hrs | Ballroom I |
| 77-OCMSA-6 | OCMSA - Operations Concepts III | 1330 hrs | 1530 hrs | Ballroom F |
| 78-OCMSA-7 | OCMSA - Operations Technologies IV | 1330 hrs | 1530 hrs | Ballroom G |
| 79-PS-4 | PS - Comms Planning | 1330 hrs | 1530 hrs | Ballroom H |
| 80-PSTR-2 | Posters II | 1500 hrs | 1600 hrs | Ballroom Foyer |
| 83-CDMP-16 | CDMP - Ground Communications | 1600 hrs | 1800 hrs | Ballroom C |
| 84-CSIS-1 | CSIS - Overall Orientations | 1600 hrs | 1800 hrs | Ballroom B |
| 85-FSMC-5 | FSMC - FC Architectures & Design II | 1600 hrs | 1800 hrs | Ballroom A |
| 86-GNC-4 | GNC - Models and Capabilities II | 1600 hrs | 1800 hrs | Ballroom I |
| 87-OCMSA-8 | OCMSA - Operations Concepts IV | 1600 hrs | 1800 hrs | Ballroom F |
| 88-OCMSA-9 | OCMSA - Operations Simulations and Training | 1600 hrs | 1800 hrs | Ballroom G |
| 89-PS-5 | PS - Pure Scheduling I | 1600 hrs | 1800 hrs | Ballroom G |
| **Thursday, 8 May 2014** | | | | |
| 91-PLNRY-4 | Commercial Space Panel | 0830 hrs | 1000 hrs | Ballroom D&E |
| 94-CSIS-2 | CSIS - Space Links and SLE | 1030 hrs | 1230 hrs | Ballroom B |
| 95-FSMC-6 | FSMC - FC Architectures & Design III | 1030 hrs | 1230 hrs | Ballroom A |
| 96-GNC-5 | GNC - Navigation/Astrodynamics I | 1030 hrs | 1230 hrs | Ballroom I |
| 97-OCMSA-10 | OCMSA - Operations Concepts V | 1030 hrs | 1230 hrs | Ballroom F |
| 98-OCMSA-11 | OCSMA - Operations Validation | 1030 hrs | 1230 hrs | Ballroom G |
| 101-CSIS-3 | CSIS - Mission Operations | 1330 hrs | 1530 hrs | Ballroom B |
| 102-CSO-1 | CSO - Space Operational Reliability & Training | 1330 hrs | 1530 hrs | Ballroom C |
| 103-FSMC-7 | FSMC - Fault Management and Recovery | 1330 hrs | 1530 hrs | Ballroom A |
| 104-GNC-6 | GNC - Navigation/Astrodynamics II | 1330 hrs | 1530 hrs | Ballroom I |
| 105-OCMSA-12 | OCMSA - Operations Experience I | 1330 hrs | 1530 hrs | Ballroom F |
| 106-OCMSA-13 | OCMSA - Payload Operations I | 1330 hrs | 1530 hrs | Ballroom G |
| 107-PS-7 | PS - Deep Space I | 1330 hrs | 1530 hrs | Ballroom H |
| 110-CSIS-4 | CSIS - New Standards | 1600 hrs | 1800 hrs | Ballroom B |
| 111-CSO-2 | CSO - Commercial Space Infrastructure | 1600 hrs | 1800 hrs | Ballroom C |
| 112-FSMC-8 | FSMC - Payload Monitoring & Control | 1600 hrs | 1800 hrs | Ballroom A |
| 113-GNC-7 | GNC - Ops I | 1600 hrs | 1800 hrs | Ballroom I |
| 114-OCMSA-14 | OCMSA - Operations Experience II | 1600 hrs | 1800 hrs | Ballroom F |
| 115-OCMSA-15 | OCMSA - Payload Operations II | 1600 hrs | 1800 hrs | Ballroom G |

# Program-At-A-Glance

| Abbreviation | Title | Start Time | End Time | Location |
|---|---|---|---|---|
| | **Thursday, 8 May 2014 (Continued)** | | | |
| 116-PS-8 | PS - Deep Space II | 1600 hrs | 1800 hrs | Ballroom H |
| | **Friday, 9 May 2014** | | | |
| 119-CSIS-5 | CSIS - Interoperability for International Space Exploration | 0830 hrs | 1030 hrs | Ballroom B |
| 120-CSO-3 | CSO - Mission Concepts & Analysis | 0830 hrs | 1030 hrs | Ballroom C |
| 121-FSMC-9 | FSMC - On-Board/Ground Aspects | 0830 hrs | 1030 hrs | Ballroom A |
| 122-GNC-8 | GNC - Ops II | 0830 hrs | 1030 hrs | Ballroom I |
| 123-OCMSA-16 | OCMSA - End of Life Operations | 0830 hrs | 1030 hrs | Ballroom G |
| 124-OCMSA-17 | OCMSA - Operations Experience III | 0830 hrs | 1030 hrs | Ballroom F |
| 125-PS-9 | PS - Pure Scheduling II | 0830 hrs | 1030 hrs | Ballroom H |
| 126-PLNRY-5 | Closing Ceremony | 1030 hrs | 1230 hrs | Ballroom D&E |

## Monday

| Monday, 5 May 2014 | | |
|---|---|---|
| 1-NW-1<br>0830 - 0900 hrs | Networking Coffee Break | Ballroom Foyer |

| Monday, 5 May 2014 | | |
|---|---|---|
| 2-PLNRY-1<br>0900 - 1100 hrs | Opening Ceremony | Ballroom D&E |

Welcome Messages and Opening Session

**Charles Elachi**
Director, NASA JPL California Institute of Technology

**William Gerstenmaier**
Associate Administrator for Human Exploration and Operations, NASA Headquarters

**Sandy Magnus**
Executive Director, American Institute of Aeronautics and Astronautics

Highlight Talks

**Jeff Norris**
Manager, Mission Operations Innovation Office, NASA JPL

**Neville Page**
Film and Television Creature and Concept Designer

| Monday, 5 May 2014 | | |
|---|---|---|
| 3-NW-2<br>1100 - 1130 hrs | Networking Coffee Break | Exhibit Hall A |

| Monday, 5 May 2014 | | |
|---|---|---|
| 4-SB-1<br>1100 - 1130 hrs | Speaker Briefing | Session Rooms |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| 5-CDMP-1 | CDMP - Advanced Ground Segment Technologies I | | Ballroom B |
| Chaired by: M. SPADA, European Space Agency (ESA) and M. DOYON, Canadian Space Agnecy | | | |
| 1130 hrs<br>AIAA-2014-1600<br>**Heterogeneous Wireless Mesh Network Technology Evaluation for Space Proximity and Surface Applications**<br>M. Decristofaro, C. Lansdowne, A. Schlesinger, NASA Johnson Space Center, Houston, TX | 1200 hrs<br>AIAA-2014-1601<br>**Integrating Space Communication Network Capabilities via Web Portal Technologies**<br>M. Johnston, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; B. Carruth, M. Wallace, A. Coffman, Innovative Productivity Solutions, Inc., Bulverde, TX; C. Lee, C. Lau, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; et al. | | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| 6-FSMC-1 | FSMC - Flight Control Systems & EGSE I | | Ballroom C |
| Chaired by: A. BOWMAN, Johns Hopkins University Applied Physics Laboratory and N. PECCIA, European Space Agency (ESA) -ESOC | | | |
| 1130 hrs<br>AIAA-2014-1602<br>**GECCOS - the new Monitoring and Control System at DLR-GSOC for Space Operations, based on SCOS-2000**<br>C. Stangl, A. Braun, M. Geyer, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1200 hrs<br>AIAA-2014-1603<br>**Galileo Ground Segment Upgrades and Parallel Operations in Preparation for Early Service Provision**<br>C. Duarte, R. Tüllmann, German Aerospace Center (DLR), Munich, Germany; G. Meliton, CAM Systems GmbH, Munich, Germany; I. Muñoz, HE Space, Munich, Germany; N. Carlier, German Aerospace Center (DLR), Munich, Germany | | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **7-HSO-1** | **HSO - Ops I** | | **Ballroom I** |
| Chaired by: V. HALL, NASA-Johnson Space Center and T. MUELLER, DLR | | | |
| 1130 hrs<br>AIAA-2014-1604<br>**Avionics Architectures for Exploration: Building a better approach for (Human) Spaceflight Avionics**<br>M. Goforth, J. Ratliff, K. Hames, S. Viltalpur, NASA Johnson Space Center, Houston, TX | 1200 hrs<br>AIAA-2014-1605<br>**Extravehicular Activity Asteroid Exploration and Sample Collection Capability**<br>Z. Scoville, S. Sipila, J. Bowie, NASA Johnson Space Center, Houston, TX | | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **8-LBO-1** | **LBO - Launch Operations Modeling--Cost and Availability** | | **Ballroom H** |
| Chaired by: C. CRUZEN, NASA Marshall Space Flight Center and P. ROVIERA, ESA - European Space Agency | | | |
| 1130 hrs<br>AIAA-2014-1606<br>**Launch Vehicle Production and Operations Cost Metrics**<br>M. Watson, J. Neeley, R. Blackburn, NASA Marshall Space Flight Center, Huntsville, AL | 1200 hrs<br>AIAA-2014-1607<br>**Use of DES Modeling for Determining Launch Availability for SLS**<br>M. Watson, E. Staton, NASA Marshall Space Flight Center, Huntsville, AL; G. Cates, NASA Kennedy Space Center, Huntsville, AL; R. Finn, NASA Johnson Space Center, Huntsville, AL; K. Altino, K. Burns, NASA Marshall Space Flight Center, Huntsville, AL | | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **9-MDM-1** | **MDM - Extended Mission Operations** | | **Ballroom G** |
| Chaired by: M. BUTLER, NASA Headquarters, HEOMD and C. AUDOUY, CNES | | | |
| 1130 hrs<br>AIAA-2014-1608<br>**Extending the lifetime of ESA's X-ray observatory XMM-Newton**<br>M. Kirsch, ESA, Darmstadt, Germany; A. Elfving, ESA, Noordwijk, The Netherlands; R. Kresken, A. Mcdonald, CGI Group, Inc., Darmstadt, Germany; J. Martin, ESA, Darmstadt, Germany; M. Pantaleoni, RHEA System, Louvaine-la-Neuve, Belgium; et al. | 1200 hrs<br>AIAA-2014-1609<br>**JASON-1 (NASA-JPL/CNES) : A successful operational story throughout hardware ageing**<br>R. Canton, P. Pelipenko, French Space Agency (CNES), Toulouse, France | | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **10-MDM-2** | **MDM - Mission Design** | | **Ballroom F** |
| Chaired by: A. AMADOR, JPL and J. ARRIETA-CAMACHO, NASA Jet Propulsion Laboratory | | | |
| 1130 hrs<br>AIAA-2014-1610<br>**Mapping Swing-By Trajectories in the Triple Asteroid 2001SN263**<br>A. Prado, National Institute for Space Research (INPE), São José dos Campos, Brazil | 1200 hrs<br>AIAA-2014-1611<br>**Mission Design from Cradle to Grave: Applying Concurrent Engineering from Mission Feasibility Analysis through to End of Life Operations**<br>S. Reid, RHEA System, Wavre, Belgium; S. Gerené, A. Matthyssen, J-CDS, Leiden, The Netherlands | | |

| Monday, 5 May 2014 | | |
|---|---|---|
| **11-LNCH-1**<br>**1230 - 1330 hrs** | **Exhibit Hall Luncheon** | **Exhibit Hall A** |

