**THE CONFERENCE**

The international IEEE Aerospace Conference, with AIAA and PHM Society as technical cosponsors, is organized to promote interdisciplinary understanding of aerospace systems, their underlying science and technology, and their application to government and commercial endeavors. The annual, week-long conference, set in a stimulating and thought-provoking environment, is designed for aerospace experts, academics, military personnel, and industry leaders. The 2014 conference is the 35th in the conference series.

**WHAT SETS THIS CONFERENCE APART**

**High-Quality Papers and Presentations.** Each year, a large number of presentations are given by professionals distinguished in their fields and by high-ranking members of the government and military.

**Science and Aerospace Frontiers.** The plenary sessions feature internationally prominent researchers working on frontiers of science and engineering that may significantly impact the world we live in. Registrants are briefed on cutting-edge technologies emerging from and intersecting with their disciplines.

**Multidisciplinary Focus.** This is the only general IEEE conference designed to facilitate cross-fertilization of aerospace disciplines and dialogue among members of government, industry, and the academic community.

**Exceptional Networking Opportunities.** The conference provides extraordinary opportunities for discussions and collaborative dialogue with aerospace pacesetters. Professional exchanges, which often extend years beyond the week-long conference, benefit the participants, their organizational sponsors, industry, and the engineering and scientific professions.

**Author Development.** The conference provides unusually thorough and supportive paper reviews, relying on expert guidance from senior engineers and scientists and an opportunity for instructive interaction between author and reviewers.

**Conference Proceedings.** A CD-ROM of the 4,000+ page Conference Proceedings is included in the registration package.

**International Participation.** The conference attracts a growing number of foreign attendees. Representatives of 27 countries participated in the 2013 conference.

**Sequestered Venue.** The Yellowstone Conference Center and lodging nestle closely together in the small village of Big Sky, fostering communications and ensuring easy access to all events.

**TECHNICAL PROGRAM**

This Call invites papers reporting original work or state-of-the-art reviews that will enhance knowledge of:

- Aerospace systems, science and technology
- Applications of aerospace systems and technology to military, civilian or commercial endeavors
- Systems engineering and management science in the aerospace industry
- Government policy that directs or drives aerospace programs, systems and technologies.

Specific topics planned for the 2014 Conference are listed in the **Tracks, Sessions and Organizers** section, pages 7–26.

**NETWORKING PROGRAM**

The Networking Program provides opportunities for engaging with other conference professionals beyond the technical sessions. Networking events include:

- Saturday arrival icebreaker reception
- Buffet dinners at four evening meetings
- Pre-dinner receptions
- Midweek mountainside lunch
- Networking “Java Jams” prior to afternoon sessions
- Post-session fireside ice cream socials
- Friday evening farewell dinner.

The costs for these are covered in the registration and guest activity fees.

An extensive activity program is available for guests. Recreation options can be found on the conference website.

**WHO SHOULD ATTEND?**

This is a conference for **Participants.** Consider attending if you have a professional interest in aerospace engineering or science and wish to:

- Present results and insights from your own work
- Interact with colleagues who present papers in your field
- Engage with people and ideas across a broad spectrum of aerospace technologies
- Understand how your organization might participate in next year’s conference.

**What Attendees Say:**

“The flagship conference for aerospace!”

“Superb technical depth available every moment from 8:30 a.m. until 10 p.m.”

“Ideal blend of technical depth, breadth of topics, and meaningful interaction with experts in the field.”

“Networking is extremely valuable. Great opportunity for small business connections. Family atmosphere is an enormous plus. Plenaries are relevant, intriguing, and entertaining.”

“Lots of excellent talks. Great ‘rhythm’ to conference day.”

“Lets me give a good picture of the industry to my managers and company.”

“Most fun I ever have working 14 hour days.”

“I hear the latest results in my whole field of interest.”

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**Front Cover** – The Mars Science Laboratory’s Curiosity Rover took this ‘Self Portrait’ using the rover arm mounted camera. On August 5, 2012, after an 8-month cruise to Mars, Curiosity performed a successful landing using a revolutionary Sky crane landing system. Curiosity is now engaged in a multi-year investigation of the Gale Crater. NASA image.

**Back Cover** – The final Launch of the Space Shuttle Endeavor (STS-134) caught as it rises for the last time through the clouds over the Cape. This image was captured by a shuttle training aircraft. Endeavor is now on display at the Samuel Oschin Space Shuttle Endeavour Display Pavilion at the California Science Center, Los Angeles, CA. NASA image.
**Call for Papers**

**Aerospace Conference**

**For more information**, visit our website: [aeroconf.org](http://aeroconf.org) for updates, paper submittal instructions, and the latest information on the 2014 Conference.

**CONFERENCE-RELATED QUESTIONS**

**Chair**

Erik Nilsen  
818-354-4441  
chair@aeroconf.org

**TECHNICAL PROGRAM QUESTIONS**

**Program Chair**

Richard Mattingly  
818-354-4605  
richard.mattingly@jpl.nasa.gov

**Program Vice Chair**

Karen Profet  
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kendra.cook@aeroconf.org

**REGISTRATION QUESTIONS**

**Registration Chair**

Monica Panno  
310-276-7474  
registration@aeroconf.org

**PAPER REVIEW QUESTIONS**

**Paper Review Chair**

James Hoffman  
818-354-4384  
James.P.Hoffman@jpl.nasa.gov

**GENERAL HELP**

IEEE Aerospace Conference  
info@aeroconf.org

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**ABSTRACT SUBMISSION**

A 500-word abstract is due by **July 15, 2013** at the conference website [www.aeroconf.org](http://www.aeroconf.org).

Abstracts will be accepted ONLY through the conference website. Accept/reject notices will be emailed promptly. Author instructions are on the website.

Note: The IEEE Aerospace Conference is designed as a venue for engineers and scientists to present and discuss their work. Please submit only if you expect to attend the conference yourself or have your paper presented by a colleague. (See IEEE Policy on Presentation, below.)

**PAPER SUBMISSION**

Papers of 6–20 pages must be submitted for review **no later than Friday, October 25, 2013**, a firm deadline! Each paper must be in final publishable format and submitted via the conference website as a PDF file. Format requirements, tools, and conversion templates are provided in the Author’s Instructions on the website. Papers will be reviewed and comments made available to authors for electronic download by November 15. **REVISED papers responsive to reviewer comments must be submitted to the web site by Sunday, January 5, 2014.**

Questions regarding the review process may be directed to:

James Hoffman, Paper Review Chair  
PaperReviewChair@aeroconf.org  
818-354-4384

Access to an **IEEE Copyright Form**, will be available on the paper submittal page of the conference website. The form must be submitted by **January 5, 2014.**

Submitted papers are considered for the conference **Best Paper Award**, which is selected prior to the conference on the basis of technical innovation and quality of the written paper. (See [www.aeroconf.org](http://www.aeroconf.org) for criteria.)

**IEEE Policies on Presentation and Reuse**

**Publication of Conference Papers in the IEEE Xplore Digital Library**

IEEE policy on publication of papers accepted for IEEE conferences states that “IEEE reserves the right to exclude a paper from distribution after the conference (e.g., removal from IEEE Xplore), if the paper is not presented at the conference.”

IEEE Xplore is the association’s digital library of nearly 2 million full-text documents. IEEE journals and conference proceedings are among the world’s most highly cited technical publications.