| Monday, 5 May 2014 | | |
|---|---|---|
| **12-SB-2**<br>**1310 - 1330 hrs** | **Speaker Briefing** | **Session Rooms** |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **13-CDMP-2** | **CDMP - Advanced Ground Segment Technologies II** | | **Ballroom B** |
| Chaired by: M. SPADA, European Space Agency (ESA) and M. DOYON, Canadian Space Agnecy | | | |
| 1330 hrs<br>AIAA-2014-1612<br>**Space-based Reconfigurable Software Defined Radio Test Bed aboard International Space Station**<br>R. Reinhart, NASA Glenn Research Center, Cleveland, OH; J. Lux, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1400 hrs<br>AIAA-2014-1613<br>**Wireless Sensor Networks for Planetary Exploration: Issues and Challenges through a Specific Application**<br>C. Sergiou, A. Paphitis, University of Cyprus, Nicosia, Cyprus; C. Panayiotou, Cyprus Space Exploration Organization (CSEO), Nicosia, Cyprus; P. Kristis, University of Cyprus, Nicosia, Cyprus; K. Christou, University of Athens, Athens, Greece | 1430 hrs<br>AIAA-2014-1614<br>**Deploying operational multi-satellite control centres on virtual environments**<br>T. Morel, GMV, Madrid, Spain | 1500 hrs<br>AIAA-2014-1615<br>**Retaining the operational status of a space mission during the loss of the main control system using virtualization**<br>F. Gotter, J. Pfau, CGI Group, Inc., Darmstadt, Germany |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **14-CDMP-3** | **CDMP - Network Operations and Management I** | | **Ballroom C** |
| Chaired by: V. NAZAROV, IKI RAN and O. PEINADO, DLR | | | |
| 1330 hrs<br>AIAA-2014-1616<br>**Designing an Alternate Mission Operations Control Room**<br>S. Reeves, P. Montgomery, NASA Marshall Space Flight Center, Huntsville, AL | 1400 hrs<br>AIAA-2014-1617<br>**NIMBUS (Network Infrastructure Management tool for Business and User Support)**<br>M. Guillaro, Vitrociset Belgium, Transinne, Belgium; N. Salor Moral, Vitrociset Belgium, Noordwijk, The Netherlands; S. Dionisi, Vitrociset Belgium, Darmstadt, Germany | | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **15-HSO-2** | **HSO - Ops II** | | **Ballroom I** |
| Chaired by: F. ALLARD, ESA/ESTEC and A. GOSLING, INSYEN AG | | | |
| 1330 hrs<br>AIAA-2014-1618<br>**The Future of Columbus Operations**<br>D. Sabath, T. Kuch, G. Soellner, T. Müller, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1400 hrs<br>AIAA-2014-1619<br>**Exploration Technologies for Operations**<br>E. Smith, D. Korsmeyer, NASA Ames Research Center, Moffett Field, CA; V. Hall, NASA Johnson Space Center, Houston, TX | 1430 hrs<br>AIAA-2014-1620<br>**Human Mars Mission Surface Science Operations**<br>M. Bobskill, NASA Langley Research Center, Hampton, VA; M. Lupisella, NASA Goddard Space Flight Center, Greenbelt, MD | 1500 hrs<br>AIAA-2014-1621<br>**A Communication Architecture for an Advanced Extravehicular Mobile Unit**<br>W. Ivancic, O. Sands, C. Bakula, M. Bradish, T. Wright, NASA Glenn Research Center, Cleveland, OH |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **16-LBO-2** | **LBO - Launch Vehicle Operations** | | **Ballroom H** |
| Chaired by: C. CRUZEN, NASA Marshall Space Flight Center and J. MONREAL, European Space Agency (ESA) | | | |
| 1330 hrs<br>AIAA-2014-1622<br>**NASA Space Launch System Operations Outlook**<br>W. Hefner, B. Matisak, R. McElyea, NASA Marshall Space Flight Center, Huntsville, AL; J. Kunz, P. Weber, N. Cummings, NASA Kennedy Space Center, Cape Canaveral, FL; et al. | 1400 hrs<br>AIAA-2014-1623<br>**Optimised Ariane-5 ME Launch Operations**<br>D. Albat, ESA, Paris, France | 1430 hrs<br>AIAA-2014-1624<br>**Ariane 5 Production and Integration Operations: Ten Years of Continuous Efficiency and Quality Improvement**<br>D. Iranzo-Greus, Astrium, Les Mureaux, France | 1500 hrs<br>AIAA-2014-1625<br>**Development of a Two-Stage Mars Ascent Vehicle Using In-Situ Propellant Production**<br>L. Paxton, Self, Pleasant Hill, CA; D. Vaughan, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **17-MDM-3** | **MDM - Mission System Design I** | | **Ballroom F** |
| Chaired by: P. LOCK, Jet Propulsion Laboratory and A. AMADOR, JPL | | | |
| 1330 hrs<br>AIAA-2014-1626<br>**TDP1 - Ground system design and operational experience**<br>G. Rossmanith, S. Kuhlmann, R. Ballweg, German Aerospace Center (DLR), Wessling, Germany | 1400 hrs<br>AIAA-2014-1627<br>**OPALS: Mission System Operations Architecture for an Optical Communications Demonstration on the ISS**<br>M. Abrahamson, O. Sindiy, B. Oaida, M. Wilkerson, M. Kokorowski, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1430 hrs<br>AIAA-2014-1628<br>**Cloud Computing Techniques for Space Mission Design**<br>J. Arrieta-Camacho, J. Senent, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1500 hrs<br>AIAA-2014-1629<br>**Enabling Future Low-cost Small Spacecraft Mission Concepts using Small Radioisotope Power Systems**<br>Y. Lee, B. Bairstow, R. Amini, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; J. Zakrajsek, S. Oleson, R. Cataldo, NASA Glenn Research Center, Cleveland, OH |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **18-MDM-4** | **MDM - Multi-Mission Operations** | | **Ballroom G** |
| Chaired by: M. BUTLER, NASA Headquarters, HEOMD and C. AUDOUY, CNES | | | |
| 1330 hrs<br>AIAA-2014-1630<br>**Multi-Mission Elements: Key Assets for EUMETSAT programmes**<br>E. Bouchez, M. Horny, EUMETSAT, Darmstadt, Germany | 1400 hrs<br>AIAA-2014-1631<br>**A Multifaceted Approach to Modernizing NASA's Advanced Multi-Mission Operations System (AMMOS) System Architecture**<br>J. Estefan, B. Giovannoni, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1430 hrs<br>AIAA-2014-1632<br>**Space Weather Impacts on Spacecraft: The Road towards Operational Services**<br>G. Lawrence, S. Reid, C. Tranquille, RHEA System, Wavre, Belgium; H. Evans, ESA, Noordwijk, The Netherlands | 1500 hrs<br>AIAA-2014-1633<br>**NERIO-I: Nuclear Explorations for Realizing Interplanetary Objectives I**<br>B. Leung, University of Illinois, Urbana-Champaign, Urbana, IL |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **19-SSO-2** | **SSO - Trimmed Communication Architectures** | | **Ballroom A** |
| Chaired by: J. CUTLER, University of Michigan and P. LODS, CNES | | | |
| 1330 hrs<br>AIAA-2014-1634<br>**Adapting a Large-Scale Multi-Mission Ground System for Low-Cost CubeSats**<br>W. Quach, L. DeForrest, A. Klesh, J. Schoolcraft, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1400 hrs<br>AIAA-2014-1635<br>**NASA Wallops Flight Facility-Morehead State Ground Network for Small Satellite Mission Operations**<br>S. Schaire, NASA Wallops Flight Facility, Wallops Island, VA; S. Altunc, NASA Goddard Space Flight Center, Greenbelt, MD; B. Malphrus, J. Kruth, Morehead State University, Morehead, KY | 1430 hrs<br>AIAA-2014-1636<br>**Development and Operation Results of Cubesat RAIKO Using Ground Network System**<br>Y. Sakamoto, Tohoku University, Sendai, Japan; M. Nishio, Kagoshima University, Kagoshima, Japan; T. Nakajo, Fukui University of Technology, Fukui, Japan; R. Ishimaru, Chiba Institute of Technology, Narashino, Japan | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **20-PSTR-1**<br>**1500 - 1720 hrs** | **Posters I** | | **Ballroom Foyer** |
| Chaired by: M. SCHMIDHUBER, DLR/GSOC Mission Operations and P. ESTABROOK, Jet Propulsion Laboratory | | | |
| AIAA-2014-1637<br>**Middle Man Concept for In-orbit Collision Risk Mitigation: CAESAR and CARA Examples**<br>M. Moury, French Space Agency (CNES), Toulouse, France; L. Newman, NASA Goddard Space Flight Center, Greenbelt, MD | AIAA-2014-1638<br>**Virtual Science Operations Center: Concept, Deployment and Operations**<br>R. Nazirov, O. Batanov, V. Nazarov, F. Korotkov, N. Eysmont, A. Sukhanov, Russian Academy of Sciences, Moscow, Russia; et al. | AIAA-2014-1639<br>**Optimal Transfer Trajectories to the Haumea System**<br>D. Sanchez, A. Prado, A. Sukhanov, National Institute for Space Research (INPE), São José dos Campos, Brazil; T. Yokoyama, São Paulo State University, Rio Claro, Brazil | AIAA-2014-1640<br>**Kinetic Energy Transfer of Near-Earth Objects for Interplanetary Manned Missions (KETNEO-FIMM)**<br>W. Sanks, U.S. Air Force Academy, Colorado Springs, CO |
| AIAA-2014-1641<br>**Study the problem of performance evaluation of Earth observation satellite mission planning**<br>H. Wang, L. Guo, Q. Xie, B. Zhou, Y. Qu, Chinese Academy of Sciences, Beijing, China | AIAA-2014-1642<br>**Centralized Mission Planning and Scheduling System for the Landsat Data Continuity Mission (Landsat 8)**<br>A. Barnoy, MetiSpace Technologies, Inc., Rockville, MD; A. Kavelaars, GMV, Berkeley, CA; S. Gregory, G. Garcia, MetiSpace Technologies, Inc., Rockville, MD; G. Greer, Hammers Company, Greenbelt, MD; J. Williams, U.S. Geological Survey, Sioux Falls, SD; et al. | AIAA-2014-1643<br>**Parallel operation of the high altitude simulation test positions P4.1 & P4.2**<br>P. Lutz, ESA, Paris, France; A. Frank, German Aerospace Center (DLR), Lampoldshausen, Germany | AIAA-2014-1644<br>**MP Editor: A fresh approach for generic management of Mission Planning Rules & Constraints**<br>W. Heinen, S. Pearson, S. Reid, RHEA System, Wavre, Belgium |
| AIAA-2014-1645<br>**MRO:SHARAD Observation Planning: A Geospatial Edge**<br>A. Egan, Southwest Research Institute, Boulder, CO | AIAA-2014-1646<br>**DEIMOS-2 Advanced Mission Planning Capabilities**<br>A. Monge, B. Cillero, O. Gonzalez, J. Gonzalez Abeytua, DEIMOS Space S.L.U., Tres Cantos, Spain; F. Pirondini, DEIMOS Space S.L.U., Boecillo, Spain; A. Ortiz, DEIMOS Space S.L.U., Puertollano, Spain | AIAA-2014-1647<br>**Analyzing the Impacts of Natural Environments on Launch and Landing Availability for NASA's Exploration Systems Development Programs**<br>K. Altino, NASA Marshall Space Flight Center, Huntsville, AL; K. Burns, Raytheon Company, Huntsville, AL; R. Barbré, Jacobs, Huntsville, AL; F. Leahy, NASA Marshall Space Flight Center, Huntsville, AL | AIAA-2014-1648<br>**Incorporating the Philae Lander within overall Rosetta Science Operations**<br>M. Ashman, M. Almeida, F. Nespoli, ESA, Madrid, Spain |
| AIAA-2014-1649<br>**Cassini's Cross Discipline Target Working Team: Advanced Planning of Long Temporal Intervals during the Mission to Saturn**<br>K. Perry, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | AIAA-2014-1650<br>**Automated Scheduling of Personnel to Staff Operations for the Mars Science Laboratory**<br>A. Allbaugh, A. Mishkin, S. Laubach, R. Knight, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | AIAA-2014-1651<br>**Development of the Operation Management System for Low Earth Orbit Satellite Operation and Improvement Plan for Next Phase**<br>I. Jang, D. Kim, M. Lee, D. Chung, Korea Aerospace Research Institute, Daejeon, South Korea | AIAA-2014-1653<br>**NASA's Spacecraft Communication and Navigation Network Integration**<br>E. Uzo-Okoro, H. Shaw, NASA Goddard Space Flight Center, Greenbelt, MD |
| AIAA-2014-1654<br>**Enhanced ISS Ku Band Telemetry Service**<br>A. Cecil, J. Bryan, S. Welch, R. Pitts, NASA Marshall Space Flight Center, Huntsville, AL | AIAA-2014-1655<br>**FOBOS, a LEON-optimised RTOS with support for Packet Utilisation Standard (PUS) Services**<br>J. Gomez, M. Pastena, P. van Duijn, SSBV, Noordwijk, The Netherlands | | |

| Monday, 5 May 2014 | | |
|---|---|---|
| 21-NW-3<br>1530 - 1600 hrs | Networking Coffee Break | Exhibit Hall A |

| Monday, 5 May 2014 | | |
|---|---|---|
| 22-SB-3<br>1530 - 1600 hrs | Speaker Briefing | Session Rooms |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| 23-CDMP-4 | CDMP - Ground Network Implementation | | Ballroom B |
| Chaired by: P. HOGAN, Canadian Space Agnecy and M. GOETZELMANN, Telespazio VEGA Deutschland GmbH | | | |
| 1600 hrs<br>AIAA-2014-1656<br>**Exchange and virtualization of a high performance and high availability network**<br>U. Schäfer, O. Peinado, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; R. Gridley, Telespazio, Gilching, Germany | 1630 hrs<br>AIAA-2014-1657<br>**ATV 4 flight operations dependency on a highly reliable ground network**<br>R. Gridley, Telespazio, Gilching, Germany; U. Schäfer, German Aerospace Center (DLR), Wessling, Germany; O. Peinado, Telespazio, Gilching, Germany | 1700 hrs<br>AIAA-2014-1658<br>**A Formal Downgrading Policy Framework for the Secure Sharing of Mission Sensitive Data and Services**<br>E. Skoutaris, University of Luxembourg, Luxembourg, Luxembourg; D. Fischer, ESA, Darmstadt, Germany; T. Engel, University of Luxembourg, Luxembourg, Luxembourg | 1730 hrs<br>AIAA-2014-1659<br>**An Implicit Voice Conferencing System**<br>M. Töpfer, R. Kozlowski, German Aerospace Center (DLR), Wessling, Germany |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| 24-CDMP-5 | CDMP - Network Operations and Management II | | Ballroom C |
| Chaired by: V. NAZAROV, IKI RAN and A. HAUKE | | | |
| 1600 hrs<br>AIAA-2014-1660<br>**Web Interface and Collaboration Platform for the ESTRACK Management System**<br>H. Dreihahn, ESA, Darmstadt, Germany; A. Hoffmann, Telespazio, Darmstadt, Germany | 1630 hrs<br>AIAA-2014-1661<br>**RootVis telemetry analysis framework**<br>L. Faltenbacher, T. Göttfert, B. Grishechkin, A. Braun, A. Kumar, German Aerospace Center (DLR), Wessling, Germany | 1700 hrs<br>AIAA-2014-1662<br>**Modernizing the NASA Space Network Ground Systems for Centralized Management and Control of Distributed Shared Resources**<br>N. Loomis, Booz Allen Hamilton, McLean, VA | 1730 hrs<br>AIAA-2014-1663<br>**A Distributed Storage Architecture for Ground Network Based on HDFS**<br>Q. Xie, B. Zhou, N. Li, Chinese Academy of Sciences, Beijing, China |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| 25-HSO-3 | HSO - Ops III | | Ballroom I |
| Chaired by: V. HALL, NASA-Johnson Space Center and T. MUELLER, DLR | | | |
| 1600 hrs<br>AIAA-2014-1664<br>**The ISS 2B PVTCS Ammonia Leak: An Operational History**<br>A. Vareha, NASA Johnson Space Center, Houston, TX | 1630 hrs<br>AIAA-2014-1665<br>**ATV Operations: from Demo Flight to Human Spaceflight Partner**<br>P. Benarroche, M. Vanhove, M. Augelli, French Space Agency (CNES), Toulouse, France | 1700 hrs<br>AIAA-2014-1666<br>**The ISS "SOLAR" attitude, from a 1-time experimental attitude change request to a standard ISS attitude to advance SOLAR science**<br>C. Jacobs, Space Applications Services, Brussels, Belgium; A. Michel, Belgian Institute for Space Aeronomy, Brussels, Belgium; D. Van Hoof, S. Klai, Space Applications Services, Brussels, Belgium; D. Moreau, Belgian Institute for Space Aeronomy, Brussels, Belgium; A. Sela, Space Applications Services, Brussels, Belgium; et al. | 1730 hrs<br>AIAA-2014-1667<br>**Columbus Cabin Heat Exchanger Dry Out during ISS High Beta Angle Phase**<br>L. Zanardini, ALTEC S.p.A., Turin, Italy; S. Steffen, German Aerospace Center (DLR), Oberpfaffenhofen, Germany |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| 26-LBO-3 | LBO - Launch Vehicle Ground Facilities and Operations | | Ballroom H |
| Chaired by: A. WAITE, BRPH Architects-Engineers, INC and C. SINGER, NASA-Marshall Space Flight Center | | | |
| 1600 hrs<br>AIAA-2014-1668<br>**ESA launchers ground facilities: background, operational phase and future developments**<br>P. Roviera, ESA, Paris, France; J. Bertrand, French Space Agency (CNES), Toulouse, France; C. Lardot, Arianespace, Evry, France | 1630 hrs<br>AIAA-2014-1669<br>**Launch Vehicle Control Center Architectures**<br>M. Watson, A. Epps, V. Woodruff, NASA Marshall Space Flight Center, Huntsville, AL; M. Vachon, NASA Johnson Space Center, Houston, TX; R. Williams, The Aerospace Corporation, El Segundo, CA | 1700 hrs<br>AIAA-2014-1670<br>**NASA Space Rocket Logistics Challenges**<br>C. Bramon, M. Watson, J. Neeley, S. Inman, NASA Marshall Space Flight Center, Huntsville, AL; L. Tuttle, NASA Kennedy Space Center, Cape Canaveral, FL; J. Jones, Logistics Management Associates, Irvine, CA | 1730 hrs<br>AIAA-2014-1671<br>**IXV Ground Segment Architecture Status of Implementation and Testing**<br>I. Musso, A. Bellomo, ALTEC S.p.A., Turin, Italy; G. Santoro, Thales Group, Turin, Italy; J. Gallego, ESA, Paris, France; R. Veneri, ALTEC S.p.A., Turin, Italy |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **27-MDM-5** | **MDM - Cost & Risk Analysis** | | **Ballroom G** |
| Chaired by: M. WATSON, NASA Marshall Space Flights Center and M. ABRAHAMSON, Jet Propulsion Laboratory | | | |
| 1600 hrs<br>AIAA-2014-1672<br>**Establishing an Integrated Risk Management Process within DLR Space Operations**<br>S. Huberth, German Aerospace Center (DLR), Wessling, Germany | 1630 hrs<br>AIAA-2014-1673<br>**Cost Analysis in a Multi-Mission Operations Environment**<br>M. Newhouse, L. Felton, Computer Sciences Corporation, Huntsville, AL; N. Bornas, D. Botts, Colsa Corporation, Huntsville, AL; G. Ijames, P. Montgomery, NASA Marshall Space Flight Center, Huntsville, AL; et al. | 1700 hrs<br>AIAA-2014-1674<br>**Implementation of Mission Assurance Processes for Air Force Space Systems' Operational Transitions**<br>D. McCasland, The Aerospace Corporation, Colorado Springs, CO; I. Awwad, Air Force Space and Missile Systems Center, Los Angeles AFB, CA; J. Vance, W. Yenne, The Aerospace Corporation, Colorado Springs, CO; B. Arnheim, The Aerospace Corporation, El Segundo, CA | |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **28-MDM-6** | **MDM - Mission System Design II** | | **Ballroom F** |
| Chaired by: P. LOCK, Jet Propulsion Laboratory and A. AMADOR, JPL | | | |
| 1600 hrs<br>AIAA-2014-1675<br>**Integrated Attitude Control Strategy for the Asteroid Redirect Mission**<br>P. Lopez, NASA Johnson Space Center, Houston, TX; H. Price, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1630 hrs<br>AIAA-2014-1676<br>**Semantics in Space Systems Architectures**<br>A. Romero, M. Ferreira, National Institute for Space Research (INPE), São José dos Campos, Brazil | 1700 hrs<br>AIAA-2014-1677<br>**In orbit storage strategy for MSG satellites - an efficient method for spacecraft resources exploitation**<br>F. Murolo, P. Pili, L. Matheson, M. Klinc, S. Pessina, EUMETSAT, Darmstadt, Germany; C. Vogel, Thales Group, Cannes, France; et al. | 1730 hrs<br>AIAA-2014-1678<br>**Requirements, Configuration and Testing: Improved Management through Semi-automatic Processes**<br>T. López Delgado, German Aerospace Center (DLR), Wessling, Germany |

| Monday, 5 May 2014 | | | |
|---|---|---|---|
| **29-SSO-3** | **SSO - Advanced Operations Concepts** | | **Ballroom A** |
| Chaired by: J. CUTLER, University of Michigan and Z. MOUNZER, Telespazio VEGA Deutschland GmbH | | | |
| 1600 hrs<br>AIAA-2014-1679<br>**Operational Considerations for a Swarm of CubeSat-Class Spacecraft**<br>M. Sorgenfrei, M. Nehrenz, NASA Ames Research Center, Moffett Field, CA | 1630 hrs<br>AIAA-2014-1680<br>**Operations of a Radioisotope-based Propulsion System Enabling CubeSat Exploration of the Outer Planets**<br>A. Rajguru, N. Jerred, S. Howe, Center for Space Nuclear Research, Idaho Falls, ID | 1700 hrs<br>AIAA-2014-1681<br>**Operations Cost Reduction for a Jovian Science Mission using CubeSats**<br>A. Faler, A. Rajguru, University of Southern California, Los Angeles, CA | 1730 hrs<br>AIAA-2014-1682<br>**From Disaggregation to Dematerialization: Toward the Second Space Age**<br>M. Bille, B. Hojnowski, P. Kolodziejski, T. Hunsaker, J. Vollmers, R. Schmotzer, Booz Allen Hamilton, McLean, VA |

| Monday, 5 May 2014 | | |
|---|---|---|
| **30-RECP-1**<br>**1800 - 1930 hrs** | **Exhibit Hall Reception** | **Exhibit Hall A** |

## Tuesday

| Tuesday, 6 May 2014 | | |
|---|---|---|
| **31-NW-4**<br>**0800 - 0830 hrs** | **Networking Coffee Break** | **Ballroom Foyer** |

| Tuesday, 6 May 2014 | | |
|---|---|---|
| **32-PLNRY-2**<br>**0830 - 1000 hrs** | **Control Center of the Future Panel** | **Ballroom D&E** |

Moderator: Jeff Norris, Manager, Mission Operations Innovation Office, NASA JPL

Panelists:

**Jean-Luc Froeliger**
VP of Satellite Operations and Engineering, Intelsat

**Chris Kettering**
The Boeing Company

**Bill Possel**
Director of Mission Operations and Data Systems
Laboratory for Atmospheric and Space Physics (LASP)
University of Colorado at Boulder

**Martin Wickler**
Deputy Head of Mission Operations Department, DLR

**John Muratore**
SpaceX

| Tuesday, 6 May 2014 | | |
|---|---|---|
| 33-NW-5<br>1000 - 1030 hrs | Networking Coffee Break | Exhibit Hall A |

| Tuesday, 6 May 2014 | | |
|---|---|---|
| 34-SB-4<br>1000 - 1030 hrs | Speaker Briefing | Session Rooms |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| 35-CDMP-6 | CDMP - Ground Data Systems | | Ballroom C |
| Chaired by: M. MERRI, European Space Agency (ESA) and P. HOGAN, Canadian Space Agnecy | | | |
| 1030 hrs<br>AIAA-2014-1683<br>**Streamlining GDS Deployment with the AMMOS Automated Deployment System**<br>E. Monson, K. Smith, S. Ng, J. Lei, R. Elliott, A. Cervantes, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1100 hrs<br>AIAA-2014-1684<br>**Ground Systems dependability calculation**<br>J. Vivero, J. Recio, GMV, Barcelona, Spain | | |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| 36-CDMP-7 | CDMP - Space Communications I | | Ballroom B |
| Chaired by: S. PARASHAR, Canadian Space Agnecy and M. SARKARATI | | | |
| 1030 hrs<br>AIAA-2014-1685<br>**The NASA Lunar Laser Communication Demonstration—Successful High-Rate Laser Communications To and From the Moon**<br>B. Robinson, D. Boroson, D. Burianek, D. Murphy, F. Khatri, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; A. Biswas, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; et al. | 1100 hrs<br>AIAA-2014-1686<br>**Statistical Ka-Band Link Analysis**<br>K. Cheung, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1130 hrs<br>AIAA-2014-1687<br>**The Benefits of Packet Service in Evolving Space Communications Provider Networks**<br>J. Gao, L. Clare, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; D. Israel, NASA Goddard Space Flight Center, Greenbelt, MD | 1200 hrs<br>AIAA-2014-1688<br>**Design Concepts for a Small Space-Based GEO Satellite for Missions between Low Earth and Near Earth Orbits**<br>K. Bhasin, S. Oleson, J. Warner, NASA Glenn Research Center, Cleveland, OH; J. Schier, NASA Headquarters, Washington, DC |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| 37-HSO-4 | HSO - Training | | Ballroom I |
| Chaired by: V. HALL, NASA-Johnson Space Center and T. MUELLER, DLR | | | |
| 1030 hrs<br>AIAA-2014-1689<br>**Evolving the NASA Near Earth Network for the Next Generation of Human Spaceflight**<br>C. Roberts, D. Carter, J. Hudiburg, NASA Goddard Space Flight Center, Greenbelt, MD; R. Tye, NASA Wallops Flight Facility, Wallops Island, VA; P. Celeste, Booz Allen Hamilton, Annapolis Junction, MD; P. Peskett, Exelis, Wallops, VA | 1100 hrs<br>AIAA-2014-1690<br>**International Space Station Operator Social Training and Document Management**<br>H. Cowart, NASA Marshall Space Flight Center, Huntsville, AL | 1130 hrs<br>AIAA-2014-1691<br>**Impact of Improved Ergonomics, Collaboration, and HCI in Ground Operations: The AERG Study at ESOC**<br>J. Lenk, A. Lüdtke, A. Puchkovskiy, Oldenburger Institute for Information Technology, Oldenburg, Germany; D. Javaux, G. Vroonen, Symbio, Liège, Belgium; G. Scotti, Terma, Darmstadt, Germany; et al. | |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| 38-LBO-4 | LBO - Balloon & Sounding Rocket Operations | | Ballroom H |
| Chaired by: A. DELUNA, ATDL, Inc. and D. ALBAT, ESA HQ-European Space Agency | | | |
| 1030 hrs<br>AIAA-2014-1692<br>**NOSYCA: the New Operational SYstem for the Control of Aerostats**<br>S. Nouvellon, Capgemini, Toulouse, France | 1100 hrs<br>AIAA-2014-1693<br>**Simulation means supporting NOSYCA project**<br>A. Strzepek, S. Salas-Solano, J. Tourraille, J. Marigo, P. Landrodie, French Space Agency (CNES), Toulouse, France | 1130 hrs<br>AIAA-2014-1694<br>**MORABA-Operational Aspects of Launching Rockets**<br>L. Altenbuchner, J. Ettl, M. Hörschgen-Eggers, W. Jung, A. Schmidt, A. Stamminger, German Aerospace Center (DLR), Wessling, Germany; et al. | 1200 hrs<br>AIAA-2014-1695<br>**Sub-Orbital Tethered Balloon Launch System**<br>W. Curley, Embry-Riddle Aeronautical University, Portland, FL |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **39-MDM-7** | **MDM - Crewed Operations in Cis-Lunar Space for Asteroid Exploration** | | **Ballroom G** |
| Chaired by: M. WATSON, NASA Marshall Space Flights Center and J. STICH | | | |
| 1030 hrs<br>AIAA-2014-1696<br>**Asteroid Redirect Crewed Mission Nominal Design and Performance**<br>G. Condon, NASA Johnson Space Center, Houston, TX; J. Williams, Jacobs, Houston, TX | 1100 hrs<br>AIAA-2014-1697<br>**Contingency Trajectory Planning for the Asteroid Redirect Crewed Mission**<br>J. Williams, G. Condon, NASA Johnson Space Center, Houston, TX | 1130 hrs<br>AIAA-2014-1698<br>**Asteroid Crewed Segment Mission Lean Development**<br>J. Gard, M. Mcdonald, W. Jermstad, NASA Johnson Space Center, Houston, TX | 1200 hrs<br>AIAA-2014-1699<br>**Extensibility of Human Asteroid Mission to Mars and Other Destinations**<br>J. Gard, M. Mcdonald, J. Caram, NASA Johnson Space Center, Houston, TX |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **40-MDM-8** | **MDM - Science Operations I** | | **Ballroom F** |
| Chaired by: A. HADDOCK, NASA Marshall Space Flight Center and T. LEVOIR, CNES | | | |
| 1030 hrs<br>AIAA-2014-1700<br>**Venus Express: Lessons from 8 years of science operations**<br>D. Merritt, Telespazio, Luton, United Kingdom; M. Pérez Ayúcar, Aurora Technology BV, Lisse, The Netherlands; R. Hoofs, ESA, Villanueva de la Cañada, Spain; C. Wilson, Oxford University, Oxford, United Kingdom | 1100 hrs<br>AIAA-2014-1701<br>**Processing a billion of star, an organizational challenge**<br>V. Valette, French Space Agency (CNES), Toulouse, France | | |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **41-SSO-4** | **SSO - Operational Proofs & On-Going Initiatives I** | | **Ballroom A** |
| Chaired by: J. CUTLER, University of Michigan and R. CANTON, CNES | | | |
| 1030 hrs<br>AIAA-2014-1702<br>**OPS-SAT: A ESA nanosatellite for accelerating innovation in satellite control**<br>D. Evans, M. Merri, ESA, Darmstadt, Germany | 1100 hrs<br>AIAA-2014-1703<br>**The Near Earth Object Scout Spacecraft: A Low-Cost Approach to In-Situ Characterization of the Near Earth Object Population**<br>S. Koontz, G. Condon, L. Graham, NASA Johnson Space Center, Houston, TX; C. Swenson, Utah State University, Logan, UT; R. Bevilacqua, Rensselaer Polytechnic Institute, Troy, NY | 1130 hrs<br>AIAA-2014-1704<br>**Planning the GENSO Ground Station Network via an Ant Colony-based approach**<br>C. Iacopino, P. Palmer, University of Surrey, Guildford, United Kingdom; N. Policella, A. Donati, ESA, Darmstadt, Germany | 1200 hrs<br>AIAA-2014-1705<br>**The PICARD Scientific Mission: status of the program**<br>M. Rouzé, French Space Agency (CNES), Toulouse, France; A. Hauchecorne, J. Hochedez, A. Irbah, M. Meftah, LATMOS, Guyancourt, France; T. Corbard, OCA, Nice, France; et al. |

| Tuesday, 6 May 2014 | | |
|---|---|---|
| **42-LNCH-2**<br>**1230 - 1330 hrs** | **Exhibit Hall Luncheon** | **Exhibit Hall A** |

| Tuesday, 6 May 2014 | | |
|---|---|---|
| **43-SB-5**<br>**1310 - 1330 hrs** | **Speaker Briefing** | **Session Rooms** |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **44-CDMP-8** | **CDMP - Data Management I** | | **Ballroom C** |
| Chaired by: M. LANUCARA and J. SOULA, CNES | | | |
| 1330 hrs<br>AIAA-2014-1706<br>**Operational Data Management within the LdP ISIS CCC (Upcoming CNES CCC)**<br>E. Aitier, L. Arnaud, French Space Agency (CNES), Toulouse, France | 1400 hrs<br>AIAA-2014-1707<br>**Digital Signal Distribution and Processing in the NASA Space Network Ground Segment Sustainment Project**<br>B. Schupler, Honeywell International, Inc., Lanham, MD; J. Spencer, General Dynamics Corporation, Scottsdale, AZ | 1430 hrs<br>AIAA-2014-1708<br>**Future missions: Updating SLE carrier infrastructure to support evolving operations requirements**<br>J. Marak, ESA, Darmstadt, Germany; F. Marinic, N. Novello, S. Peterson, Telespazio, Darmstadt, Germany; B. Durrett, SciSys, Darmstadt, Germany | 1500 hrs<br>AIAA-2014-1709<br>**Validation on Modified Ranging Tone through KOMPSAT-2 Satellite**<br>D. Park, S. Ahn, E. Kim, Korea Aerospace Research Institute, Daejeon, South Korea; K. Yeom, Chungnam National University, Daejeon, South Korea |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **45-CDMP-9** | **CDMP - Space Communications II** | | **Ballroom B** |
| Chaired by: L. BRYANT, Jet Propulsion Laboratory and S. PARASHAR, Canadian Space Agnecy | | | |
| 1330 hrs<br>AIAA-2014-1710<br>**Optical Communications Telescope Laboratory (OCTL) Support of Space to Ground Link Demonstrations**<br>J. Kovalik, M. Wright, W. Roberts, A. Biswasa, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1400 hrs<br>AIAA-2014-1711<br>**Uplink and Downlink Electronics Upgrades for the NASA Deep Space Network Aperture Enhancement (DAE) Project**<br>R. LaBelle, C. Buu, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1430 hrs<br>AIAA-2014-1712<br>**Radially Combined Solid State High Power Amplifier for Space Communications**<br>R. Vaninetti, Harris Corporation, Melborne, FL; J. Merchant, General Dynamics Corporation, Scottsdale, AZ | 1500 hrs<br>AIAA-2014-1713<br>**Communications During Critical Mission Operations: Preparing for InSight's Landing on Mars**<br>S. Asmar, K. Oudrhiri, S. Kurtik, S. Weinstein-Weiss, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **46-HSO-5** | **HSO - Tools** | | **Ballroom I** |
| Chaired by: F. ALLARD, ESA/ESTEC and A. GOSLING, INSYEN AG | | | |
| 1330 hrs<br>AIAA-2014-1714<br>**A Matter of Some (Artificial) Gravity**<br>R. Salvage, Self, Victorville, CA | 1400 hrs<br>AIAA-2014-1715<br>**From Contingency to Routine Operations Utilizing a Highly Configurable Mission Planning System for Mars Express**<br>E. Rabenau, NOVA Space, Bath, United Kingdom; J. Godfrey, ESA, Darmstadt, Germany | 1430 hrs<br>AIAA-2014-1716<br>**Human Health/Human Factors Considerations in Trans-Lunar Space**<br>C. Moore, R. Howard, G. Mendeck, NASA Johnson Space Center, Houston, TX | 1500 hrs<br>AIAA-2014-1717<br>**Asteroid Redirect Crewed Mission Space Suit and EVA System Architecture Trade Study**<br>R. Blanco, NASA Johnson Space Center, Houston, TX |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **47-MDM-9** | **MDM - Science Operations II** | | **Ballroom F** |
| Chaired by: A. HADDOCK, NASA Marshall Space Flight Center and T. LEVOIR, CNES | | | |
| 1330 hrs<br>AIAA-2014-1718<br>**JASON-1: Orbit change to combine end-of-life safety and new science objectives**<br>C. Audouy, T. Guinle, French Space Agency (CNES), Toulouse, France; G. Shirtliffe, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1400 hrs<br>AIAA-2014-1719<br>**Handling Late Changes to Titan Science**<br>J. Pitesky, K. Steadman, T. Ray, M. Burton, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1430 hrs<br>AIAA-2014-1720<br>**Architecting the Dawn Ceres Science Plan**<br>C. Polanskey, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; S. Joy, University of California, Los Angeles, Los Angeles, CA; C. Raymond, M. Rayman, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1500 hrs<br>AIAA-2014-1721<br>**THE OSIRIS-REX Asteroid Sample Return -MISSION Operations Design**<br>J. Gal-Edd, NASA Goddard Space Flight Center, Greenbelt, MD |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **48-OCMSA-1** | **OCMSA - Operations Technologies I** | | **Ballroom G** |
| Chaired by: D. EVANS, European Space Agency (ESA) -ESOC and R. D'AURIA, ALTEC S.p.A. | | | |
| 1330 hrs<br>AIAA-2014-1722<br>**A Predictive Approach to Failure Estimation and Identification for Space Systems Operations**<br>I. Verzola, LSE Space GmbH, Wessling, Germany; A. Lagny, CAM Systems GmbH, Munich, Germany; J. Biswas, Technical University of Munich, Munich, Germany | 1400 hrs<br>AIAA-2014-1723<br>**Is it possible to automate 30 years of flying experience?**<br>E. Fraga, GMV, Madrid, Spain; M. Tortosa, J. Biosca, Eutelsat, Paris, France | 1430 hrs<br>AIAA-2014-1724<br>**GS4EO: An Innovative Solution for Flight Operations Software on Low Cost EO Missions**<br>O. Gonzalez, A. Fernandez, A. Monge, J. Gonzalez Abeytua, DEIMOS Space S.L.U., Tres Cantos, Spain; F. Pirondini, DEIMOS Space S.L.U., Boecillo, Spain; A. Ortiz, DEIMOS Space S.L.U., Puertollano, Spain | 1500 hrs<br>AIAA-2014-1725<br>**Ground Segment Design for On-Orbit Servicing Missions at GSOC**<br>A. Ohndorf, S. Eberle, R. Faller, M. Gnat, German Aerospace Center (DLR), Wessling, Germany |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **49-PS-1** | **PS - EO/S/W I** | | **Ballroom H** |
| Chaired by: M. WICKLER, DLR and S. NAKAMURA, Japan Aerospace Exploration Agency (JAXA) | | | |
| 1330 hrs<br>AIAA-2014-1726<br>**TARDIS: An Automation Framework for JPL Mission Design and Navigation**<br>I. Roundhill, R. Kelly, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1400 hrs<br>AIAA-2014-1727<br>**Planning the operations for Sentinel-1 satellite: how to fit a complex puzzle**<br>J. Tejo, A. Garrigues Rua, J. Salas Godoy, GMV, Madrid, Spain | 1430 hrs<br>AIAA-2014-1728<br>**EO and SAR Constellation Imagery Collection Planning**<br>E. Herz, Orbit Logic, Inc., Greenbelt, MD | |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **50-SSO-5** | **SSO - Operational Proofs & On-Going Initiatives II** | | **Ballroom A** |
| Chaired by: J. CUTLER, University of Michigan and R. CANTON, CNES | | | |
| 1330 hrs<br>AIAA-2014-1729<br>**Small Satellite Solar Thermal Propulsion System Design: An Engineering Model**<br>M. Dhanasar, W. Edmonson, F. Ferguson, North Carolina Agricultural and Technical State University, Greensboro, NC; I. Blankson, NASA Glenn Research Center, Cleveland, OH | 1400 hrs<br>AIAA-2014-1730<br>**Operating the Stuttgart Micro Satellite based on the "Combined Data and Power Management Infrastructure"**<br>J. Eickhoff, K. Klemich, U. Mohr, N. Bucher, R. Witt, B. Baetz, University of Stuttgart, Stuttgart, Germany | 1430 hrs<br>AIAA-2014-1731<br>**Design of Solar Thermal Thruster for Microsatellite Orbital Control**<br>M. Soliman, National Authority for Remote Sensing and Space Sciences (NARSS), Cairo, Egypt; B. El Hadidi, Cairo University, Giza, Egypt | 1500 hrs<br>AIAA-2014-1732<br>**Battery operations for the TET-1 spacecraft**<br>A. Kumar, K. Mueller, German Aerospace Center (DLR), Munich, Germany |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **20-PSTR-1**<br>**1500 - 1720 hrs** | **Posters I** | | **Ballroom Foyer** |
| Chaired by: M. SCHMIDHUBER, DLR/GSOC Mission Operations and P. ESTABROOK, Jet Propulsion Laboratory | | | |
| AIAA-2014-1637<br>**Middle Man Concept for In-orbit Collision Risk Mitigation: CAESAR and CARA Examples**<br>M. Moury, French Space Agency (CNES), Toulouse, France; L. Newman, NASA Goddard Space Flight Center, Greenbelt, MD | AIAA-2014-1638<br>**Virtual Science Operations Center: Concept, Deployment and Operations**<br>R. Nazirov, O. Batanov, V. Nazarov, F. Korotkov, N. Eysmont, A. Sukhanov, Russian Academy of Sciences, Moscow, Russia; et al. | AIAA-2014-1639<br>**Optimal Transfer Trajectories to the Haumea System**<br>D. Sanchez, A. Prado, A. Sukhanov, National Institute for Space Research (INPE), São José dos Campos, Brazil; T. Yokoyama, São Paulo State University, Rio Claro, Brazil | AIAA-2014-1640<br>**Kinetic Energy Transfer of Near-Earth Objects for Interplanetary Manned Missions (KETNEO-FIMM)**<br>W. Sanks, U.S. Air Force Academy, Colorado Springs, CO |
| AIAA-2014-1641<br>**Study the problem of performance evaluation of Earth observation satellite mission planning**<br>H. Wang, L. Guo, Q. Xie, B. Zhou, Y. Qu, Chinese Academy of Sciences, Beijing, China | AIAA-2014-1642<br>**Centralized Mission Planning and Scheduling System for the Landsat Data Continuity Mission (Landsat 8)**<br>A. Barnoy, MetiSpace Technologies, Inc., Rockville, MD; A. Kavelaars, GMV, Berkeley, CA; S. Gregory, G. Garcia, MetiSpace Technologies, Inc., Rockville, MD; G. Greer, Hammers Company, Greenbelt, MD; J. Williams, U.S. Geological Survey, Sioux Falls, SD; et al. | AIAA-2014-1643<br>**Parallel operation of the high altitude simulation test positions P4.1 & P4.2**<br>P. Lutz, ESA, Paris, France; A. Frank, German Aerospace Center (DLR), Lampoldshausen, Germany | AIAA-2014-1644<br>**MP Editor: A fresh approach for generic management of Mission Planning Rules & Constraints**<br>W. Heinen, S. Pearson, S. Reid, RHEA System, Wavre, Belgium |
| AIAA-2014-1645<br>**MRO:SHARAD Observation Planning: A Geospatial Edge**<br>A. Egan, Southwest Research Institute, Boulder, CO | AIAA-2014-1646<br>**DEIMOS-2 Advanced Mission Planning Capabilities**<br>A. Monge, B. Cillero, O. Gonzalez, J. Gonzalez Abeytua, DEIMOS Space S.L.U., Tres Cantos, Spain; F. Pirondini, DEIMOS Space S.L.U., Boecillo, Spain; A. Ortiz, DEIMOS Space S.L.U., Puertollano, Spain | AIAA-2014-1647<br>**Analyzing the Impacts of Natural Environments on Launch and Landing Availability for NASA's Exploration Systems Development Programs**<br>K. Altino, NASA Marshall Space Flight Center, Huntsville, AL; K. Burns, Raytheon Company, Huntsville, AL; R. Barbré, Jacobs, Huntsville, AL; F. Leahy, NASA Marshall Space Flight Center, Huntsville, AL | AIAA-2014-1648<br>**Incorporating the Philae Lander within overall Rosetta Science Operations**<br>M. Ashman, M. Almeida, F. Nespoli, ESA, Madrid, Spain |
| AIAA-2014-1649<br>**Cassini's Cross Discipline Target Working Team: Advanced Planning of Long Temporal Intervals during the Mission to Saturn**<br>K. Perry, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | AIAA-2014-1650<br>**Automated Scheduling of Personnel to Staff Operations for the Mars Science Laboratory**<br>A. Allbaugh, A. Mishkin, S. Laubach, R. Knight, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | AIAA-2014-1651<br>**Development of the Operation Management System for Low Earth Orbit Satellite Operation and Improvement Plan for Next Phase**<br>I. Jang, D. Kim, M. Lee, D. Chung, Korea Aerospace Research Institute, Daejeon, South Korea | AIAA-2014-1653<br>**NASA's Spacecraft Communication and Navigation Network Integration**<br>E. Uzo-Okoro, H. Shaw, NASA Goddard Space Flight Center, Greenbelt, MD |
| AIAA-2014-1654<br>**Enhanced ISS Ku Band Telemetry Service**<br>A. Cecil, J. Bryan, S. Welch, R. Pitts, NASA Marshall Space Flight Center, Huntsville, AL | AIAA-2014-1655<br>**FOBOS, a LEON-optimised RTOS with support for Packet Utilisation Standard (PUS) Services**<br>J. Gomez, M. Pastena, P. van Duijn, SSBV, Noordwijk, The Netherlands | | |