**Reuse of Conference Papers in Journal Publications**

IEEE policy recognizes and encourages the evolutionary publication process from conference presentation to scholarly publication. Guidelines for author reuse of their presented papers can be found at: [www.ieee.org/publications_standards/publications/rights/Section_822F.htm](http://www.ieee.org/publications_standards/publications/rights/Section_822F.htm)

A list of IEEE journals can be found at: [ieee.org/publications_standards/publications/periodicals/journals_magazines.html](http://www.ieee.org/publications_standards/publications/periodicals/journals_magazines.html)

**REGISTRATION**

The conference registration fee includes:

- Access to all technical sessions
- Conference Proceedings on CD-ROM
- Conference Digest and Schedule
- Recreation activities discount
- Networking/Social Program
  - Saturday night icebreaker reception
  - Five catered dinner buffets
  - Mid-week mountainside lunch
  - Four pre-dinner socials
  - Four post-session ice cream socials
  - Hot beverages before morning and afternoon sessions

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<th>REGISTRATION FEES (US$)</th>
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<th>Received after Jan 27, 2014</th>
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*Spouse/partner/child of primary registrant

For Travel and Lodging, see page 4.

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**Travel and Lodging**

Special travel rates are available from major cities through the conference travel agent.

Special lodging rates near the Yellowstone Conference Center are also available through the conference travel agent. Book early for best choice.

**Lodging Rates (US$)**

*Includes full breakfast buffet (Huntley Lodge, Summit Hotel, Village Center and Shoshone Condominiums only).

**Does NOT include taxes and service fees (17% total) or $8 baggage handling gratuity.

**Per person for 7 nights, 2 persons/bedroom**

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<th>Unit and Occupancy</th>
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**Per person for 7 nights, 1 person/bedroom**

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Note: Conference Center costs are covered by lodging booked at any property listed on this page. In fairness to all attendees, those who book elsewhere will be charged a supplementary Conference Center fee of $40 per night.

**Arrange Registration, Travel and Lodging at**

[www.aeroconf.org](http://www.aeroconf.org)

**After October 1, 2013**
## Preliminary Schedule

6 Days of Presentations, Over 175 Hours of Technical Sessions

20 Hours of Conference-Sponsored Technical Networking Events

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All dinners and networking activities are intended to promote, enhance, and facilitate technical discussions and long-term professional and personal relationships.
## Tracks,Sessions & Organizers

### Track 1

**Science and Aerospace Frontiers (Plenary Sessions)**

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<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>David Woerner</td>
<td>818-393-2000</td>
<td><a href="mailto:dwoerner@ieee.org">dwoerner@ieee.org</a></td>
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David Woerner
PROJECT MANAGER
Jet Propulsion Laboratory

### Track 2

**Space Missions, Systems and Architectures**

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<th>Name</th>
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<tr>
<td>Marina Ruggieri</td>
<td>+39-06-7259 7451</td>
<td><a href="mailto:ruggieri@uniroma2.it">ruggieri@uniroma2.it</a></td>
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<tr>
<td>Peter Kahn</td>
<td>818-354-3314</td>
<td><a href="mailto:peter.b.kahn@jpl.nasa.gov">peter.b.kahn@jpl.nasa.gov</a></td>
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Marina Ruggieri
FULL PROFESSOR, TELECOMMUNICATIONS
University of Roma Tor Vergata
Director, CTIF, Italy. IEEE Division IX Director-Elect, AESS N&I Committee Chair, IEEE TAB Strategic Planning Committee, Editor IEEE Transactions on AES. VP, AFCEA, Rome Chapter. Author of 320 papers and 9 books.

Peter Kahn
PROJECT SYSTEM ENGINEER
Jet Propulsion Laboratory
Deputy Manager of the Mission Systems Concepts Section at the Jet Propulsion Laboratory. Over 25 years systems engineering experience in space flight projects.

### Session 2.01

**Deep Space, Earth and Discovery Missions**

The status and results of missions in formulation, implementation, and operation. Session objective is to provide a full mission prospective and discuss the system level tradeoffs, challenges and lessons learned. From operational missions, results are discussed along with the in-flight challenges. It addresses all types of missions from Earth orbiting to planetary to heliophysics to astrophysics missions.

*James Graf*  
Deputy Director, Earth Science and Technology Directorate, Jet Propulsion Laboratory

*Nick Chrissotimos*  
Associate Director of Flight Projects Code 460, NASA - Goddard Space Flight Center

### Session 2.02

**Future Space and Earth Science Missions**

Concepts for future space or Earth science programs or missions, from early formulation through Phase B.

*Robert Gershman*  
Principal Engineer, Jet Propulsion Laboratory

*Patricia Beauchamp*  
Program Technical Manager, Strategic Missions and Advanced Concepts, Jet Propulsion Laboratory

*Michael Amato*  
Systems Engineer, NASA Goddard Space Flight Center

### Session 2.03

**Entry Descent and Landing Systems and Technologies**

Papers that cover landing system design, test and flight results, including sensor and actuator technologies and their integration into the EDL architecture; EDL/approach or aerocapture guidance navigation, aerodynamics, decelerators, EDL mechanical subsystems and aerothermal subsystems.

*Rob Manning*  
Engineering Fellow, Jet Propulsion Laboratory

*Ian Clark*  
Systems Engineer, Jet Propulsion Laboratory
Session 2.04 Access to Space and Emerging Mission Capabilities

The high cost of launch continues to be a roadblock to space missions large and small. The development of adapters (ESPA, PPOD, e.g.), the acceptance of risk for accommodating secondary or auxiliary payloads, and the explosion of cubesat and smallsat capability have led to some creative approaches to space missions. This session is meant to showcase how our space colleagues are leveraging these emerging capabilities.

Eleni Sims 505-846-8147 505-440-1132 sam.sims@aero.org
Project Engineer, Aerospace Corporation

Kenneth Reese 505-853-3095 505-966-6676 kenneth.reese@kirtland.af.mil
Mission Manager, Space Development and Test Directorate, Kirtland AFB

Session 2.05 Robotic Mobility and Sample Acquisition Systems

Use of robotic systems for in situ space exploration involving robotic mobility, manipulation, and sampling. All aspects of these robotic systems, including design, development, implementation, and operation, are valued topics of presentation. Research prototypes as well as fielded or flown systems are of interest.

Richard Volpe 818-354-6328 volpe@jpl.nasa.gov
Section Manager, Jet Propulsion Laboratory

Session 2.06 Future Missions & Enabling Technologies for In Situ Exploration, Sample Returns

Future mission concepts, planetary protection technologies, sample handling techniques, novel technologies for in situ exploration, technologies not covered under robotic mobility and sample acquisition, human precursor mission concepts, and technologies that enable precursor missions.

Patricia Beauchamp 818-354-0529 818-645-2479 patricia.m.beauchamp@jpl.nasa.gov
Program Technical Manager, Strategic Missions and Advanced Concepts, Jet Propulsion Laboratory

Ying Lin 818-393-6381 ying.lin@jpl.nasa.gov
Planetary Science Instrument Development Program Manager, Jet Propulsion Laboratory

Session 2.07 In Situ Instruments for Landed Surface Exploration, Orbiters and Flybys

Instruments for surface and subsurface chemistry and geology (elemental, isotopic, molecular, mineralogical composition), geophysics (tectonics, internal structure, heat flow, geochronology), atmospheric chemistry and dynamics, dust and particles, charged particle/plasma, and magnetometers.

Stephanie Getty 301-614-5442 stephanie.a.getty@nasa.gov
Research Planetary Scientist, NASA - Goddard Space Flight Center

Daniel Winterhalter 818-354-3238 daniel.winterhalter@jpl.nasa.gov
Principal Scientist, NASA Jet Propulsion Laboratory, California Institute of Technology

Session 2.08 Q/V Band and Beyond Satellite Missions

“Future High Throughput Satellite (HTS) systems, able to support terabit/s connectivity, will require a very large bandwidth availability; this pushes towards the exploitation of the so-called “beyond Ka-band” systems. This session focuses on the proposed and on-going Q/V band and beyond satellite missions, both of scientific and commercial nature. Enabling system architecture and technologies are included as well, i.e. smart gateway architectures, propagation impairment mitigation techniques, high power generation systems, etc.”