| Tuesday, 6 May 2014 | | |
|---|---|---|
| **51-NW-6**<br>**1530 - 1600 hrs** | **Networking Coffee Break** | **Exhibit Hall A** |

| Tuesday, 6 May 2014 | | |
|---|---|---|
| **52-SB-6**<br>**1530 - 1600 hrs** | **Speaker Briefing** | **Session Rooms** |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **53-CDMP-10** | **CDMP - Data Management II** | | **Ballroom C** |
| Chaired by: M. LANUCARA and J. SOULA, CNES | | | |
| 1600 hrs<br>AIAA-2014-1733<br>**Spacecraft State-of-health (SOH) Analysis via Data Mining**<br>S. Lindsay, D. Woodbridge, Sandia National Laboratories, Albuquerque, NM | 1630 hrs<br>AIAA-2014-1734<br>**IDEFIX, New Component of the CNES Multimission Network an Innovant Autonomous System for Ingestion, Processing and Distribution of X-Band Data**<br>H. Ruiz, J. Roquebert, F. Faure-Marfany, French Space Agency (CNES), Toulouse, France | 1700 hrs<br>AIAA-2014-1735<br>**How the use of "Big Data" clusters improves off-line data analysis and operations**<br>R. Santos, ESA, Darmstadt, Germany | 1730 hrs<br>AIAA-2014-1736<br>**The SMAP Dictionary Management System**<br>K. Smith, C. Swan, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **54-CDMP-11** | **CDMP - Space Communications III** | | **Ballroom B** |
| Chaired by: S. PARASHAR, Canadian Space Agnecy and M. SARKARATI | | | |
| 1600 hrs<br>AIAA-2014-1737<br>**The rejection of interference of LEO Ground Antenna system inducing mobile communication**<br>Y. Mo, KARI, Daejeon, South Korea | 1630 hrs<br>AIAA-2014-1738<br>**The Alaska Satellite Facility: A Complete University-Operated Ground System**<br>S. Arko, N. La Belle-Hamer, W. Albright, R. McCoy, University of Alaska, Fairbanks, Fairbanks, AK; R. Turner, NASA Goddard Space Flight Center, Greenbelt, MD | 1700 hrs<br>AIAA-2014-1739<br>**An Optical Communications Pathfinder for the Next Generation Tracking and Data Relay Satellite**<br>B. Edwards, D. Israel, NASA Goddard Space Flight Center, Greenbelt, MD; K. Wilson, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; J. Moores, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA | 1730 hrs<br>AIAA-2014-1740<br>**Network Monitor and Control of Disruption-Tolerant Networks**<br>J. Torgerson, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **55-FSMC-2** | **FSMC - Flight Control Systems & EGSE II** | | **Ballroom A** |
| Chaired by: G. WILLIAMS, EUMETSAT and J. SAMUELS | | | |
| 1600 hrs<br>AIAA-2014-1741<br>**Ground Data System Analysis Tools to Track Flight System State Parameters for the Mars Science Laboratory (MSL) and Beyond**<br>D. Allard, L. DeForrest, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1630 hrs<br>AIAA-2014-1742<br>**INSAT3D: 3D-Ready Operations**<br>L. Claustres, Telespazio, Ramonville Saint-Agne, France; E. Renaudie, French Space Agency (CNES), Toulouse, France; C. Dodeller, B. Alamo, Thales Group, Cannes, France | 1700 hrs<br>AIAA-2014-1743<br>**High performance WebGL for Visualization of Conjunction Analysis**<br>D. Novak, CGI Group, Inc., Darmstadt, Germany | 1730 hrs<br>AIAA-2014-1744<br>**Data mining from PLEIADES telecommand logbooks**<br>G. Picart, French Space Agency (CNES), Toulouse, France; T. Dosogne, CS Communications & Systems, Toulouse, France; M. Smith, SPACEBEL, Labège, France |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **56-GNC-1** | **GNC - Debris/Collision Avoidance I** | | **Ballroom I** |
| Chaired by: J. ARRIETA-CAMACHO, NASA Jet Propulsion Laboratory and G. VALENTINI, Agenzia Spaziale Italiana-ASI | | | |
| 1600 hrs<br>AIAA-2014-1745<br>**Collision Avoidance Operations in a Multi-Mission Environment**<br>M. Bester, B. Roberts, M. Lewis, J. Thorsness, G. Picard, S. Frey, University of California, Berkeley, Berkeley, CA; et al. | 1630 hrs<br>AIAA-2014-1746<br>**Operational Reality of Collision Avoidance Manoeuvres**<br>K. Symonds, T. Flohrer, N. Mardle, D. Fornarelli, X. Marc, T. Ormston, ESA, Darmstadt, Germany | 1700 hrs<br>AIAA-2014-1747<br>**GMV'S Conjunction Analysis Expert Support Service**<br>M. Sansegundo, HISPASAT, Madrid, Spain; J. Cuesta, GMV, Madrid, Spain | 1730 hrs<br>AIAA-2014-1748<br>**Analysis of Space debris collision risk using KARISMA for KOMPSAT Satellite series**<br>H. Kim, S. Lee, D. Cho, J. Sung, Korea Aerospace Research Institute, Daejeon, South Korea |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **57-OCMSA-2** | **OCMSA - Operations Concepts I** | | **Ballroom F** |
| Chaired by: A. BOWMAN, Johns Hopkins University Applied Physics Laboratory and P. LOCK, Jet Propulsion Laboratory | | | |
| 1600 hrs<br>AIAA-2014-1749<br>**Robustness and versatility of the reorbiting strategy for the Meteosat Second Generation satellites fleet**<br>F. Murolo, P. Pili, S. Pessina, M. Klinc, EUMETSAT, Darmstadt, Germany; C. Vogel, A. Reboux, Thales Group, Cannes, France; et al. | 1630 hrs<br>AIAA-2014-1750<br>**File Based Operations - Architectures and the EUCLID Example**<br>C. Haddow, M. Pecchioli, F. Keck, M. Schmidt, F. Flentge, ESA, Darmstadt, Germany | 1700 hrs<br>AIAA-2014-1751<br>**Gaia Mission Operations Concept and Launch and Early Orbit Phase - In-Orbit Experience**<br>A. Rudolph, D. Milligan, G. Whitehead, ESA, Darmstadt, Germany; F. di Marco, P. Collins, E. Serpell, Telespazio VEGA Deutschland GmbH, Darmstadt, Germany; et al. | 1730 hrs<br>AIAA-2014-1752<br>**Rosetta Lander: On-Comet Operations Preparation and Planning**<br>K. Geurts, Telespazio, Cologne, Germany; C. Fantinati, S. Ulamec, R. Willnecker, German Aerospace Center (DLR), Cologne, Germany |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **58-OCMSA-3** | **OCMSA - Operations Technologies II** | | **Ballroom G** |
| Chaired by: R. VENERI, ALTEC and S. EBERLE, DLR/GSOC | | | |
| 1600 hrs<br>AIAA-2014-1753<br>**Applying Virtualization Technology to Earth Station Systems**<br>H. Uegaki, K. Murakami, S. Harauchi, Mitsubishi Group, Amagasaki, Japan | 1630 hrs<br>AIAA-2014-1754<br>**Automating ESA's Planetary Missions: From Concept to Conclusion**<br>M. Eiblmaier, R. Blake, SciSys, Darmstadt, Germany; A. Williams, S. Lodiot, ESA, Darmstadt, Germany; M. Bartesaghi, Telespazio, Darmstadt, Germany; J. Godfrey, ESA, Darmstadt, Germany | 1700 hrs<br>AIAA-2014-1755<br>**Using AADL to Enable MBSE for NASA Space Mission Operations**<br>M. Munoz Fernandez, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1730 hrs<br>AIAA-2014-1756<br>**The Cassini Solstice Mission: Streamlining Operations by Sequencing with PIEs**<br>N. Vandermey, K. Magee, E. Alonge, W. Heventhal, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Tuesday, 6 May 2014 | | | |
|---|---|---|---|
| **59-PS-2** | **PS - EO/S/W II** | | **Ballroom H** |
| Chaired by: M. WICKLER, DLR and S. NAKAMURA, Japan Aerospace Exploration Agency (JAXA) | | | |
| 1600 hrs<br>AIAA-2014-1757<br>**Science Mission Planning for DESDynI with CLASP**<br>J. Doubleday, R. Knight, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1630 hrs<br>AIAA-2014-1758<br>**Mission Planning System for the TET-1 OnOrbitVerification Mission**<br>A. Spörl, C. Lenzen, M. Wörle, J. Hartung, F. Mrowka, A. Braun, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; et al. | 1700 hrs<br>AIAA-2014-1759<br>**Onboard Planning and Scheduling Autonomy within the Scope of the FireBird Mission**<br>C. Lenzen, M. Woerle, T. Göttfert, F. Mrowka, M. Wickler, German Aerospace Center (DLR), Wessling, Germany | 1730 hrs<br>AIAA-2014-1760<br>**Fully Automated Mission Planning and Capacity Analysis Tool for the DEIMOS-2 Agile Satellite**<br>M. Renard, S. Tonetti, S. Cornara, B. Altés-Arlandis, DEIMOS Space S.L.U., Tres Cantos, Spain; F. Pirondini, DEIMOS Space S.L.U., Boecillo, Spain |

## Wednesday

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **60-NW-7**<br>**0800 - 0830 hrs** | **Networking Coffee Break** | **Ballroom Foyer** |

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **61-PLNRY-3**<br>**0830 - 1000 hrs** | **Smallsat Operations Panel** | **Ballroom D&E** |

Moderator: Manfred Bester, University of California Berkeley

Panelists:

**Peter Allan**
Head of the Space Data Division, Deputy Director of RAL Space Rutherford Appleton Laboratory

**William Devereux**
Supervisor, Engineering and Technology Branch Space Department, Johns Hopkins University Applied Physics Laboratory

**Hakan Kayal**
Compter Science, Universitat Wurzburg

**Chris Boshuizen**
Cofounder Planet Labs, Inc

**Trevor Sorensen**
Specialist/Project Manager, Hawaii Spaceflight Laboratory

**James Cutler**
Department of Aerospace, Assistant Professor, University of Michigan

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **62-NW-8**<br>**1000 - 1030 hrs** | **Networking Coffee Break** | **Exhibit Hall A** |