Tommaso Rossi +39 06 72597283 →+39 33 58374382 tommaso.rossi@uniroma2.it
Assistant Professor, University of Rome Tor Vergata

Giuseppe Codispoti +39 33 91359676 giuseppe.codispoti@asi.it
QV Band Telecommunications Program Manager, ASI, Italian Space Agency

Session 2.09 Mission Design for Spacecraft Formations

Topics include configuration analysis, orbital dynamics, control and operational issues for the missions exploited by several spacecraft flying in formation about the Earth or other celestial bodies.

Giovanni Palmerini +39-064-9919760 +39-366-6750164 giovanni.palmerini@uniroma1.it
Professor, Guidance and Navigation, Sapienza Università di Roma

Session 2.10 Space-Based Solar Power Transfer

This session is a venue for presentation of research and development of space-based satellites and technologies, including current state of the art, economics, work force training, international issues, and comparison with other renewable energies.

Seyed (Reza) Zekavat 906-370-7597 rezaz@mtu.edu
Associate Professor, Michigan Technological University

Paul Jaffe 202-767-6616 paul.jaffe@nrl.navy.mil
Section Head, Naval Research Laboratory
**Session 2.11 Radiation Issues and Modeling for Deep Space Missions**

The mitigation of adverse effects from radiation on humans and electronics in space is a critical step in mission success. This session focuses on research in understanding the nature of the radiation field in space and how that field is changed as it passes through shielding materials and the human body. Topics include radiation measurements made in space, fragment measurements and materials studies conducted at accelerator facilities on ground, radiation transport modeling, improvements of nuclear reaction models and radiation transport codes, and benchmarking of measurements performed both in space and on ground for the verification and validation of the transport codes.

**Lembit Sihver**  +46 31 772 2921 +46 73 079 4223  sihver@chalmers.se
Professor, Chalmers University of Technology

**Lawrence Heilbron**  865-974-0982  510-734-5120  lheilbro@utk.edu
Assistant Professor, University of Tennessee

**Session 2.12 Space Debris and Dust: The Environment, Risks, and Mitigation Concepts and Practices**

Operational satellites are at risk from collisions with the more than 20,000 trackable debris objects that remain in orbit today, as well as hundreds of thousands of objects, including micrometeoroids, that are too small to be cataloged. Beyond the realm of Earth-oriented orbits, unique and immensely valuable science-gathering spacecraft can also be exposed to similar hypervelocity collisional risks, but from cometary and asteroidal micro-millimeter scale particles (dust). Papers are invited that address the space debris population and growth projections; debris and dust characteristics; impact modeling and materials testing; modeling and simulation and/or test results that can lead to quantification of the risks to spacecraft in various orbits and exploration missions; and mitigation strategies including debris removal or repositioning, spacecraft shielding, orbit selection, and spacecraft operations. Papers documenting past mission anomalies traced to space debris, and mitigation strategies employed today, are also of critical interest.

**William Devereux**  240-228-6509  301-943-6907  will.devereux@jhuapl.edu
Branch Supervisor, Johns Hopkins University/Applied Physics Laboratory

**Kaushik Iyer**  (240) 228-8936  iyerka1@jhuapl.edu
Materials Physicist, Johns Hopkins University/Applied Physics Laboratory

**Track 3 Antennas, RF/Microwave Systems, and Propagation**

**Farzin Manshadi**  818-354-0068  farzin.manshadi@jpl.nasa.gov
JPL SPECTRUM MANAGER
Jet Propulsion Laboratory

Leads spacecraft frequency selection, radio frequency interference analysis, frequency coordination, and long term spectrum planning activities. Previously, JPL supervisor of design & development of the microwave antennas at the NASA Deep Space Network. PhD, EE UCLA.

**James Hoffman**  818-354-4384  james.p.hoffman@jpl.nasa.gov
Senior Research Engineer
Jet Propulsion Laboratory

Senior Engineer in JPL's Radar Science and Engineering Section and has worked in microwave instrument design for remote sensing applications for more than 10 years. Currently the RF System Lead for the proposed radar mission DEStDynI and the InSight Landing Radar.

**Session 3.01 Phased Array Antenna Systems and Beamforming Technologies**

Included are active power combining, thermal management, phasing networks, integration, power, test and evaluation and beamsteering, algorithm development and associated hardware implementations, and modeling and simulation for all levels of phased array development and beamsteering.

**Janice Booth**  256-876-1426  256-337-8838  janice.c.booth@us.army.mil
Electronics Engineer, AMRDEC Weapons Development and Integration Directorate

**Session 3.02 Ground and Space Antenna Technologies and Systems**

Papers on all aspects of antenna systems for ground, ground to/from space and space communications, including reflector antennas and feeds, arrays, and transmit/receive subsystems.

**Vahraz Jamnejad**  818-354-2674  818-468-9422  vahraz.jamnejad@jpl.nasa.gov
Principal Technologist, Jet Propulsion Laboratory

**Session 3.03 RF/Microwave Systems**

Papers about RF and microwave systems or components, passive and active, including radar systems.

**James Hoffman**  818-354-4384  626-298-0783  james.p.hoffman@jpl.nasa.gov
Senior Research Engineer, Jet Propulsion Laboratory
Session 3.04  
**Radio Astronomy and Radio Science**

Papers on the techniques, hardware and systems, and results in the fields of Radio Astronomy and Radio Science.

Mark Bentum  
+31-534892108  +31-681932260  
m.j.bentum@utwente.nl

Associated professor, University of Twente

Session 3.05  
**Miniaturized RF/Microwave Technologies Enabling Small Satellite and UAV Systems**

Papers in all fields that advance the state-of-the-art in the miniaturization of RF and microwave technologies. These include device technologies such as RF ASICS, MMICs, and system-on-chip; packaging technologies such as flexible electronics, 3D microwave integration; and hybrid techniques; instruments and systems for small satellites, and UAVs.

John Papapolymerou  
404-385-6004  
papapol@ece.gatech.edu

Professor, Georgia Institute of Technology

Tushar Thrivikraman  
818-393-8628  
tushar.thrivikraman@jpl.nasa.gov

RF Microwave Engineer, Jet Propulsion Laboratory

Track 4  
**Communication & Navigation Systems & Technologies**

| Phil Dafesh | 310-336-8733 |
| philip.a.dafesh@aero.org |
| DIRECTOR, DIGITAL COMMUNICATION IMPLEMENTATION DEPARTMENT |
| Aerospace Corporation |

Directs development and application of GPS, wireless, and software-defined-radio technology. 48 publications, 5 patents and 2 patents pending MS & PhD, EE, UCLA. BS, Physics & EE, Cal Poly Pomona.

Shirley Tseng  
714-832-5373  
shirleytseng@earthlink.net

SYSTEMS ENGINEER |
Tseng LLC |
Consults on design and implementation of large-scale, high-performance satellite and terrestrial high performance networks. Previously: satellite design, development, test; satellite operations & ground station design, GE.

Session 4.01  
**Evolving Space Communication Architectures**

A forum in which to trace, examine and predict trends in the architectures of space communications and navigation. Innovative concepts and game changing approaches with a system view are especially sought.

Shervin Shambayati  
650-852-7322  818-434-0461  
shambayati.servin@ssd.loral.com

Senior Systems Engineering Specialist, Space Systems Loral

Robert Cesarone  
818-354-8385  
robert.j.cesarone@jpl.nasa.gov

Assistant Program Manager, Jet Propulsion Laboratory

Session 4.02  
**Communication Protocols and Services for Space Networks**

The focus is communication protocols and services supporting space systems, including ground- and space-based methods to increase efficiency, to enable new exploration/applications, and to improve Quality of Service. Techniques include relay communications, routing, delay/disruption tolerant networking, retransmission approaches, adaptive link/network/transport methods, demand access, and advanced scheduling. Novel space network architectures are of key interest, including microspacecraft swarms, sensor webs, and surface networks. Implementation and evolution of communications networking into space systems, as well as application to specific missions, are sought.