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **63-SB-7**<br>**1000 - 1030 hrs** | **Speaker Briefing** | **Session Rooms** |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **64-CDMP-12** | **CDMP - Software Development and Maintenance I** | | **Ballroom B** |
| Chaired by: P. HOGAN, Canadian Space Agnecy and A. HAUKE | | | |
| 1030 hrs<br>AIAA-2014-1761<br>**Space Object Environment Sensor Simulator**<br>V. Navarro, N. Wright, ESA, Villanueva de la Cañada, Spain; M. Spada, ESA, Darmstadt, Germany; N. Sanchez, E. Parrilla, DEIMOS Space S.L.U., Tres Cantos, Spain | 1100 hrs<br>AIAA-2014-1762<br>**Open Source Software for Mission Operations - Technology, Licensing and Community**<br>J. Trimble, NASA Ames Research Center, Moffett Field, CA | 1130 hrs<br>AIAA-2014-1763<br>**SAG - Example of a generic data hosting and processing platform for Space operations**<br>S. Peña Luque, French Space Agency (CNES), Toulouse, France | |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **65-CDMP-13** | **CDMP - Space Cyber Security I** | | **Ballroom C** |
| Chaired by: J. GONZALEZ PICAZO, EUMETSAT and M. GNAT, DLR - German Aerospace Center | | | |
| 1030 hrs<br>AIAA-2014-1764<br>**Cyber Threat Risk Assessment of Uplink and Commanding System for Mission Operation**<br>A. Ko, G. Faris, K. Tan, F. Cilloniz-Bicchi, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1100 hrs<br>AIAA-2014-1765<br>**Space Missions Cybersecurity**<br>J. Vivero, GMV, Barcelona, Spain; L. del Monte, ESA, Paris, France | 1130 hrs<br>AIAA-2014-1766<br>**Security Risk Assessment and Management for ESOC's Mission Operations Infrastructure Data Systems**<br>N. Melgarejo Diaz, GMV, Barcelona, Spain; F. Flentge, J. Eggleston, ESA, Darmstadt, Germany | |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **66-FSMC-3** | **FSMC - Flight Control Systems & EGSE III** | | **Ballroom A** |
| Chaired by: M. BUTLER, NASA Headquarters, HEOMD and H. PASQUIER, CNES | | | |
| 1030 hrs<br>AIAA-2014-1767<br>**Highlights of the European Ground Systems - Common Core Initiative**<br>M. Pecchioli, ESA, Darmstadt, Germany; J. Carranza, ESA, Noordwijk, The Netherlands | 1100 hrs<br>AIAA-2014-1768<br>**The Design of the European Ground Systems - Common Core (EGS-CC)**<br>M. Goetzelmann, Telespazio, Darmstadt, Germany; L. Tucker, CGI Group, Inc., Darmstadt, Germany; N. Mecredy, Terma, Leiden, The Netherlands; J. Sanmarti, GTD, Barcelona, Spain | 1130 hrs<br>AIAA-2014-1769<br>**Modernization of the Cassini Ground System**<br>G. Razo, T. Fujii, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1200 hrs<br>AIAA-2014-1770<br>**The Common Ground System for both satellite ground test and on-orbit operations**<br>Y. Huh, J. Choi, Korea Aerospace Research Institute, Daejeon, South Korea |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **67-GNC-2** | **GNC - Debris/Collision Avoidance II** | | **Ballroom I** |
| Chaired by: D. BERRY and P. VALERINO | | | |
| 1030 hrs<br>AIAA-2014-1771<br>**A Framework for Integrated Modeling of Perturbations in Atmospheres for Conjunction Tracking (IMPACT)**<br>J. Koller, S. Brennan, H. Godinez, D. Higdon, Los Alamos National Laboratory, Los Alamos, NM; M. Jah, Air Force Research Laboratory, Kirtland AFB, NM; T. Kelecy, The Boeing Company, Colorado Springs, CO; et al. | 1100 hrs<br>AIAA-2014-1772<br>**Orbit Prediction for Conjunction Analysis between KOMPSAT Series and Space Objects**<br>H. Yim, O. Jung, D. Chung, Korea Aerospace Research Institute, Daejeon, South Korea | 1130 hrs<br>AIAA-2014-1773<br>**Life or Death? Maximising Mission Lifetime Return in the Space Debris Era**<br>A. Monham, P. Righetti, R. Dyer, EUMETSAT, Darmstadt, Germany | 1200 hrs<br>AIAA-2014-1774<br>**JAC Software, Dedicated to the Analysis of Conjunction Messages**<br>F. Laporte, French Space Agency (CNES), Toulouse, France |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **68-OCMSA-4** | **OCMSA - Operations Concepts II** | | **Ballroom F** |
| Chaired by: G. GALET, CNES and T. IWATA, Japan Aerospace Exploration Agency-Tsukuba | | | |
| 1030 hrs<br>AIAA-2014-1775<br>**Reversal of TanDEM-X's Relative Motion from Counter-Clockwise to Clockwise**<br>E. Maurer, R. Kahle, G. Morfill, B. Schlepp, S. Zimmermann, German Aerospace Center (DLR), Wessling, Germany | 1100 hrs<br>AIAA-2014-1776<br>**Mission Operations as a Service: Cloud Computing for Space Missions beyond Infrastructure-as-a-Service**<br>M. Sarkarati, M. Merri, M. Spada, V. Navarro, J. Marak, O. Procope Mamert, ESA, Darmstadt, Germany | 1130 hrs<br>AIAA-2014-1777<br>**The Afternoon Constellation, Where Sharing Innovation is the Key to Mission Longevity**<br>C. Marechal, French Space Agency (CNES), Toulouse, France; J. Wilson, Science Systems and Applications, Inc., Hampton, VA | 1200 hrs<br>AIAA-2014-1778<br>**Calculation of Operations Efficiency Factors for Mars Surface Missions**<br>S. Laubach, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **69-OCMSA-5** | **OCMSA - Operations Technologies III** | | **Ballroom G** |
| Chaired by: R. D'AURIA, ALTEC S.p.A. and D. EVANS, European Space Agency (ESA) -ESOC | | | |
| 1030 hrs<br>AIAA-2014-1779<br>**Improving efficiency, communication and standardization of Flight, Ground and Mission Operations via Open Source Web Tools**<br>P. Dale, CAM Systems GmbH, Munich, Germany; M. Schumacher, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1100 hrs<br>AIAA-2014-1780<br>**Truly File-Based Operations at Mars: Lessons Learned and Ideas for Future Missions**<br>D. Lakey, R. Blake, SciSys, Darmstadt, Germany; B. Teixeira De Sousa, I. Tanco, E. Montagnon, M. Denis, ESA, Darmstadt, Germany | 1130 hrs<br>AIAA-2014-1781<br>**Automating the SMAP Ground Data System to Support Lights-Out Operations**<br>A. Sanders, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1200 hrs<br>AIAA-2014-1782<br>**Advancing Autonomous Operations for Deep Space Vehicles**<br>A. Haddock, NASA Marshall Space Flight Center, Huntsville, AL; H. Stetson, Teledyne Brown Engineering, Inc., Huntsville, AL |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **70-PS-3** | **PS - EO/S/W III** | | **Ballroom H** |
| Chaired by: M. WICKLER, DLR and S. NAKAMURA, Japan Aerospace Exploration Agency (JAXA) | | | |
| 1030 hrs<br>AIAA-2014-1783<br>**Onboard Autonomous Planning System**<br>E. Herz, D. George, Orbit Logic, Inc., Greenbelt, MD; T. Esposito, Emergent Space Technologies, Inc., Greenbelt, MD; K. Center, PnP Innovations, Inc., Albuquerque, NM | 1100 hrs<br>AIAA-2014-1784<br>**Benefits of using Advanced Planning and Scheduling Technology: The Alphasat TDP Operations case**<br>N. Policella, H. Oliveira, E. Benzi, ESA, Darmstadt, Germany | 1130 hrs<br>AIAA-2014-1785<br>**The Incremental Planning System GSOC's Next Generation Mission Planning Framework**<br>M. Wörle, C. Lenzen, T. Göttfert, A. Spörl, B. Grishechkin, F. Mrowka, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; et al. | |

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **71-LNCH-3**<br>**1230 - 1330 hrs** | **Exhibit Hall Luncheon** | **Exhibit Hall A** |

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **72-SB-8**<br>**1310 - 1330 hrs** | **Speaker Briefing** | **Session Rooms** |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **73-CDMP-14** | **CDMP - Software Development and Maintenance II** | | **Ballroom B** |
| Chaired by: M. SARKARATI and A. HAUKE | | | |
| 1330 hrs<br>AIAA-2014-1786<br>**Mobile control, Satellite access through portable devices**<br>T. Lopez, GMV, Madrid, Spain | 1400 hrs<br>AIAA-2014-1787<br>**Reality Filtering**<br>A. Hauke, U. Häring, E. Barkasz, M. Preuss, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1430 hrs<br>AIAA-2014-1652<br>**SOLAR Predictor : A Knowledge Management Tool Supporting Long Term Console Operations**<br>S. Klai, Space Applications Services, Zaventem, Belgium; A. Michel, D. Moreau, Belgian Institute for Space Aeronomy, Brussels, Belgium; A. Sela, D. Van Hoof, C. Jacobs, Space Applications Services, Zaventem, Belgium; et al. | |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **74-CDMP-15** | **CDMP - Space Cyber Security II** | | **Ballroom C** |
| Chaired by: J. GONZALEZ PICAZO, EUMETSAT and M. GNAT, DLR - German Aerospace Center | | | |
| 1330 hrs<br>AIAA-2014-1788<br>**Holistic Password Management for the Ground Segment**<br>M. Garcia Chillon, GMV, Barcelona, Spain; M. Rueckert, ESA, Darmstadt, Germany | 1400 hrs<br>AIAA-2014-1789<br>**Securing Ground Data System Applications for Space Operations**<br>M. Pajevski, K. Tso, B. Johnson, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1430 hrs<br>AIAA-2014-1790<br>**Ready for secure software: Secure software engineering for space missions**<br>D. Fischer, M. Spada, ESA, Darmstadt, Germany | |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **75-FSMC-4** | **FSMC - FC Architectures & Design I** | | **Ballroom A** |
| Chaired by: C. YANA, CNES and M. PECCHIOLI, European Space Agency (ESA) -ESOC | | | |
| 1330 hrs<br>AIAA-2014-1791<br>**Dynamic visualization of PLEIADES trend analysis (MONROE)**<br>G. Picart, M. Bigot, French Space Agency (CNES), Toulouse, France; D. Monestes, T. Ripoll, CS Communications & Systems, Toulouse, France | 1400 hrs<br>AIAA-2014-1792<br>**Migrating the XMM-Newton & Integral Ground Segment**<br>N. Pfeil, Terma GmbH, Darmstadt, Germany; M. Kirsch, ESA, Darmstadt, Germany | 1430 hrs<br>AIAA-2014-1793<br>**A Model-Based Approach to Developing Your Mission Operations System**<br>P. Lock, P. Guske, K. Schimmels, R. Smith, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1500 hrs<br>AIAA-2014-1794<br>**Spacecraft monitoring and control a pragmatic evaluation through the eyes of the CAP theorem**<br>J. Feiteirinha, SERCO Services GmbH, Darmstadt, Germany; A. Walsh, ESA, Darmstadt, Germany; J. Osório, PT Inovacao, Coimbra, Portugal |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **76-GNC-3** | **GNC - Models and Capabilities I** | | **Ballroom I** |
| Chaired by: O. JUNG, KARI (Korea Aerospace Research Institute) and M. ABRAHAMSON, Jet Propulsion Laboratory | | | |
| 1330 hrs<br>AIAA-2014-1795<br>**Attitude Control on TET-1 - Experiences from the First Year of Operations**<br>M. Hobsch, J. Herman, S. Löw, F. Cossavella, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1400 hrs<br>AIAA-2014-1796<br>**Rendezvous and Docking Strategy for Crewed Segment of the Asteroid Redirect Mission**<br>H. Hinkel, S. Cryan, C. D'Souza, NASA Johnson Space Center, Houston, TX | 1430 hrs<br>AIAA-2014-1797<br>**Dynamics and Controls of a Generalized Frequency Domain Model Flexible Rotating Spacecraft**<br>T. Elgohary, J. Turner, Texas A&M University, College Station, TX | |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **77-OCMSA-6** | **OCMSA - Operations Concepts III** | | **Ballroom F** |
| Chaired by: P. PELIPENKO and S. BURNS, EUMETSAT | | | |
| 1330 hrs<br>AIAA-2014-1798<br>**Autonomous Rock Outcrop Segmentation as a Tool for Science and Exploration Tasks in Surface Operations**<br>R. Francis, K. McIsaac, University of Western Ontario, London, Canada; D. Thompson, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; G. Osinski, University of Western Ontario, London, Canada | 1400 hrs<br>AIAA-2014-1799<br>**Design and execution of a multi-constraint operational relocation strategy of a geostationary fleet**<br>F. Murolo, P. Pili, L. Matheson, R. Parmiter, S. Pessina, A. Damiano, EUMETSAT, Darmstadt, Germany | 1430 hrs<br>AIAA-2014-1800<br>**Mission Assurance Practices for Satellite Operations**<br>K. Childers, The Aerospace Corporation, El Segundo, CA | 1500 hrs<br>AIAA-2014-1801<br>**SpaceOps 2012 Plus 2: Social Tools to Simplify ISS Flight Control Communications and Log Keeping**<br>D. Scott, H. Cowart, NASA Marshall Space Flight Center, Huntsville, AL |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **78-OCMSA-7** | **OCMSA - Operations Technologies IV** | | **Ballroom G** |
| Chaired by: R. FURROW, JHU/Applied Physics Laboratory and S. ASMAR, Jet Propulsion Laboratory | | | |
| 1330 hrs<br>AIAA-2014-1802<br>**Automation concept for the next generation of CNES Command Control Centers**<br>M. Duhaze, L. Arnaud, French Space Agency (CNES), Toulouse, France | 1400 hrs<br>AIAA-2014-1803<br>**WaveOps: Using Real-Time Collaboration Technology to Support Effective Mission Operations**<br>M. Spada, D. Fischer, ESA, Darmstadt, Germany; G. Montroni, HE Space, Darmstadt, Germany; C. Mateo, Y. Voumard, Solenix GmbH, Darmstadt, Germany | 1430 hrs<br>AIAA-2014-1804<br>**Standard-Based Automation: Scalability, Flexibility and Exchange for Long Term Missions**<br>N. Salor Moral, Vitrociset Belgium, Noordwijk, The Netherlands; S. Dionisi, Vitrociset Belgium, Darmstadt, Germany; M. Mazza, Vitrociset Belgium, Noordwijk, The Netherlands | 1500 hrs<br>AIAA-2014-1805<br>**INTEGRAL operations beyond the design lifetime - Challenges of running an 11 year old mission**<br>J. Huebner, R. Southworth, M. Kirsch, ESA, Darmstadt, Germany; P. Kretschmar, E. Kuulkers, ESA, Madrid, Spain; S. De Padova, SERCO Services GmbH, Darmstadt, Germany; et al. |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **79-PS-4** | **PS - Comms Planning** | | **Ballroom H** |
| Chaired by: S. NAKAMURA, Japan Aerospace Exploration Agency (JAXA) and V. NAZAROV, IKI RAN | | | |
| 1330 hrs<br>AIAA-2014-1806<br>**Planning of Automated Operations for Galileo Early Service Provision**<br>J. Brajovic, German Aerospace Center (DLR), Wessling, Germany; R. Cadenas, GMV, Madrid, Spain; P. Dale, CAM Systems GmbH, Munich, Germany | 1400 hrs<br>AIAA-2014-1807<br>**Scheduling as an interoperability service and its security aspects**<br>M. Gnat, T. Maerkl, D. Richter, E. Knorr, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1430 hrs<br>AIAA-2014-1808<br>**Robust Commanding**<br>T. Göttfert, C. Lenzen, M. Wörle, F. Mrowka, M. Wickler, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1500 hrs<br>AIAA-2014-1809<br>**APGEN Scheduling: 15 Years of Experience in Planning Automation**<br>P. Maldague, S. Wissler, M. Lenda, D. Finnerty, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **80-PSTR-2**<br>**1500 - 1720 hrs** | **Posters II** | | **Ballroom Foyer** |
| Chaired by: M. SCHMIDHUBER, DLR/GSOC Mission Operations and P. ESTABROOK, Jet Propulsion Laboratory | | | |
| AIAA-2014-1810<br>**Comparison of gauging methods for Orbital's GEOStarTM 1 Satellites**<br>B. Yendler, YSPM, LLC, Saratoga, CA; J. Molinsky, Orbital Sciences Corporation, Dulles, VA; S. Chernikov, YSPM, LLC, Saratoga, CA; D. Guadagnoli, Orbital Sciences Corporation, Dulles, VA | AIAA-2014-1811<br>**An effective shift method for multi-satellite operations in KGS**<br>H. Baek, Y. Kim, J. Lee, D. Chung, E. Kim, Korea Aerospace Research Institute, Daejeon, South Korea; S. Lee, Chungnam National University, Daejeon, South Korea | AIAA-2014-1812<br>**Simple vs. Complex OBCP: Experience and Solutions for managing On-Board Control Procedures**<br>W. Heinen, S. Reid, S. Pearson, RHEA System, Wavre, Belgium | AIAA-2014-1813<br>**An innovative approach to operational validation process based on CPNs (Coloured Petri Nets)**<br>G. Censi, M. Cerone, S. Bevilacqua, S. Nardangeli, F. Faenza, C. De Bellis, Telespazio, Rome, Italy |
| AIAA-2014-1814<br>**Surface EVA Trade-offs to Minimize DCS Risk and Optimize Pre-Breathe Times**<br>B. Alpert, NASA Johnson Space Center, Houston, TX | AIAA-2014-1815<br>**Powered Swing-By in the Elliptic Restricted Problem**<br>A. Ferraz, A. Prado, O. Winter, National Institute for Space Research (INPE), São José dos Campos, Brazil | AIAA-2014-1816<br>**Lean Mission Operations Systems Design - Applying Lessons from Agile and Lean Software Development to Mission Operations Design**<br>J. Trimble, NASA Ames Research Center, Moffett Field, CA | AIAA-2014-1817<br>**Command Chain Automation**<br>S. Zimmermann, D. Schulze, C. Stangl, German Aerospace Center (DLR), Wessling, Germany |
| AIAA-2014-1818<br>**Evolving Mission Control System Infrastructure for an Altering Fleet of Spacecraft**<br>R. Messaros, Siemens, Vienna, Austria; C. Stangl, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; M. Oswald, Siemens, Vienna, Austria | AIAA-2014-1819<br>**System Health Management Design Strategies**<br>J. Day, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; S. Johnson, University of Colorado, Colorado Springs, Colorado Springs, CO | AIAA-2014-1820<br>**System Resilience Framework and Modeling for a CubeSat System**<br>Y. Rodriguez, A. Madni, University of Southern California, Los Angeles, CA | AIAA-2014-1821<br>**Vega Launch Operations and Ground Facilities**<br>D. Nicolini, P. Roviera, ESA, Frascati, Italy |

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **81-NW-9**<br>**1530 - 1600 hrs** | **Networking Coffee Break** | **Exhibit Hall A** |

| Wednesday, 7 May 2014 | | |
|---|---|---|
| **82-SB-9**<br>**1530 - 1600 hrs** | **Speaker Briefing** | **Session Rooms** |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **83-CDMP-16** | **CDMP - Ground Communications** | | **Ballroom C** |
| Chaired by: M. GOETZELMANN, Telespazio VEGA Deutschland GmbH and O. PEINADO, DLR | | | |
| 1600 hrs<br>AIAA-2014-1822<br>**EFAL: EDRS Feeder Link from Antarctic Latitudes - System Architecture and Operations Concept**<br>S. Bobrovskyi, R. Barrios, D. Giggenbach, F. Moll, F. Sellmaier, F. Huber, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1630 hrs<br>AIAA-2014-1823<br>**Analytical Determination of Kepler Uplink Lock Frequency**<br>G. Bershenyi, L. Reedy, C. Stewart, University of Colorado, Boulder, Boulder, CO; K. Larson, Ball Aerospace & Technologies Corporation, Boulder, CO | 1700 hrs<br>AIAA-2014-1824<br>**Mission Control Room Conferencing using Standard PABX Systems: A novel prototyping approach towards multi-conferencing capabilities of Space Mission control room conferencing, using a standard telephony system**<br>D. Peter, M. Töpfer, German Aerospace Center (DLR), Munich, Germany | 1730 hrs<br>AIAA-2014-1825<br>**Technical and operational investigations of the real-time communication for robotic missions**<br>M. Gnat, R. Falcone, A. Hauke, A. Ohndorf, S. Eberle, German Aerospace Center (DLR), Oberpfaffenhofen, Germany |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **84-CSIS-1** | **CSIS - Overall Orientations** | | **Ballroom B** |
| Chaired by: G. CALZOLARI, European Space Agency (ESA) and J. DIFFERDING, NASA Ames Research Center | | | |
| 1600 hrs<br>AIAA-2014-1826<br>**Results from the recent Interoperability Plenary-3, and the implications on future interoperability for global space communications and operations architectures**<br>M. Pilgram, German Aerospace Center (DLR), Wessling, Germany; P. Liebrecht, NASA Headquarters, Washington, DC; J. Soula, French Space Agency (CNES), Toulouse, France; G. Calzolari, ESA, Darmstadt, Germany | 1630 hrs<br>AIAA-2014-1827<br>**CCSDS: A brief story of success**<br>N. Peccia, ESA, Darmstadt, Germany; W. Tai, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1700 hrs<br>AIAA-2014-1828<br>**Operations engineering for cross support**<br>N. Nomura, Space Engineering Development Corporation, Tsukuba, Japan; T. Asama, F. Kudoh, H. Doi, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan; Y. Watanabe, D. Aonuma, Space Engineering Development Corporation, Tsukuba, Japan | 1730 hrs<br>AIAA-2014-1829<br>**Security Standards for Space-Terrestrial Internetworks: A Multi-Dimensional Approach to Securing Shared Circuits**<br>E. Birrane, V. Ramachandran, S. Jacobs, Johns Hopkins University Applied Physics Laboratory, Laurel, MD |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **85-FSMC-5** | **FSMC - FC Architectures & Design II** | | **Ballroom A** |
| Chaired by: M. BUTLER, NASA Headquarters, HEOMD and J. MIRO, European Space Operations | | | |
| 1600 hrs<br>AIAA-2014-1830<br>**Flight-Ground Integration - The Future of Operability**<br>P. Lock, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; C. Grasso, Blue Sun Enterprises, Inc., Boulder, CO | 1630 hrs<br>AIAA-2014-1831<br>**ISIS MCS: A High-Performance Mission Control System Based On CCSDS Mission Operations Standards**<br>N. Champsavoir, French Space Agency (CNES), Toulouse, France; J. Georger, ATOS, Toulouse, France | 1700 hrs<br>AIAA-2014-1832<br>**Reconfigurable Software for Mission Operations**<br>J. Trimble, NASA Ames Research Center, Moffett Field, CA | 1730 hrs<br>AIAA-2014-1833<br>**A Full End-to-end Automation Chain with MOIS, PLUTO, MATIS, SMF and SCOS-2000**<br>S. Pearson, S. Reid, W. zur Borg, RHEA System, Wavre, Belgium |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **86-GNC-4** | **GNC - Models and Capabilities II** | | **Ballroom I** |
| Chaired by: M. ABRAHAMSON, Jet Propulsion Laboratory and F. LAPORTE, CNES | | | |
| 1600 hrs<br>AIAA-2014-1834<br>**Small near Earth asteroids and gravity assist maneuvers as basic constituents of planetary defense against hazardous sky objects**<br>A. Ledkov, N. Eysmont, M. Boyarsky, Russian Academy of Sciences, Moscow, Russia; D. Dunham, KinetX, Tempe, AZ; R. Nazirov, K. Fedyaev, Russian Academy of Sciences, Moscow, Russia | 1630 hrs<br>AIAA-2014-1835<br>**Expanding the Comprehensive Open-architecture Space Mission Operations System (COSMOS) for Integrated Guidance, Navigation and Control of Multiple Small Satellites**<br>M. Nunes, T. Sorensen, E. Pilger, H. Garbeil, J. Lewis, D. Azimov, University of Hawaii, Manoa, Honolulu, HI; et al. | 1700 hrs<br>AIAA-2014-1836<br>**Improved Re-Entry Prediction Method Using the Last-Minute Motion of Re-Entering Objects**<br>S. Ikeda, T. Tajima, J. Abe, I. Matsuda, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan | 1730 hrs<br>AIAA-2014-1837<br>**Solar Dynamics Observatory Reaction Wheel Bearing Friction Increase: Detection, Analysis, and Impacts**<br>F. Ekinci, Honeywell International, Inc., Greenbelt, MD |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **87-OCMSA-8** | **OCMSA - Operations Concepts IV** | | **Ballroom F** |
| Chaired by: J. VOLPP, European Space Agency (ESA) -ESOC and G. WILLIAMS, EUMETSAT | | | |
| 1600 hrs<br>AIAA-2014-1838<br>**Innovative Rover Operations Concepts - Autonomous Planner (IRONCAP) - Concluding the adventure**<br>R. Steel, A. Hoffmann, M. Niezette, Telespazio, Darmstadt, Germany; A. Cimatti, M. Roveri, Fondazione Bruno Kessler, Povo, Italy; K. Kapellos, TRASYS, Brussels, Belgium; et al. | 1630 hrs<br>AIAA-2014-1839<br>**Laser Com in space, the operational concept**<br>P. Martin-Pimentel, C. Rochow, D. Troendle, F. Heine, TESAT Spacecom, Backnang, Germany; U. Sterr, ST2C GmbH, Esslingen, Germany; S. Kuhlmann, German Aerospace Center (DLR), Wessling, Germany; et al. | 1700 hrs<br>AIAA-2014-1840<br>**VML 3.0 Reactive Rendezvous and Docking Sequencer for Mars Sample Return**<br>C. Grasso, Blue Sun Enterprises, Inc., Boulder, CO | 1730 hrs<br>AIAA-2014-1841<br>**Staring At The Sun: Implementing the Remote Sensing Window Concept for Solar Orbiter**<br>D. Lakey, SciSys, Darmstadt, Germany; M. Pantaleoni, RHEA System, Wavre, Belgium; C. Watson, L. Sanchez, ESA, Madrid, Spain; B. Teixeira De Sousa, I. Tanco, ESA, Darmstadt, Germany |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **88-OCMSA-9** | **OCMSA - Operations Simulations and Training** | | **Ballroom G** |
| Chaired by: C. AUDOUY, CNES and A. BOWMAN, Johns Hopkins University Applied Physics Laboratory | | | |
| 1600 hrs<br>AIAA-2014-1842<br>**Optimization / Evolution of the operational trades & skills**<br>G. Galet, French Space Agency (CNES), Toulouse, France | 1630 hrs<br>AIAA-2014-1843<br>**Using AUTORAD for Cassini file uplinks - incorporating automated commanding into mission operations**<br>S. Goo, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1700 hrs<br>AIAA-2014-1844<br>**A Simulated Journey to Mercury: the Challenges of the BepiColombo Simulator Development for the Flight Control Team**<br>I. Clerigo, LSE Space GmbH, Darmstadt, Germany; E. Montagnon, ESA, Darmstadt, Germany; D. Segneri, Telespazio VEGA Deutschland GmbH, Darmstadt, Germany | 1730 hrs<br>AIAA-2014-1845<br>**BASILES: A common simulation platform to promote models and simulation reuse**<br>S. Salas Solano, J. Marigo, F. Manon, A. Strzepek, P. Landrodie, N. Rousse, French Space Agency (CNES), Toulouse, France; et al. |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **89-PS-5** | **PS - Pure Scheduling I** | | **Ballroom H** |
| Chaired by: S. NAKAMURA, Japan Aerospace Exploration Agency (JAXA) and V. NAZAROV, IKI RAN | | | |
| 1600 hrs<br>AIAA-2014-1846<br>**An Approach for Automation the Satellite of Routine's Operation and Procedures**<br>M. Soares, M. Ferreira, A. Tomé, F. Junior, J. Clivelaro, V. Oliveira, National Institute for Space Research (INPE), São José dos Campos, Brazil; et al. | 1630 hrs<br>AIAA-2014-1847<br>**Using Modern Methodologies with Maintenance Software**<br>B. Streiffert, L. Francis, B. Smith, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1700 hrs<br>AIAA-2014-1848<br>**An Evolution of the Language for Mission Planning (LMP) through operational usage**<br>R. Steel, E. Noreus, A. Hoffmann, S. De la Rosa-Steinz, M. Renesto, M. Niezette, Telespazio, Darmstadt, Germany | |

Thursday, 8 May 2014

| 90-NW-10<br>0800 - 0830 hrs | Networking Coffee Break | Ballroom Foyer |
|---|---|---|

Thursday, 8 May 2014

| 91-PLNRY-4<br>0830 - 1000 hrs | Commercial Space Panel | Ballroom D&E |
|---|---|---|

Moderator: Alex MacDonald, Commerical Space Specialist, National Space Technology Applications Office, JPL

Panelists:

| Arno Wielders<br>Mars One | John Olsen<br>Vice President, Space Systems, Sierra Nevada Corporation | James Wolff<br>Cofounder, Deep Space Industries | Ryan Johnson<br>President and CEO, The BlackBridge Group | Jeffrey Manber<br>Managing Director, NanoRacks LLC |
|---|---|---|---|---|

Thursday, 8 May 2014

| 92-NW-11<br>1000 - 1030 hrs | Networking Coffee Break | Exhibit Hall A |
|---|---|---|

Thursday, 8 May 2014

| 93-SB-10<br>1000 - 1030 hrs | Speaker Briefing | Session Rooms |
|---|---|---|

Thursday, 8 May 2014

| 94-CSIS-2 | CSIS - Space Links and SLE | | Ballroom B |
|---|---|---|---|
| Chaired by: J. SOULA, CNES and E. BERGAMINI, Instituto Nacional de Pesquisas Espaciais | | | |
| 1030 hrs<br>AIAA-2014-1849<br>**Also foundations need refurbishment - Space Link Services Evolution**<br>G. Calzolari, ESA, Darmstadt, Germany | 1100 hrs<br>AIAA-2014-1850<br>**CCSDS Next Generation Space Link Protocol (NGSLP)**<br>G. Kazz, E. Greenberg, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1130 hrs<br>AIAA-2014-1851<br>**GMSK/PN for high rate telemetry and high accuracy ranging of Lagrange and Mars missions**<br>G. Calzolari, E. Vassallo, G. Sessler, ESA, Darmstadt, Germany; M. Visintin, Technical University of Turin, Turin, Italy | 1200 hrs<br>AIAA-2014-1852<br>**Dissection of the CCSDS Space Link Extension (SLE) Transfer Services**<br>J. Vizcaya Garcia, Telespazio, Darmstadt, Germany; E. Soerensen, D. Firre, F. Delhaise, ESA, Darmstadt, Germany |

Thursday, 8 May 2014

| 95-FSMC-6 | FSMC - FC Architectures & Design III | | Ballroom A |
|---|---|---|---|
| Chaired by: N. PECCIA, European Space Agency (ESA) -ESOC and N. CHAMPSAVOIR, CNES | | | |
| 1030 hrs<br>AIAA-2014-1853<br>**Virtualize the Lab, Close the Warehouse**<br>J. Jacobsohn, K. Stewart, C. Talon, M. Palsson, MetiSpace Technologies, Inc., Rockville, MD | 1100 hrs<br>AIAA-2014-1854<br>**The integration challenges of a new generation of Editors and Tools for Mission Operations Preparation**<br>W. Heinen, S. Pearson, S. Reid, RHEA System, Wavre, Belgium | 1130 hrs<br>AIAA-2014-1855<br>**Development of Automatic / Remote Satellite Operation System**<br>H. Nagamatsu, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan | |

Thursday, 8 May 2014

| 96-GNC-5 | GNC - Navigation/Astrodynamics I | | Ballroom I |
|---|---|---|---|
| Chaired by: P. VALERINO and I. ROUNDHILL, Jet Propulson Lab | | | |
| 1030 hrs<br>AIAA-2014-1856<br>**Advancing Navigation, Timing, and Science with the Deep Space Atomic Clock**<br>T. Ely, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1100 hrs<br>AIAA-2014-1857<br>**Passive Ranging for Geostationary Satellites: On a Novel System and Operational Benefits**<br>L. Rodriguez, G. Krier, M. Thill, SES, Betzdorf, Luxembourg; J. de Vicente, ESA, Darmstadt, Germany | 1130 hrs<br>AIAA-2014-1858<br>**Methods of Pulse Phase Tracking for X-ray Pulsar Based Spacecraft Navigation using Low Flux Pulsars**<br>K. Anderson, D. Pines, University of Maryland, College Park, College Park, MD | 1200 hrs<br>AIAA-2014-1859<br>**Orbit Control Manoeuvre Strategy for EarthCARE**<br>T. Ormston, ESA, Darmstadt, Germany; D. Kuijper, CGI Group, Inc., Darmstadt, Germany; N. Mardle, ESA, Darmstadt, Germany |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **97-OCMSA-10** | **OCMSA - Operations Concepts V** | | **Ballroom F** |
| Chaired by: M. BUTLER, NASA Headquarters, HEOMD and A. RUDOLPH, European Space Agency (ESA) -ESOC | | | |
| 1030 hrs<br>AIAA-2014-1860<br>**The Mission Operations Facility design and operational concept for EUMETSAT's next generation geostationary satellite programme (MTG)**<br>T. Esdar, EUMETSAT, Darmstadt, Germany; F. Martínez Fadrique, GMV, Madrid, Spain | 1100 hrs<br>AIAA-2014-1861<br>**Simulating Remote Mars Rover Operations in the Atacama Desert for Future ESA Missions**<br>M. Woods, A. Shaw, SciSys, Bristol, United Kingdom | 1130 hrs<br>AIAA-2014-1862<br>**Modelling and Using Common Ground in Human-agent Collaboration during Spacecraft Operations**<br>J. Pfau, CGI Group, Inc., Darmstadt, Germany; T. Miller, L. Sonenberg, University of Melbourne, Melbourne, Australia | 1200 hrs<br>AIAA-2014-1863<br>**ExoMars: "Not Yet Another Mars Mission" - A Data Systems Perspective on the Challenges of the ExoMars Programme**<br>M. Pantoquilho, P. Schmitz, ESA, Darmstadt, Germany; P. Choukroun, Telespazio VEGA Deutschland GmbH, Darmstadt, Germany; G. Montroni, HE Space, Darmstadt, Germany |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **98-OCMSA-11** | **OCSMA - Operations Validation** | | **Ballroom G** |
| Chaired by: S. EBERLE, DLR/GSOC and R. FURROW, JHU/Applied Physics Laboratory | | | |
| 1030 hrs<br>AIAA-2014-1864<br>**Verification of Mars Odyssey Flight Software Ten Years After Launch**<br>D. Gingerich, Lockheed Martin Corporation, Denver, CO | 1100 hrs<br>AIAA-2014-1865<br>**Use of an Acquisition Station Simulator Tool in the Frame of a Payload Data Ground Segment Overall Testing**<br>S. Mattia, RHEA System, Wavre, Belgium; C. Caspar, ESA, Frascati, Italy | 1130 hrs<br>AIAA-2014-1866<br>**ESA's model based approach for the development of operational spacecraft simulators**<br>A. Walsh, M. Pecchioli, V. Reggestad, ESA, Darmstadt, Germany; P. Ellsiepen, Telespazio, Darmstadt, Germany | 1200 hrs<br>AIAA-2014-1867<br>**CUBIST: Implementation and Evaluation of a Semantic Business Intelligence System for Payload Operations**<br>S. Klai, E. Sevinç, Space Applications Services, Zaventem, Belgium; C. Muller, D. Moreau, Belgian Institute for Space Aeronomy, Brussels, Belgium |

| Thursday, 8 May 2014 | | |
|---|---|---|
| **99-LNCH-4**<br>**1230 - 1330 hrs** | **Exhibit Hall Luncheon** | **Exhibit Hall A** |