Loren Clare  
818-354-1388  
loren.p.clare@jpl.nasa.gov

Supervisor, Communications Networks Group, Jet Propulsion Laboratory

Steven Berson  
310-336-3474  
steven.berson@aero.org

Engineering Specialist, Aerospace Corporation

Session 4.03  
**Military Satellite Communication Technologies**

As our armed forces are forced to conduct rapidly changing, asymmetrical operations in remote and contested areas, the need for high-performing, efficient, and robust satellite communications has never been greater. Given current budget constraints, it has become increasingly important to develop cost-effective solutions for satellite communications in challenged environments with little set-up time and high reliability. This session focuses on SATCOM to our armed forces including waveform, network protocol, and hardware design, as well as improvements to satellite/terminal architectures, system engineering, and acquisition strategies.

James Hant  
310-336-1388  
james.j.hant@aero.org

Director, Modeling and Simulation Department, Aerospace Corporation
Session 4.04  
**Navigation and Communication Systems for Exploration**

Systems, technology, and operations for navigation and/or communication among elements involved in civil, commercial, or national security missions in any orbital domain (Earth and interplanetary). The session is focused on new operational concepts, science discoveries or performance improvements to accomplish space missions.

**Patrick Stadter**  
240-228-4658  
patrick.stadter@jhuapl.edu  
Principal Professional Staff, Johns Hopkins University/Applied Physics Laboratory

**David Copeland**  
240-228-8390  
david.copeland@jhuapl.edu  
Senior Professional Staff II, Johns Hopkins University/Applied Physics Laboratory

Session 4.05  
**Relay Communications for Space Exploration**

For a wide range of space exploration scenarios, multi-hop relay communications can provide significant benefits in terms of increased data return and reduced user burden (mass, power, cost) over conventional space-to-ground links. In this session we examine relay communications for both Earth-orbiting missions and missions throughout the solar system. Topics of interest include relay system architecture, relay spacecraft design (for both dedicated relay orbiters and for hybrid science/telecom spacecraft), relay telecommunications payload design, relay communication protocols, mission applications and operational experiences/lessons-learned.

**Charles Edwards**  
818-354-4408  818-687-8623  
chad.edwards@jpl.nasa.gov  
Chief Telecommunications Engineer, Mars Exploration Program, Jet Propulsion Laboratory

**David Israel**  
301-286-5294  
dave.israel@nasa.gov  
Laser Communications Relay Demonstration PI, NASA - Goddard Space Flight Center

Session 4.06  
**Testbeds for Development of Future Communication, Navigation, and Networking Concepts**

Papers are sought that describe uses and development of high fidelity testbeds for future aeronautic and space communications, navigation, and networking concepts. Testbeds should include elements that are agile in transmission and reception capabilities and employ reconfigurable Software Defined Radios (SDR) and/or Cognitive Radio (CR) technology. Of particular interest are testbeds that transcend the boundaries of a single organization or are used in novel ways to develop SDR/CR, Dynamic Spectrum Allocation, Delay/Disruption Tolerant Networking, or combined communicating/sensing and navigating capabilities or to incorporate security functions and adaptive modulation.

**Sandra Johnson**  
216-433-8016  330-697-5115  
sandra.k.johnson@nasa.gov  
Electronics Engineer, NASA Glenn Research Center

**Aaron Swank**  
216-433-3722  
a.j.swank@grc.nasa.gov  
Research Engineer, NASA Glenn Research Center

Session 4.07  
**Space Communication Systems Roundtable : Networking the Solar System**

The roundtable will provide updates on the deployment status of the Solar Network. Panelists will provide a review of the rudimentary networks that already exist in Earth orbit or Mars orbit. Will they evolve into one big network that spans the Solar System? If so, how might this occur? How will challenging issues, such as distance, SNR, latency and timekeeping be dealt with? Will this network be a managed endeavor or a happy anarchy? What are the roles of standards and protocols?

**Robert Cesarone**  
818-354-8385  
robert.j.cesarone@jpl.nasa.gov  
Assistant Program Manager, Jet Propulsion Laboratory

Session 4.08  
**Innovative Space Communications and Tracking Techniques**

This session solicits innovative contributions to improve flight and ground communication and tracking systems such as antenna arrays, software-defined radios, advanced receivers, deployable antennas and relay satellites, Ka and Optical communications, novel signal formats, new coding methods, and CubeSat communications and tracking techniques.

**Kar Ming Cheung**  
818-393-0662  818-653-9520  
kar-ming.cheung@jpl.nasa.gov  
Technical Group Supervisor, Jet Propulsion Laboratory

**Alessandra Babuscia**  
617-253-6883  617-800-5219  
babuscia@mit.edu  
Postdoctoral Research Associate, Massachusetts Institute of Technology

Session 4.09  
**Space Navigation Techniques**

Papers in this session are collected on topics related to different aspects of space navigation algorithms including, but not limited to spacecraft formation flying, relative navigation between spacecraft, rendezvous missions, satellite constellation & navigation, integrated navigation, novel navigation methods (e.g. using celestial sources such as x-ray sources or radio sources), DSN-based navigation, robust navigation, autonomous navigation, and inertial navigation.

**Amir Emadzadeh**  
408-216-2454  
amire@ee.ucla.edu  
Senior Engineer, Qualcomm
Session 4.10 Communication System Analysis & Simulation

This session solicits innovative contributions on modeling, analysis, and/or simulation of satellite, aerospace, or terrestrial communication systems. Topics include modeling and design of network services and systems, communication waveforms and modulation, integration of terrestrial and satellite networks, deep space communication systems, terrestrial and deep space relay communication networks, communication protocols for satellite communication, traffic modeling, transmission engineering and analysis, network measurements, network optimization and resource provisioning, next generation internet, overlay and virtual networks, autonomic communication systems, cross-layer & cross-system protocol design, and communication network monitoring.

Yogi Krikorian 310-336-1793 818-795-5923 yogi.y.krikorian@aero.org
Senior Engineering Specialist, Aerospace Corporation

Session 4.11 Wideband Communications Systems

This session solicits innovative contributions about satellite, aerospace and terrestrial wideband and narrowband RF and laser communications. Papers on modeling and simulations of communications systems and their components are welcomed. Detailed topics include digital broadband transmission over satellite and terrestrial links, broadband terrestrial wireless transmission, millimeter wave communications, TV and HDTV broadcasting, antenna design for broadband communications, MIMO and multi-carrier techniques, channel equalization, synchronization, resource management, software defined radio and cognitive radio, emerging technologies for safety-critical and emergency communications, and emerging standards for terrestrial and satellite communications (WiMAX, LTE-A, DVB-S2, IEEE 802.11x).

Dave Taggart 310-336-4211 davetaggart@cox.net
Senior Engineering Specialist, Aerospace Corporation

Claudio Sacchi +39 041283907 +39 3356006431 +39 3495749500 sacchi@disi.unitn.it
Assistant professor, University of Trento

Session 4.12 Communications and/or Related Systems: Theory, Simulation, and Signal Processing

This session solicits innovative contributions on theory, modeling and simulation, and signal processing foundations of satellite, aerospace and terrestrial radio communications.

Dave Taggart 310-336-4211 davetaggart@cox.net
Senior Engineering Specialist, Aerospace Corporation

Rajendra Kumar 562-985-1556 rajendra.kumar@csulb.edu
Professor, California State University

Session 4.13 Global Navigation Satellite Systems

This session’s focus will be on developments related to global navigation satellite systems. It will address the current and future envisioned applications of GPS, GLONASS, Galileo, and Compass systems. Topics will include receiver technology, interoperability, orbit computations, augmentation systems, navigation algorithms, and standard products related to GNSS.

Arun Vydhyanathan +31 889736746 arun@xsens.com
Lead Engineer - Motion trackers, Xsens Technologies B.V.