| Thursday, 8 May 2014 | | |
|---|---|---|
| **100-SB-11**<br>**1310 - 1330 hrs** | **Speaker Briefing** | **Session Rooms** |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **101-CSIS-3** | **CSIS - Mission Operations** | | **Ballroom B** |
| Chaired by: M. GNAT, DLR - German Aerospace Center and M. KEARNEY, NASA Marshall Space Flight Center | | | |
| 1330 hrs<br>AIAA-2014-1868<br>**Get More Science Out of Your Missions with the CCSDS Mission Operations Services**<br>M. Merri, M. Sarkarati, ESA, Darmstadt, Germany; CCSDS Spacecraft Monitor & Control Working Group, Consultative Committee for Space Data Systems, Washington, DC | 1400 hrs<br>AIAA-2014-1869<br>**Implementation of CCSDS Mission Operations Services at the German Space Operations Center**<br>S. Gärtner, J. Hartung, M. Wendler, German Aerospace Center (DLR), Wessling, Germany | 1430 hrs<br>AIAA-2014-1870<br>**RobOps - Services for Telerobotic System Operations**<br>F. Flentge, ESA, Darmstadt, Germany; B. Brunner, S. Jaekel, German Aerospace Center (DLR), Wessling, Germany; C. Mateo, Solenix GmbH, Darmstadt, Germany; P. Steele, ESA, Darmstadt, Germany; C. Laroque, Telespazio VEGA Deutschland GmbH, Darmstadt, Germany; et al. | 1500 hrs<br>AIAA-2014-1871<br>**METERON CCSDS MO Compliant Telerobotic Services Talk DTN**<br>M. Sarkarati, M. Spada, M. Merri, J. Raymaekers, K. Nergaard, ESA, Darmstadt, Germany |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **102-CSO-1** | **CSO - Space Operational Reliability & Training** | | **Ballroom C** |
| Chaired by: D. LAVALLEE, JHU/Applied Physics Laboratory and Z. MOUNZER, Telespazio VEGA Deutschland GmbH | | | |
| 1330 hrs<br>AIAA-2014-1872<br>**Bringing Together Industry and Academia via Graduate Commercial Spaceflight Operations Curriculum**<br>B. Cheetham, J. Feldhacker, J. Herman, G. Born, University of Colorado, Boulder, Boulder, CO | 1400 hrs<br>AIAA-2014-1873<br>**ATV-CC Training Academy, lessons learned at end of programme**<br>T. Beck, ESA, Toulouse, France; E. Micaloni, Terma, Toulouse, France; J. Bois, P. O'Shea, ESA, Toulouse, France; L. Francillout, French Space Agency (CNES), Toulouse, France | | |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **103-FSMC-7** | **FSMC - Fault Management and Recovery** | | **Ballroom A** |
| Chaired by: G. PICART, CNES and J. MIRO, European Space Operations | | | |
| 1330 hrs<br>AIAA-2014-1874<br>**A Fault-Tolerant On-Board Computing and Data Handling Architecture Incorporating a Concept for Failure Detection, Isolation, and Recovery for the SHEFEX III Navigation System**<br>R. Schwarz, S. Theil, German Aerospace Center (DLR), Bremen, Germany | 1400 hrs<br>AIAA-2014-1875<br>**Curing XMM-Newton's reaction wheel cage instability: the in-flight re-lubrication experience**<br>M. Pantaleoni, RHEA System, Wavre, Belgium; P. Chapman, Astrium, Stevenage, United Kingdom; R. Harris, Astrium, Friedrichshafen, Germany; M. Kirsch, ESA, Darmstadt, Germany; R. Kresken, CGI Group, Inc., Darmstadt, Germany; J. Martin, ESA, Darmstadt, Germany; et al. | 1430 hrs<br>AIAA-2014-1876<br>**The Solar Dynamics Observatory: Solar Array Performance after Three Years in Orbit**<br>D. Poland, Honeywell International, Inc., Greenbelt, MD | 1500 hrs<br>AIAA-2014-1877<br>**Thermal Control in SMOS Payload Operations: Anomalies, Seasonal Effects, Failure & Recovery Issues**<br>M. Kornberg, LSE Space GmbH, Darmstadt, Germany; E. Checa, S. Dolce, M. Martin-Neira, ESA, Noordwijk, The Netherlands; P. Rubiales, J. Closa, EADS, Madrid, Spain; et al. |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **104-GNC-6** | **GNC - Navigation/Astrodynamics II** | | **Ballroom I** |
| Chaired by: I. ROUNDHILL, Jet Propulson Lab and F. LAPORTE, CNES | | | |
| 1330 hrs<br>AIAA-2014-1878<br>**The Double Flybys of the Cassini Mission: Navigation Challenges and Lessons Learned**<br>S. Wagner, B. Buffington, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1400 hrs<br>AIAA-2014-1879<br>**RF mute events for Lagrange missions: Lessons learned from Herschel and Planck**<br>S. Peterson, Telespazio, Darmstadt, Germany; F. Delhaise, ESA, Darmstadt, Germany | 1430 hrs<br>AIAA-2014-1880<br>**Updating the Reference Trajectory for the Cassini Solstice Mission**<br>P. Valerino, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1500 hrs<br>AIAA-2014-1881<br>**Highly Physical Penumbra Solar Radiation Pressure Modeling and the Earth Flyby Anomaly**<br>R. Robertson, Virginia Polytechnic Institute and State University, Blacksburg, VA; M. Shoemaker, Los Alamos National Laboratory, Los Alamos, NM |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **105-OCMSA-12** | **OCMSA - Operations Experience I** | | **Ballroom F** |
| Chaired by: A. RUDOLPH, European Space Agency (ESA) -ESOC and A. MONHAM, EUMETSAT | | | |
| 1330 hrs<br>AIAA-2014-1882<br>**Kepler Mission Operations Response to Wheel Anomalies**<br>K. Larson, K. McCalmont, C. Peterson, S. Ross, Ball Aerospace & Technologies Corporation, Boulder, CO | 1400 hrs<br>AIAA-2014-1883<br>**Lithium Ion Battery Management Strategies for European Space Operations Centre Missions**<br>T. Ormston, ESA, Darmstadt, Germany; L. Maleville, LSE Space GmbH, Darmstadt, Germany; V. Tran, ESA, Darmstadt, Germany; L. Lucas, LSE Space GmbH, Darmstadt, Germany; K. Van Der Pols, Telespazio, Darmstadt, Germany; M. Denis, ESA, Darmstadt, Germany; et al. | 1430 hrs<br>AIAA-2014-1884<br>**Mars Exploration Rovers 2004-2013: Evolving Operational Tactics Driven by Aging Robotic Systems**<br>J. Townsend, P. Bellutta, M. Keuneke, M. Seibert, A. Stroupe, J. Wright, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; et al. | 1500 hrs<br>AIAA-2014-1885<br>**The Cluster Mission after 13 Years - Operations beyond its Design Limits**<br>J. Volpp, ESA, Darmstadt, Germany; D. Sieg, SciSys, Darmstadt, Germany |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **106-OCMSA-13** | **OCMSA - Payload Operations I** | | **Ballroom G** |
| Chaired by: D. BINDSCHADLER, Jet Propulsion Laboratory and C. POLANSKEY, Jet Propulsion Lab | | | |
| 1330 hrs<br>AIAA-2014-1886<br>**BepiColombo MPO SSMM and Data Downlink Modelling for Science Operations Analysis**<br>S. de la Fuente, R. Hoofs, ESA, Villanueva de la Cañada, Spain; A. Dietz, ESA, Darmstadt, Germany; J. Windsor, ESA, Noordwijk, The Netherlands; R. Heinze, Astrium, Friedrichshafen, Germany; M. Casale, ESA, Villanueva de la Cañada, Spain | 1400 hrs<br>AIAA-2014-1887<br>**Private Public Cooperation for Hosted Payload Operations: the Alphasat Concept**<br>E. Benzi, ESA, Noordwijk, The Netherlands; A. Cacioni, Inmarsat, London, United Kingdom | 1430 hrs<br>AIAA-2014-1888<br>**Agile Science for Primitive Bodies and Deep Space Exploration**<br>S. Chien, B. Bue, J. Castillo-Rogez, D. Gharibian, D. Thompson, K. Wagstaff, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **107-PS-7** | **PS - Deep Space I** | | **Ballroom H** |
| Chaired by: V. NAZAROV, IKI RAN and E. MAURER, DLR | | | |
| 1330 hrs<br>AIAA-2014-1889<br>**Mission Planning Framework - Building the Rosetta and Bepi-Columbo Planning Systems**<br>C. Haddow, D. Werner, ESA, Darmstadt, Germany | 1400 hrs<br>AIAA-2014-1890<br>**PHILAE Lander: a scheduling challenge**<br>A. Moussi-Soffys, P. Gaudon, J. Fronton, C. Delmas, French Space Agency (CNES), Toulouse, France | 1430 hrs<br>AIAA-2014-1891<br>**Planning Strategies for Mars (Analog) Missions: Real-Time, 3-Days-in-Advance and 1-Day-in-Advance Planning**<br>A. Dinkelaker, S. Hettrich, L. Ghasemzadeh, A. Alizadeh, E. Lupu, T. Kauerhoff, Austrian Space Forum, Innsbruck, Austria; et al. | 1500 hrs<br>AIAA-2014-1892<br>**Automated Scheduling of Science Activities for Titan Encounters by Cassini**<br>T. Ray, R. Knight, D. Mohr, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA |

| Wednesday, 7 May 2014 | | | |
|---|---|---|---|
| **80-PSTR-2**<br>**1500 - 1720 hrs** | **Posters II** | | **Ballroom Foyer** |
| Chaired by: M. SCHMIDHUBER, DLR/GSOC Mission Operations and P. ESTABROOK, Jet Propulsion Laboratory | | | |
| AIAA-2014-1810<br>**Comparison of gauging methods for Orbital's GEOStarTM 1 Satellites**<br>B. Yendler, YSPM, LLC, Saratoga, CA; J. Molinsky, Orbital Sciences Corporation, Dulles, VA; S. Chernikov, YSPM, LLC, Saratoga, CA; D. Guadagnoli, Orbital Sciences Corporation, Dulles, VA | AIAA-2014-1811<br>**An effective shift method for multi-satellite operations in KGS**<br>H. Baek, Y. Kim, J. Lee, D. Chung, E. Kim, Korea Aerospace Research Institute, Daejeon, South Korea; S. Lee, Chungnam National University, Daejeon, South Korea | AIAA-2014-1812<br>**Simple vs. Complex OBCP: Experience and Solutions for managing On-Board Control Procedures**<br>W. Heinen, S. Reid, S. Pearson, RHEA System, Wavre, Belgium | AIAA-2014-1813<br>**An innovative approach to operational validation process based on CPNs (Coloured Petri Nets)**<br>G. Censi, M. Cerone, S. Bevilacqua, S. Nardangeli, F. Faenza, C. De Bellis, Telespazio, Rome, Italy |
| AIAA-2014-1814<br>**Surface EVA Trade-offs to Minimize DCS Risk and Optimize Pre-Breathe Times**<br>B. Alpert, NASA Johnson Space Center, Houston, TX | AIAA-2014-1815<br>**Powered Swing-By in the Elliptic Restricted Problem**<br>A. Ferraz, A. Prado, O. Winter, National Institute for Space Research (INPE), São José dos Campos, Brazil | AIAA-2014-1816<br>**Lean Mission Operations Systems Design - Applying Lessons from Agile and Lean Software Development to Mission Operations Design**<br>J. Trimble, NASA Ames Research Center, Moffett Field, CA | AIAA-2014-1817<br>**Command Chain Automation**<br>S. Zimmermann, D. Schulze, C. Stangl, German Aerospace Center (DLR), Wessling, Germany |
| AIAA-2014-1818<br>**Evolving Mission Control System Infrastructure for an Altering Fleet of Spacecraft**<br>R. Messaros, Siemens, Vienna, Austria; C. Stangl, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; M. Oswald, Siemens, Vienna, Austria | AIAA-2014-1819<br>**System Health Management Design Strategies**<br>J. Day, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; S. Johnson, University of Colorado, Colorado Springs, Colorado Springs, CO | AIAA-2014-1820<br>**System Resilience Framework and Modeling for a CubeSat System**<br>Y. Rodriguez, A. Madni, University of Southern California, Los Angeles, CA | AIAA-2014-1821<br>**Vega Launch Operations and Ground Facilities**<br>D. Nicolini, P. Roviera, ESA, Frascati, Italy |

| Thursday, 8 May 2014 | | |
|---|---|---|
| **108-NW-12**<br>**1530 - 1600 hrs** | **Networking Coffee Break** | **Ballroom Foyer** |

| Thursday, 8 May 2014 | | |
|---|---|---|
| **109-SB-12**<br>**1530 - 1600 hrs** | **Speaker Briefing** | **Session Rooms** |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **110-CSIS-4** | **CSIS - New Standards** | | **Ballroom B** |
| Chaired by: M. PILGRAM, DLR and E. BERGAMINI, Instituto Nacional de Pesquisas Espaciais | | | |
| 1600 hrs<br>AIAA-2014-1893<br>**RESTFul Access To Space Protocol Registries Including Spacecraft Identifiers**<br>M. Blanchet, S. Perreault, G. Leclanche, Viagenie, Québec, Canada | 1630 hrs<br>AIAA-2014-1894<br>**Using CCSDS Standards for Space Situational Awareness**<br>D. Berry, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1700 hrs<br>AIAA-2014-1895<br>**Timeline Exchange - Elements to Standardize**<br>W. Reinholtz, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1730 hrs<br>AIAA-2014-1896<br>**The CCSDS Monitored Data Cross Support Transfer Service**<br>J. Pietras, Global Science and Technology, Inc., Greenbelt, MD |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **111-CSO-2** | **CSO - Commercial Space Infrastructure** | | **Ballroom C** |
| Chaired by: D. LAVALLEE, JHU/Applied Physics Laboratory and Z. MOUNZER, Telespazio VEGA Deutschland GmbH | | | |
| 1600 hrs<br>AIAA-2014-1897<br>**Could a subsonic air-launched RLV enable a paradigm shift in space operations?**<br>D. Salt, Telespazio, Darmstadt, Germany | 1630 hrs<br>AIAA-2014-1898<br>**Building Commercial Space Infrastructure**<br>S. Dam, K. Taggart, SPEC Innovations, Manassas, VA; A. Thatcher, Mensa, Boise, ID; H. Rezabeck, Vessel Labs, Austin, TX | 1700 hrs<br>AIAA-2014-1899<br>**Developing Propulsion CapabilityThrough Technological Milestones**<br>R. Freeman, Northcentral University, Prescott Valley, AZ | |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **112-FSMC-8** | **FSMC - Payload Monitoring & Control** | | **Ballroom A** |
| Chaired by: H. PASQUIER, CNES and M. PECCHIOLI, European Space Agency (ESA) -ESOC | | | |
| 1600 hrs<br>AIAA-2014-1900<br>**Evolution of the Scope and Capabilities of Command/Uplink Generation and Review (CoUGAR) Support Software for Mars Surface Operations**<br>M. Pack, S. Laubach, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1630 hrs<br>AIAA-2014-1901<br>**Two Years of Operations of the ChemCam Instrument onboard the Curiosity Rover at FIMOC, the French Operations Center for Mars Instruments**<br>C. Yana, E. Lorigny, French Space Agency (CNES), Toulouse, France; O. Gasnault, National Center for Scientific Research (CNRS), Toulouse, France; A. Nelson, Los Alamos National Laboratory, Los Alamos, NM | 1700 hrs<br>AIAA-2014-1902<br>**Operational workaround for activity dips of a spacecraft S-band transmitter**<br>J. Meyer, C. Loisel, G. Picart, French Space Agency (CNES), Toulouse, France; V. Furones Garcia, Thales Group, Madrid, Spain | |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **113-GNC-7** | **GNC - Ops I** | | **Ballroom I** |
| Chaired by: G. VALENTINI, Agenzia Spaziale Italiana-ASI and L. CANGAHUALA, NASA Jet Propulsion Laboratory | | | |
| 1600 hrs<br>AIAA-2014-1903<br>**Flight Dynamics Operations solution for full-Electric propulsion-based GEO missions**<br>F. Jimenez, GMV, Madrid, Spain; M. Sansegundo, HISPASAT, Madrid, Spain | 1630 hrs<br>AIAA-2014-1904<br>**XMM-Newton Fuel Saving Strategy**<br>R. Kresken, CGI Group, Inc., Darmstadt, Germany | 1700 hrs<br>AIAA-2014-1905<br>**Observations and Operational Aspects on the Galileo Attitude and Orbit Control Subsystem - Infra-Red Radiance Variations**<br>F. Riedel, German Aerospace Center (DLR), Wessling, Germany | 1730 hrs<br>AIAA-2014-1906<br>**Drag-Free Attitude and Orbit Control System Performance of ESA's GOCE Mission during Low Orbit Operations and De-orbiting**<br>C. Ghisi, SERCO Services GmbH, Darmstadt, Germany; C. Steiger, M. Romanazzo, P. Emanuelli, ESA, Darmstadt, Germany |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **114-OCMSA-14** | **OCMSA - Operations Experience II** | | **Ballroom F** |
| Chaired by: M. DUHAZE, CNES and J. VOLPP, European Space Agency (ESA) -ESOC | | | |
| 1600 hrs<br>AIAA-2014-1907<br>**Skirting Saturn's Rings and Skimming its Cloud Tops: Planning Cassini's End of Mission**<br>E. Manor-Chapman, K. Magee, S. Brooks, S. Edgington, W. Heventhal, E. Sturm, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1630 hrs<br>AIAA-2014-1908<br>**XMM-Newton's operations preparation for the 4 wheel drive project**<br>F. Schmidt, Telespazio, Darmstadt, Germany; M. Pantaleoni, RHEA System, Darmstadt, Germany; P. Chapman, EADS, Stevenage, United Kingdom; R. Harris, EADS, Friedrichshafen, Germany; M. Kirsch, ESA, Darmstadt, Germany; R. Kresken, Logica, Darmstadt, Germany; et al. | 1700 hrs<br>AIAA-2014-1909<br>**Command and Control of the European Automated Transfer Vehicle (ATV) during Free Flight to and Attached Phase with the International Space Station**<br>L. Jolivet, V. Mousset, French Space Agency (CNES), Toulouse, France | 1730 hrs<br>AIAA-2014-1910<br>**Investigating Space Weather Events Impacting the Spitzer Space Telescope**<br>L. Cheng, J. Hunt, K. Stowers, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; P. Lowrance, California Institute of Technology, Pasadena, CA; P. Travis, A. Stewart, Lockheed Martin Corporation, Littleton, CO |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **115-OCMSA-15** | **OCMSA - Payload Operations II** | | **Ballroom G** |
| Chaired by: D. BINDSCHADLER, Jet Propulsion Laboratory and C. POLANSKEY, Jet Propulsion Lab | | | |
| 1600 hrs<br>AIAA-2014-1911<br>**Adding "Missed" Science to Cassini's Ops Plan**<br>M. Roy, M. Burton, S. Edgington, J. Berkeley, J. Pitesky, T. Ray, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; et al. | 1630 hrs<br>AIAA-2014-1912<br>**The Solar System Science Operations Laboratory: A Planetary Science Lab Simulator supporting the JUpiter Icy moons Explorer (JUICE) science operations development**<br>M. Costa, Isdefe, Madrid, Spain; N. Altobelli, ESA, Villanueva de la Cañada, Spain; M. Almeida, Telespazio, Madrid, Spain; A. Cardesin Moinelo, Isdefe, Madrid, Spain | 1700 hrs<br>AIAA-2014-1913<br>**Operating the ChemCam Instrument From Two Operations Centers**<br>E. Lorigny, French Space Agency (CNES), Toulouse, France; A. Nelson, Los Alamos National Laboratory, Los Alamos, NM | 1730 hrs<br>AIAA-2014-1914<br>**Operations of the Seismometer (SEIS) Onboard the 2016 InSight Mission to Mars**<br>C. Yana, J. Baroukh, L. Kerjean, P. Laudet, French Space Agency (CNES), Toulouse, France; L. Morales, L. Dubon, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; et al. |