Session 4.14 Software Defined Radio and Cognitive Radio Systems and Technology

This section presents papers on software and cognitive radio in general, and their application to space communications in particular. Both original and space-centric tutorial papers are welcome.

Eugene Grayver 310-336-1274 eugene.grayver@aero.org
Engineering Specialist, Aerospace Corporation

Session 4.15 CNS Systems and Airborne Networks for Manned and Unmanned Aircraft

This session focuses on communications, navigation and surveillance systems for all types of aircraft, including onboard or ground-based systems for the complete range of vehicles operating in the National Airspace System (NAS): manned and unmanned vehicles, fixed wing and rotorcraft, general aviation, civil transport and military that may carry passengers, cargo or are performing surveillance-type missions. Topics range from concept development, simulation and modeling, technology development and verification, through flight testing and certification. Emerging fields include surface wireless networks, ADS-B, Datacomm, airborne network security, UAS integration, satellite-based CNS, and international activities.

Denise Ponchak 216-433-3465 denise.s.ponchak@nasa.gov
Branch Chief, NASA Glenn Research Center
### Session 4.16 Aviation Information Systems and Cyber Security

This session focuses on recent developments, challenges and future trends in high confidence design, development, certification, application, operation, and maintenance of networked information systems and software in aviation. Systems that depend on trusted integration and coordination between cyber and physical resources to enable safe and profitable operation of aircraft with minimal or no human intervention are of interest. Topics include trust, security, privacy, and safety concerns with aircraft software, data and multimedia distribution; next-generation air traffic and health management; aeronautical networks and airport wireless networks; security infrastructures for airports and airlines; RFID systems; software-intensive, large-scale systems integration; verification, certification, and accreditation for security; vulnerability and trustworthiness assessments; security incident response strategies; long-term security protection mechanisms; and information flows.

**Krishna Sampigethaya**  425-373-2919  206-890-8516  radhakrishna.sampigethaya@boeing.com
Associate Technical Fellow, Boeing Company

**Radha Poovendran**  206-221-6512  rp3@uw.edu
Professor, University of Washington

### Session 4.17 Space Information Systems Security

This session welcomes novel concepts and technologies on information security tailored to space systems. Its scope includes efficient hardware and software implementations of symmetric and asymmetric cryptographic primitives (e.g., encryption, authentication, integrity checking, key agreement and distribution), key management mechanisms tailored for the space segment, secure spacecraft recovery, protocols for delay-tolerant networks, security evaluation and standardization efforts, space environment effects on cryptographic processing, attacks against space systems and associated countermeasures, and security and reliability issues in communications.

**Marcio Juliato**  +1 519-888-4567 x37792  mrjuliat@uwaterloo.ca
Postdoctoral Fellow, University of Waterloo

**Christopher Krupiarz**  443-778-5056  christopher.krupiarz@jhuapl.edu
Software Engineer, Johns Hopkins University/Applied Physics Laboratory

### Session 4.18 Space Communication Systems Roundtable: Joint NASA/DoD technology initiatives

This panel will focus on joint NASA/DoD communication and navigation technology initiatives, both existing and under formulation consideration. Cooperation between NASA and DoD, particularly in areas of shared fundamental technologies such as communications and navigation systems, has received increasing attention as program and development funds have been challenged during recent budget cycles. Topics such as challenges and barriers as well as incentives for joint NASA/DoD efforts, especially in a constrained budgetary environment, will also be explored.

**Steven Arnold**  240-463-4351  steven.arnold@jhuapl.edu
Deputy Business Area Executive, Johns Hopkins University/Applied Physics Laboratory

### Track 5 Observation Systems and Technologies

**David Braun**  818-354-7284  dbraun@jpl.nasa.gov
OPTOMECHANICAL ENGINEERING GS
Jet Propulsion Laboratory
Supervises the Opto-Mechanical Engineering Group in the Instrument Mechanical Engineering Section at JPL. Has designed, built, and qualified hardware for many flight projects and served on numerous Tiger teams and review boards.

**David Tratt**  310-336-2876  dtratt@aero.org
SENIOR PROJECT ENGINEER
The Aerospace Corporation
Currently with The Aerospace Corporation's Space Science Applications Laboratory in Los Angeles. Research interests include imaging spectrometry and active optical remote sensing applications for Earth and planetary observation.

### Session 5.01 Large Optical Systems

This session covers all aspects of design, assembly, alignment and testing of large optical systems for applications including astronomy, energy, defense and remote observation. Topics range through design and engineering to integration, alignment, test and control of terrestrial and space-based large optical systems.

**Ryan Mcclelland**  240-366-7776  rmccle@gmail.com
Senior Mechanical Systems Engineer, SGT, Inc.

**Stefan Martin**  818-354-5861  818-726-4103  stefan.r.martin@jpl.nasa.gov
Optical Engineer, Jet Propulsion Laboratory
**Session 5.02 Optical Instruments**
This session covers subjects related to the design, build, assembly, integration, test, operation, and results of optical instruments. Proposed instruments, contextual information, and lessons learned for all phases are included.

**Tyler Evans** 301-286-5741 425-445-6017 tyler.evans@nasa.gov  
Mechanical Systems Engineer, SGT, Inc.

**David Braun** 818-354-7284 818-636-2805 dbraun@jpl.nasa.gov  
Optomechanical Engineering GS, Jet Propulsion Laboratory

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**Session 5.03 Atmospheric Turbulence: Phenomenology, Measurement, Mitigation**
This session deals with all aspects of wave propagation through atmospheric turbulence. Topics of interest to this session are adaptive optics systems, deformable/fast-steering mirror modeling and control algorithms, wave front sensing, laser beacon systems and modeling, scintillation, anisoplanatism, atmospheric turbulence characterization and modeling, deconvolution/imaging algorithms, partially coherent light, and scattering.

**Milo Hyde** 937-255-3636 575-442-1358 milo.hyde@afit.edu  
Assistant Professor, Air Force Institute of Technology

**Mark Spencer** 937-255-6565 x6155 951-323-3374 msphotonics@gmail.com  
PhD Student, Air Force Institute of Technology

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**Session 5.04 Photonic Devices and Systems for Aerospace Applications**
Papers on active (including LEDs, lasers, and photodetectors) and passive (such as optical waveguides and fiber) optical components and optoelectronic subsystems that have applications in aerospace are solicited.

**Kent Choquette** 217-265-0563 choquett@illinois.edu  
Professor, University of Illinois

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**Session 5.05 Advances in Exoplanet Detection Techniques**
Techniques for the detection and characterization of faint exoplanets near much brighter stars are maturing rapidly, and several exoplanet missions are under consideration. This session invites papers on direct and indirect techniques for faint companion detection and characterization, as well as on potential missions based on these techniques.

**Gene Serabyn** 818-393-5243 818-640-7485 gene.serabyn@jpl.nasa.gov  
Senior Research Scientist, Jet Propulsion Laboratory

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**Session 5.06 Imaging of Objects in Space**
This Session provides a forum for state of the art imaging of objects in space (both natural and man-made) using optical, infrared, and radio, radar techniques; single and multiple apertures, active and passive imaging; and ground-based and space-based instruments.

**Ifan Payne** 575-835-6808 505-363-5455 ipayne@mro.nmt.edu  
Program Director, Magdalena Ridge Observatory

**Michelle Creech Eakman** 575-835-5809 mce@kestrel.nmt.edu  
Associate Professor of Physics, New Mexico Institute of Mining and Technology

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**Session 5.07 Image Processing**
A forum on the theory and practice of image restoration and analysis. Potential topics include image registration, feature detection and estimation, image denoising, multimodal image fusion, and hardware/software architectures for image storage and processing.