| Thursday, 8 May 2014 | | | |
|---|---|---|---|
| **116-PS-8** | **PS - Deep Space II** | | **Ballroom H** |
| Chaired by: V. NAZAROV, IKI RAN and E. MAURER, DLR | | | |
| 1600 hrs<br>AIAA-2014-1915<br>**Getting the Message to MESSENGER: Overview of the Weekly Planning and Sequencing of MESSENGER Orbital Activities**<br>M. Kochte, D. Sepan, R. Shelton, Johns Hopkins University Applied Physics Laboratory, Laurel, MD | 1630 hrs<br>AIAA-2014-1916<br>**Mars Relay Operations Service (MaROS): A Present Service Preparing for the Future**<br>R. Gladden, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1700 hrs<br>AIAA-2014-1917<br>**A Data Management Tool for Dawn Science Planning**<br>G. Rabideau, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; S. Joy, University of California, Los Angeles, Los Angeles, CA; C. Polanskey, S. Chien, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | |

## Friday

| Friday, 9 May 2014 | | |
|---|---|---|
| **117-NW-13**<br>**0800 - 0830 hrs** | **Networking Coffee Break** | **Ballroom Foyer** |

| Friday, 9 May 2014 | | |
|---|---|---|
| **118-SB-13**<br>**0800 - 0830 hrs** | **Speaker Briefing** | **Session Rooms** |

| Friday, 9 May 2014 | | | |
|---|---|---|---|
| **119-CSIS-5** | **CSIS - Interoperability for International Space Exploration** | | **Ballroom B** |
| Chaired by: E. BIRRANE, Johns Hopkins University Applied Physics Laboratory and J. SOULA, CNES | | | |
| 0830 hrs<br>AIAA-2014-1918<br>**Model Conceptualization of a Procedural Standard for Improving Interoperability**<br>N. Salor Moral, Vitrociset Belgium, Noordwijk, The Netherlands; S. Dionisi, Vitrociset Belgium, Darmstadt, Germany; M. Mazza, Vitrociset Belgium, Noordwijk, The Netherlands | 0900 hrs<br>AIAA-2014-1919<br>**Lunar Optical Communications Link Demonstration Between NASA's Ladee Spacecraft and ESA's Optical Ground Station**<br>I. Zayer, ESA, Darmstadt, Germany; Z. Sodnik, ESA, Noordwijk, The Netherlands; R. Daddato, M. Lanucara, K. Schulz, ESA, Darmstadt, Germany; H. Smit, ESA, Noordwijk, The Netherlands; et al. | 0930 hrs<br>AIAA-2014-1920<br>**JAXA-NASA Interoperability Demonstration for Application of DTN Under Simulated Rain Attenuation**<br>K. Suzuki, S. Inagawa, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan; J. Lippincott, A. Cecil, NASA Marshall Space Flight Center, Huntsville, AL | 1000 hrs<br>AIAA-2014-1921<br>**Telerobotics Operations Services Concept**<br>D. Mittman, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; L. Martinez, NASA Johnson Space Center, Houston, TX |

| Friday, 9 May 2014 | | | |
|---|---|---|---|
| **120-CSO-3** | **CSO - Mission Concepts & Analysis** | | **Ballroom C** |
| Chaired by: Z. MOUNZER, Telespazio VEGA Deutschland GmbH and L. BRYANT, Jet Propulsion Laboratory | | | |
| 0830 hrs<br>AIAA-2014-1922<br>**GEO Satellite De-Orbit, Deactivation, and Shutdown Considerations**<br>M. Novean, L. Honda, J. Perkins, The Boeing Company, El Segundo, CA | 0900 hrs<br>AIAA-2014-1923<br>**Addressing the hard factors for Command File Errors by Probabilistic Reasoning**<br>L. Bryant, L. Meshkat, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | | |

| Friday, 9 May 2014 | | | |
|---|---|---|---|
| **121-FSMC-9** | **FSMC - On-Board/Ground Aspects** | | **Ballroom A** |
| Chaired by: A. BOWMAN, Johns Hopkins University Applied Physics Laboratory and N. PECCIA, European Space Agency (ESA) -ESOC | | | |
| 0830 hrs<br>AIAA-2014-1924<br>**There can only be one: heterogeneous satellite fleet automated operations with a single tool and language, the MEASAT case**<br>J. Gil, GMV, Madrid, Spain; N. Narula, MEASAT, Putrajaya, Malaysia; T. Lopez, GMV, Madrid, Spain | 0900 hrs<br>AIAA-2014-1925<br>**AES Flight System Technology Maturation for Human Spaceflight**<br>B. Othon, NASA Johnson Space Center, Houston, TX | 0930 hrs<br>AIAA-2014-1926<br>**ULSGEN (Uplink Summary Generator)**<br>Y. Wang, M. Schrock, T. Reeve, K. Nguyen, B. Smith, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1000 hrs<br>AIAA-2014-1927<br>**Re-Engineering the ISS Payload Operations Control Center During Increased Utilization and Critical Onboard Events**<br>S. Dudley, A. Marsh, NASA Marshall Space Flight Center, Huntsville, AL |

| Friday, 9 May 2014 | | | |
|---|---|---|---|
| **122-GNC-8** | **GNC - Ops II** | | **Ballroom I** |
| Chaired by: O. JUNG, KARI (Korea Aerospace Research Institute) and D. BERRY | | | |
| 0830 hrs<br>AIAA-2014-1928<br>**The Cold Gas System on TDX Accurate in-Orbit Evaluation**<br>D. Schulze, R. Kahle, J. Herman, German Aerospace Center (DLR), Wessling, Germany; A. Dietrich, Astrium, Friedrichshafen, Germany | 0900 hrs<br>AIAA-2014-1929<br>**Sentinels POD Service Operations**<br>P. Femenias, ESA, Frascati, Italy; J. Fernandez, GMV, Madrid, Spain | 0930 hrs<br>AIAA-2014-1930<br>**SHEFEX II - Precession Control System**<br>J. Ettl, J. Turner, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1000 hrs<br>AIAA-2014-1931<br>**Comprehensive Flight Dynamics Activities and Enhancement for KOMPSAT-3 Mission Operations**<br>O. Jung, Korea Aerospace Research Institute, Daejeon, South Korea |

| Friday, 9 May 2014 | | | |
|---|---|---|---|
| **123-OCMSA-16** | **OCMSA - End of Life Operations** | | **Ballroom G** |
| Chaired by: H. KRAG, European Space Agency (ESA) -ESOC and C. AUDOUY, CNES | | | |
| 0830 hrs<br>AIAA-2014-1932<br>**Study and definition of CNES Pleiades earth observation satellites end-of-life operations**<br>E. Renaudie, A. Peus, P. Viallefont, French Space Agency (CNES), Toulouse, France | 0900 hrs<br>AIAA-2014-1933<br>**Global Trends in Achieving Successful End-Of-Life Disposal in LEO and GEO**<br>H. Krag, S. Lemmens, T. Flohrer, H. Klinkrad, ESA, Darmstadt, Germany | 0930 hrs<br>AIAA-2014-1934<br>**The Deorbiting of ESA's Gravity Mission GOCE - Spacecraft Operations in Extreme Drag Conditions**<br>C. Steiger, M. Romanazzo, P. Emanuelli, ESA, Darmstadt, Germany; R. Floberghagen, ESA, Frascati, Italy; M. Fehringer, ESA, Noordwijk, The Netherlands | 1000 hrs<br>AIAA-2014-1935<br>**The End Of Life Operations Of The Herschel Space Telescope**<br>M. Schmidt, F. Keck, ESA, Darmstadt, Germany |

| Friday, 9 May 2014 | | | |
|---|---|---|---|
| **124-OCMSA-17** | **OCMSA - Operations Experience III** | | **Ballroom F** |
| Chaired by: P. LOCK, Jet Propulsion Laboratory and R. VENERI, ALTEC | | | |
| 0830 hrs<br>AIAA-2014-1936<br>**From Drawing-Board to On-Board: A New Mission Timeline on Mars Express via OBCP**<br>D. Lakey, O. Reboud, A. Minogiannis, SciSys, Darmstadt, Germany; J. Bauer, LSE Space GmbH, Darmstadt, Germany; E. Rabenau, NOVA Space, Bath, United Kingdom; M. Denis, ESA, Darmstadt, Germany | 0900 hrs<br>AIAA-2014-1937<br>**Optimization of Galileo Routine Operations for Early Service Provision**<br>M. Robichaud, T. Stolzenberg, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 0930 hrs<br>AIAA-2014-1938<br>**The Ultrasonic Gauging Sensors: results of an innovative spacecraft propellant measurement method**<br>F. Murolo, P. Pili, C. Bihr, M. Klinc, EUMETSAT, Darmstadt, Germany; R. Brandt, ESA, Noordwijk, The Netherlands | 1000 hrs<br>AIAA-2014-1939<br>**CryoSat-2 - Four Years of Operations**<br>K. Symonds, N. Mardle, ESA, Darmstadt, Germany; T. Parrinello, ESA, Frascati, Italy |

| Friday, 9 May 2014 | | | |
|---|---|---|---|
| **125-PS-9** | **PS - Pure Scheduling II** | | **Ballroom H** |
| Chaired by: V. NAZAROV, IKI RAN and E. MAURER, DLR | | | |
| 0830 hrs<br>AIAA-2014-1940<br>**The Mars Science Laboratory Supratactical Process**<br>D. Chattopadhyay, A. Mishkin, A. Allbaugh, Z. Cox, S. Lee, G. Tan-Wang, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; et al. | | | |

| Friday, 9 May 2014 | | |
|---|---|---|
| **126-PLNRY-5**<br>**1030 - 1230 hrs** | **Closing Ceremony** | **Ballroom D&E** |

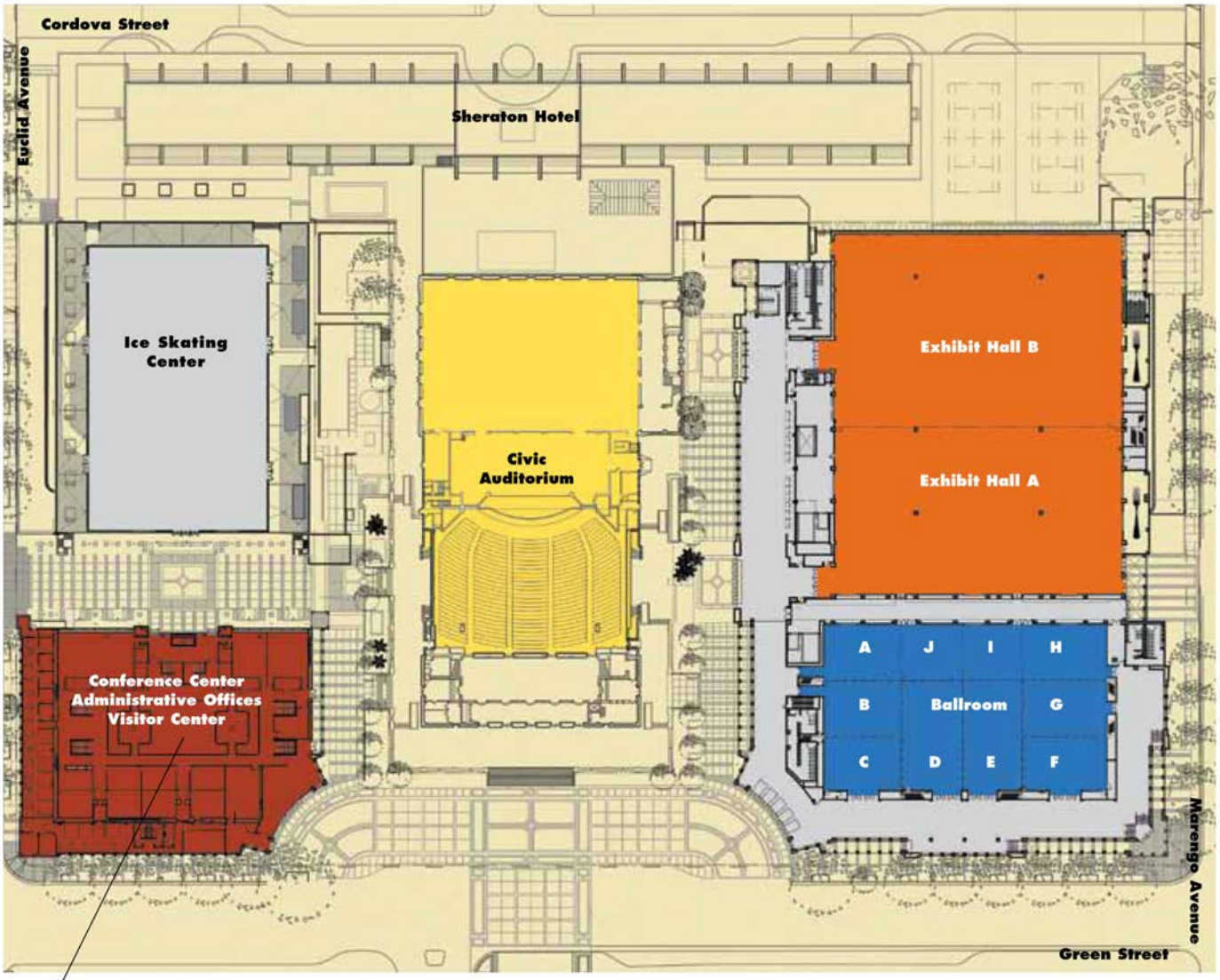
Highlight Talks

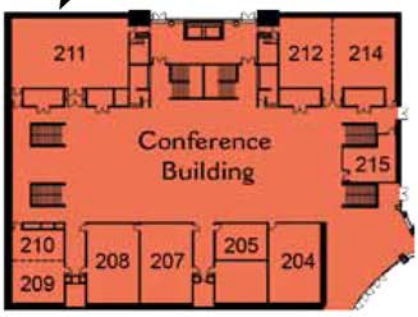
**Michael Moses**
Vice President of Operations for Virgin Galactic

**Yongseung Kim**
Executive Director of Satellite Information Research Laboratory Korea Aerospace Reserach Institute (KARI)

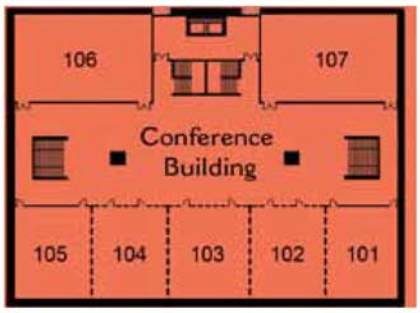
**Dr. Eunsup Sim**
Korea Aerospace Research Institute

# VENUE MAP




Conference Center Plaza Level




Conference Center Lower Level

# The International Committee on Technical Interchange for Space Mission Operations and Ground Data Systems (SpaceOps Organization)

SpaceOps

**The SpaceOps Organization** was formed in the realization that given the large number of people involved in space mission operations, an organized community or technical forum was needed. Since mission operations have become an increasingly large segment of space agency budgets, there is great interest in improving the capabilities and cost efficiencies of mission operations. It was in the spirit of providing the broadest possible managerial and technical interchange between space agencies, academia, and industry that SpaceOps was established.

**As the premier organization** serving the space operations community, SpaceOps encompasses the following areas:

- Operations-enabling technology in ground and flight systems
- Operations management
- Mission planning
- Mission management
- Cross support and interoperability
- Launch operations
- Spaceflight operations

**www.spaceops.org**

14-0272