**Martha Bancroft** 503-537-9155 503-703-4056 marti@dragonsden.com  
Owner, MBC

**Matthew Sambora** 937-255-3636 x4901 mattsambora@gmail.com  
Colonel, USAF, Air Force Institute of Technology

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**Session 5.08 Laser Communications and Atmospheric Propagation**
This session covers topics related to theory, modeling, analysis, design, and implementation of laser communication systems, including both optical wireless and optical fiber communications. In the area of laser communications through the atmosphere, this session provides a forum on theoretical, experimental, and numerical analysis; modeling of atmosphere propagation and channel fading induced by atmospheric turbulence; and methods to mitigate fading effects to enhance channel capacity and improve system reliability. Topics related to the laser energy propagation through atmospheric turbulence at lower altitudes and techniques of mitigating moderate and strong turbulence conditions are of high interests.

**Aleksandr Sergeyev** 906-487-2258 avsergue@mtu.edu  
Assistant Professor, Michigan Technological University

**Mathieu Aubailly** 301-395-0315 mathieu@umd.edu  
Assistant Research Scientist, University of Maryland
**Session 5.09  Laser Radar**

Laser radar is an optical remote sensing technology that can measure distance and other properties of a target by laser illumination. This section solicits papers on all aspects of laser radar and LIDAR, including component technologies, system integration, and aerospace applications.

Kevin Gaab  
Section Manager, The Aerospace Corporation  
310-336-0538  
kevin.m.gaab@aero.org

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**Track 6  Remote Sensing**

**Session 6.01  End to End Remote Sensing: Approaches and Challenges**

This session encompasses engineering approaches and challenges of remote sensing investigations, emphasizing end-to-end aspects including onboard instrument, host platform, telecom link, ground algorithms and analysis. End-to-End can also mean the synthesis of multiple investigations that contribute to answering a specific scientific question or measuring a specific value. These can be investigations in an intentionally designed campaign or a posteriori syntheses of existing data sets, for deep-space, earth-orbiting, or airborne missions.

Kenneth Hibbard  
Senior Systems Engineer, Johns Hopkins University/Applied Physics Laboratory  
443-778-1458  
443-463-3924  
kenneth.hibbard@jhuapl.edu

Todd Bayer  
Principal Systems Engineer, NASA Jet Propulsion Laboratory  
818-354-5810  
818-470-7078  
todd.j.bayer@jpl.nasa.gov

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**Session 6.02  Instrument and Sensor Architecture and Design**

This session covers topics related to the physical or functional architecture and design of instruments/sensors. Topics include hardware/software trades studies, fault protection approaches, unique or innovative system interfaces, accommodation of payloads within a system, and approaches to the processes involved in engineering an instrument or sensor.

Michael Amato  
Systems Engineer, NASA Goddard Space Flight Center  
301-286-3914  
michael.amato@nasa.gov

Alexander Eremenko  
Engineer, Jet Propulsion Laboratory  
818-354-1070  
alexander.e.eremenko@jpl.nasa.gov

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**Session 6.03  Imaging Spectrometer Systems, Science, and Science Applications**

This session covers subjects related to the design, build, assembly, integration, test, operation, and results of imaging spectrometers instruments. Proposed instruments, science, science applications, contextual information, and lessons learned for all phases are included.

Robert Green  
AVIRIS Experiment Scientist, Jet Propulsion Laboratory  
818-354-9136  
rog@jpl.nasa.gov

David Tratt  
Senior Project Engineer, The Aerospace Corporation  
310-336-2876  
dtratt@aero.org

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**Session 6.04  Advances in Radar Signal Processing**

This session covers the theory, algorithms, and hardware implementation of radar signal processing. Topics of interest include target and interference models, filtering, waveform design, Doppler processing, threshold detection and CFAR, synthetic aperture imaging, space-time adaptive array processing, multiple-input multiple-output systems, and compressive sensing.

Larry Smith  
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404-407-7092  
912-536-7283  
donnie.smith@grti.gatech.edu

Thomas Backes  
Research Engineer II, Georgia Tech Research Institute  
404-407-7320  
404-483-5236  
thermos.backes@grti.gatech.edu

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Session 6.05 Detection and Classification

Theoretical development and discussion of new methods of detecting or classifying objects in remote sensing applications. Applications of existing methods to remote sensing problems and discussion of results on simulated and real data.

Robert Lynch 860-705-3321 lynchrs@ieee.org
Scientist, Consultant, Analytic Information Fusion Systems

Tod Luginbuhl 401-832-8241 401-742-0475 t.e.luginbuhl@ieee.org
Electronic Engineer, Naval Undersea Warfare Center

Session 6.06 Multisensor Fusion

Papers that address all aspects of information fusion for the integration of multiple sensors are sought. Of particular interest are the theoretical aspects of some of popular questions like, When is sensor fusion better than a single sensor? or, How does one ensure that sensor fusion produces better results? Algorithms that address one of the many challenges in multisensor/multitarget tracking are also sought.

William Blair 404-407-7934 770-316-1291 dale.blair@gtri.gatech.edu
Principal Research Engineer, Georgia Tech Research Institute

Laura Bateman 240-228-6849 laura.bateman@jhuapl.edu
System Engineer, Johns Hopkins University/Applied Physics Laboratory

Session 6.07 Applications of Target Tracking

Tracking of targets, both cooperative and uncooperative, moving under water, on water, on land, in air or in space, with sonar, radar or electro-optical sensors. Fusion of data from multiple sensors. Algorithms for handling target maneuvers and data association. Estimation of sensor properties (biases, noise variances).

Darin Dunham 804-749-8750 804-519-5480 darin@vectraxx.com
Senior Research Engineer, Vectraxx, Inc.

Yaakov Bar Shalom 860-486-4823 ybs@engr.uconn.edu
Board of Trustees Distinguished Professor and M. Klewin Professor, University of Connecticut

Session 6.08 Sensor Resource Management

This session invites novel work addressing the problem of how to best utilize sensors to support acquisition, tracking, discrimination, engagement support or other missions. How can optimization, simulation, dynamic programming, or other techniques be used to solve the problem of tasking and controlling sensors in a timely manner for maximum benefit? Research can be focused on managing single or multiple sensors.

Debbie Pederson 703-418-7040 deborah.pederson@dac.us
Senior Engineer, Decisive Analytics Corp

Laura Bateman 240-228-6849 laura.bateman@jhuapl.edu
System Engineer, Johns Hopkins University/Applied Physics Laboratory

Session 6.09 Missile Guidance, Navigation and Control

The target of this section is collecting the most recent works of research and development regarding guidance, navigation and control (GNC) of tactical and strategic missiles in order to provide an exhaustive (as much as possible) picture of the state of art and a likely key to the reading of today’s new challenges. With this section we intended to give emphasis both to the more interesting theoretical aspects of the matter and to engineering problems of great practical importance, so a wide spectrum of arguments is welcomed.

Fabrizio Reali +39-06-40793148 +39-32-94123921 fabrizio.reali@tin.it
System Engineer, Telespazio

Session 6.10 Applications and Architectures for Wireless Smart Sensors Networks

Smart sensors are autonomous devices that combine sensing, computation and communication capabilities into a single package. Whether monitoring the surroundings or providing a backbone infrastructure for data meshing communications, these smart devices are growing in popularity and necessity. This session is meant to address and share the experiences of the research community in development and deployment of such smart wireless sensor networks.

Mitchell Lebold 814-865-8958 lebold@psu.edu
Research Engineer, Penn State University
Session 6.11 Integrated Sensing, Modeling, and Analysis Using Sensor Webs

This session will focus on remote sensing components that perform data acquisition (e.g., spacecraft); system control (whether autonomous or externally provided) and processing (science data product) elements; communications components; and external data systems for modeling, analysis, and decision support, such as space research analysis and data assimilation in prediction models and analysis tools; data utilization and applications in decision support systems; and planning and scheduling with systems beyond the sensing and processing resources of the sensor web.

Hook Hua 818-393-7182 hook.hua@jpl.nasa.gov
Scientific Applications Software Engineer, Jet Propulsion Laboratory

Session 7.01 High Performance Space Processing and High-Speed Interconnect Satellite Architectures and Standards

Innovations and new developments in onboard processing hardware architectures including combinations of single and multi-core processors, bridge and data handling ASICs, companion processing ASICs and FPGAs, attached memories, power distribution, system on a chip implementations, network connections and network architectures for spacecraft. Also interested in performance, size, weight and power comparisons of different components and architectures and standardized form factors utilized. Appropriate descriptions of radiation hardness by design, process or technology and mitigation of other spacecraft environmental factors should be addressed for any elements described as well as software support and integration and test of elements as applicable. Standards being developed for spacecraft processing and/or highspeed interconnects for next generation usage are especially sought. Description of actual flight or mission usage is always a welcome addition and adds perspective.

Jamal Haque 727-539-2049 jamal.haque@honeywell.com
Principal System Engineer, Honeywell

Joseph Marshall 703-367-1326 571-225-0726 joe.marshall@baesystems.com
Senior Principal Systems Engineer 2, BAE Systems

Session 7.02 Onboard Signal, Data, Command Processing and Data Handling Technologies

This session welcomes novel concepts and technologies tailored to onboard signal, data and command processing. Its scope includes software and hardware implementations (e.g. special purpose processors, FPGAs, ASICs), as well as hardware/software approaches for telecommand reception, decoding and distribution, payload data pre-processing (e.g. feature extraction, filters, pattern recognition, Gbit on copper data handling), dedicated accelerators for data processing, transmission and storage (e.g. compression, encoding, parallel processing for payloads(GIPs, GFLOPs), etc). Fault-tolerance mechanisms, autonomous operations, reconfigurable approaches and failsafe strategies that can be applied to the aforementioned topics are also welcome.

Michael Mclelland 210-522-3360 210-885-1064 michael.mclelland@swri.org
Executive Director, Space Systems Directorate, Southwest Research Institute

Jamal Haque 727-539-2049 jamal.haque@honeywell.com
Principal System Engineer, Honeywell

Session 7.03 Multi- and Many-Core Computing in Space: Hardware and Software

This session will explore topics unique to using multi and many core computing in space, including emerging hardware, software tools and techniques, legacy application migration, use cases and lessons learned from early adopters. Papers covering both homogeneous and heterogeneous multi/many core architectures and heterogeneous systems containing multi/many core components are welcome!

Martha Bancroft 503-537-9155 503-703-4056 marti@dragonsden.com
Owner, MBC

Stephen Crago 703-812-3729 crago@isi.edu
Director, Adaptive Parallel Execution Division, University of Southern California
Session 7.04 Memory and Data Storage Technologies for Space and Missile Applications
This session’s charter is to advance, discuss and present both the latest and emerging device technologies, packaging techniques, error handling, architectures and reliability enhancement for memory and data storage technologies for space and missile applications.

Michael Epperly 210-522-3477 210-601-4460 mepperly@swri.edu
Program Manager, Southwest Research Institute

Douglas Sheldon 818-393-5113 818-235-8272 douglas.j.sheldon@jpl.nasa.gov
VLSI Lead Technologist, Jet Propulsion Laboratory

Matthew Marinella 505-844-7848 mmarine@sandia.gov
Principle Member of the Technical Staff, Sandia National Laboratories

Session 7.05 Reconfigurable Computing System Technologies
This session focuses on emerging and novel designs for computing devices and systems that reconfigure to adapt to dynamic or emergent mission requirements. Examples of focus areas include on-orbit reconfiguration, temporal and spatial reuse of system resources, and reconfiguration to support fault tolerance.

Ian Troxel 720-626-0454 ian@betrokor.com
President and CEO, Betrokor, Inc.

Mohamed Ibrahim +8108042700641 mohamed@es.ise.kyutech.ac.jp
Research Assistant, Kyushu Institute of Technology

Session 7.06 Mixed Signal and System-on-a-Chip Technologies
Innovative mixed signal and systems-on-a-chip (SOC) technologies are sought. Specifically, miniaturized mixed signal circuits and systems for space applications with radiation hardened, low power implementations; sensor, detector and imager readout circuits, high resolution/high speed ADCs and DACs; high throughput digital processing architectures (ASIC, FPGA or SOC); and embeddable systems that can serve as the C&DH system for traditional or very small spacecraft; novel SOC designs for mass limited aerospace / space applications, including ASIC, FPGA, 3D, stacked die, and multi-chip stacked package implementations; resource efficient (mass/volume) miniaturized multi-channel/parallel systems; circuit designs for analog and digital processing functions; and designs for integrated communications systems applications on a chip.

Lavida Cooper 301-614-5624 301-286-3044 lavida.d.cooper@nasa.gov
Branch Head, NASA-Goddard Space Flight Center

Nikolaos Paschalidis 301-286-0166 nikolaos.paschalidis@nasa.gov
Senior Project Scientist for Advanced Technology, NASA-Goddard Space Flight Center

Session 7.07 Avionics for Small Satellites, Nano-Satellites, and CubeSats
A survey of newly designed and heritage avionics subsystems for application in smaller spacecraft. Relevant topics include attitude determination and control, telemetry systems, command and data handling, power systems, thermal systems, and guidance and navigation systems, all scoped for small satellites (<50kg). Participants include fundamental research organizations, such as universities and national laboratories, as well as system providers, such as defense departments and industry partners.

John Dickinson 210-522-5826 210-880-5370 jdickinson@swri.org
Senior Research Engineer, Southwest Research Institute

Jamal Haque 727-539-2049 jamal.haque@honeywell.com
Principal System Engineer, Honeywell

James Lumpp 859-257-3895 jel@uky.edu
Professor, University of Kentucky

Session 7.08 Power Electronics for Space Applications
Advanced power electronics devices, circuits and systems for space applications, including power devices, electronics, electro-magnetic devices and components such as photo-voltaic modules and power systems. Particular technical aspects include extreme thermal and power requirements, efficiency and power management, and reliability.

Peter Wilson +44 (0) 23 8059 4162 prw@ecs.soton.ac.uk
Reader, University of Southampton
**Session 7.09  Electronics for Extreme Environments**

This session is interested in innovations in electronics technologies (semiconductor devices, circuit concepts, packaging, reliability, and performance characterization) that can enable operation of electronics in the extreme environments of the planets in our solar systems, such as operating temperatures as low as -240°C in permanently shadowed regions of the moon, -180°C on Titan’s surface, and -125°C on Mars. Technologies capable of supporting operation at combination of low temperature and high radiation can facilitate missions to Europa. The session also covers low temperature electronics packaging technologies capable of withstanding large thermal cycles (e.g., Martian surface night/day temperature cycles between -125°C and 20°C). For Venus surface missions (480°C) the session is interested in high temperature electronics and electronics packaging technologies.

Elizabeth Kolawa 818-393-2593  elizabeth.a.kolawa@jpl.nasa.gov
Program Manager, Jet Propulsion Laboratory

Mohammad Mojarradi 818-354-0997 818-642-9176  mohammad.m.mojarradi@jpl.nasa.gov
Supervisor, Advanced Instrument Electronics, Jet Propulsion Laboratory

**Session 7.10  Advanced Packaging for Spacecraft**

Materials and techniques for assembling and testing microelectronics for spacecraft applications including component packaging, attachment, connectors, thermal/mechanical/electrical/radiation performance comparisons and failure analysis. Papers may address a specific sub-assembly such as solar cell arrays, sensors, instrumentation, power, communications, or navigation; adaptation of manufacturing methods for space applications; or integration of diverse modules such as MEMS, power electronics, sensors, optics, RF and microprocessors.

Janet Lumpp 859-257-4985 859-492-6438  jklumpp@uky.edu
Professor, University of Kentucky

**Session 7.11  Fault Tolerance, Autonomy, and Evolvability in Spacecraft Avionics**

Adaptation, including Fault Tolerance, Autonomy, and Evolvability, reflects the capability of a system to maintain or improve its performance in the presence of internal or external changes, such as faults and degradations, uncertainties and variations during fabrication, modifications in the operational environment, or incidental interference. This session addresses all aspects of adaptivity for spacecraft avionics with the scope of papers encompassing theoretical considerations, design solutions, and actual techniques applied to space flight operations.

Didier Keymeulen 818-354-4280  didier.keymeulen@jpl.nasa.gov
Principal, Member Technical Staff, Jet Propulsion Laboratory

Tom Hoffman 818-354-6521 818-648-7204  thoffman@jpl.nasa.gov
Deputy Project Manager, Jet Propulsion Laboratory

**Session 7.12  Spacecraft Guidance, Navigation, and Control Technologies**

Topics of the session include both theory and implementation issues related to the guidance, navigation and control of satellites, probes and launchers.

Giovanni Palmerini +39-06-4991-9760  +39-366-6750164  giovanni.palmerini@uniroma1.it
Professor, Guidance and Navigation, Sapienza Universita’ di Roma

John Enright 416-979-5000 x 4174  jenright@ryerson.ca
Associate Professor, Ryerson University

**Track 8  Spacecraft & Launch Vehicle Systems & Technologies**

Tye Brady 617-258-2366  tye@draper.com
DISTINGUISHED MEMBER TECHNICAL STAFF
Charles Stark Draper Laboratory
Leads the Space Systems Engineering Group at Draper Laboratory. 24 years experience on spacecraft instrumentation, design, and integration.
BS, Aerospace Engineering, Boston University; SM, Aeronautics and Astronautics, MIT.

Robert Gershman 818-354-5113  robert.gershman@jpl.nasa.gov
PRINCIPAL ENGINEER
Jet Propulsion Laboratory
Principal Engineer, JPL Mission Systems Concepts Section. Previously at JPL: Assistant Program Manager, Exploration Systems Engineering Office; Planetary Advanced Missions Manager; Deputy Manager, Galileo Science and Mission Design Office; Supervisor, Mission Engineering Group.

**Session 8.01  Exploration Systems**

This session seeks papers addressing the broader aspects of Human Exploration Systems, including planning, development and execution. Sample topics include systems architecture studies, design reference mission analyses, detailed program overviews, and broader trade study and systems engineering analyses for any aspect of Human Space Exploration Systems. Joint human and robotic mission approaches are of particular interest. New approaches and unique applications to these types of analyses are also sought.

Bret Drake 281-483-1806  bret.g.drake@nasa.gov
Exploration Architect, NASA
<table>
<thead>
<tr>
<th>Session 8.02</th>
<th>Exploration Systems Technology Development</th>
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<tr>
<td>This session seeks papers dealing with technology development for human and robotic exploration of space. This can include development efforts with technology readiness levels anywhere from laboratory to full-scale flight demos. It can also include assessments of technology needs of programs, program elements, or individual mission concepts.</td>
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<tr>
<td><strong>Robert Gershman</strong></td>
<td>818-354-5113 714-488-3164</td>
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<td>Principal Engineer, Jet Propulsion Laboratory</td>
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<tr>
<td><strong>Dana Gould</strong></td>
<td>757-864-7747 757-880-2552</td>
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<td>Game Changing Development Program Deputy Director, NASA</td>
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<tr>
<th>Session 8.03</th>
<th>Advanced Launch Vehicle Systems and Technologies</th>
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<tr>
<td>This session seeks papers covering on-going development and future advances in space transportation from Earth to orbit and distant destinations. Topics including transportation architectures, launch vehicles, infrastructure, transportation business and enabling technologies are of interest.</td>
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<tr>
<td><strong>Bernard Kutter</strong></td>
<td>303-269-5538 720-352-1372</td>
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<td>Manager Advanced Programs, United Launch Alliance</td>
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<th>Session 8.04</th>
<th>Hosted Payloads</th>
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<td>This session seeks papers regarding commercial companies working with government to share spacecraft resources for independent payloads. Topics range from spacecraft interfaces, thermal, power, telemetry, communications to mission assurance, program management, costing models and lessons learned for hosted payload programs.</td>
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<tr>
<td><strong>Doug Holker</strong></td>
<td>310-336-2232 310-897-0329</td>
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<tr>
<td>Associate Principal Director, Developmental and Project Planning, Aerospace Corporation</td>
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<th>Session 8.05</th>
<th>Human Factors &amp; Performance</th>
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<td>This session seeks papers covering human integration and operations with spacecraft systems. Suggested topics may include cockpit and flight deck displays and controls, handling qualities and flight performance, human adaptation and performance during short- and long-duration spaceflight, countermeasures technologies/systems, and training.</td>
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<tr>
<td><strong>Laura Major</strong></td>
<td>617-258-3432</td>
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<td>Human-System Collaboration Group Leader, Charles Stark Draper Laboratory</td>
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<tr>
<td><strong>Kevin Duda</strong></td>
<td>617-258-4385 413-221-8622</td>
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<tr>
<td>Senior Member of the Technical Staff, The Charles Stark Draper Laboratory, Inc.</td>
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<th>Session 8.06</th>
<th>Modular Bus Technologies, Components and Standardized Spacecraft</th>
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<td>This session seeks papers covering novel approaches to standardizing spacecraft hardware, software, and interfaces, including modularization, plug-and-play, fractionation, networks, distributed control, and other strategies to maximize hardware and software reuse, system robustness, and mission flexibility while minimizing non-recurring engineering and development time and cost.</td>
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<tr>
<td><strong>Richard Martin</strong></td>
<td>505-853-4118 505-220-8567</td>
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<td>Kirtland Core Process 3 Chief, Air Force Research Laboratory</td>
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<td><strong>Paul Graven</strong></td>
<td>424-400-5001 310-245-4301</td>
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<td>CEO, Cateni</td>
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<th>Session 8.07</th>
<th>Mechanical Systems, Design and Technologies</th>
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<td>This session seeks papers on structures, mechanical and thermal systems, devices, and technologies for space flight systems and in situ exploration. Papers addressing mechanical systems design, ground testing, and flight validation are also encouraged.</td>
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<td><strong>Lisa May</strong></td>
<td>202-358-2411 202-285-5352</td>
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<td>Program Executive, NASA Headquarters</td>
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<td><strong>Joshua St. Vaughn</strong></td>
<td>818-393-6934</td>
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<td>Group Supervisor, Jet Propulsion Laboratory</td>
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<th>Session 8.08</th>
<th>Spacecraft Propulsion and Power Technologies</th>
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<td>This session seeks papers on the development and infusion of in-space propulsion and power technologies for future NASA science missions and other Earth orbiting applications. The session's primary focus is on robotic satellite applications and is not intended for human spaceflight topics.</td>
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<td><strong>David Anderson</strong></td>
<td>216-433-8709 216-337-1601</td>
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<td>Project Manager, NASA Glenn Research Center</td>
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<tr>
<td><strong>Paul Stella</strong></td>
<td>818-354-6308</td>
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<td>principal engineer, Jet Propulsion Laboratory</td>
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**Session 8.09 Autonomous Space Exploration Systems and Technologies**

This session is looking for autonomous (spanning capabilities that are fully autonomous to supervisory controlled, to humans-in-the-loop) guidance, navigation, and control solutions for both: planetary landing, ascent, traverse systems; spacecraft rendezvous, proximity operations, and docking. Suggested topics include technologies for GNC, sensing, avionics, and propulsion subsystems. System level concepts and results from demonstrations and field tests is also encouraged.

**Babak Cohanim**  617-258-4122  515-451-6112  bcohanim@draper.com
Mission Design Group Leader, Charles Stark Draper Laboratory

**Steve Paschall**  617-258-2856  spaschall@draper.com
Member of the Technical Staff, Draper Laboratory

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**Session 8.10 New Technologies and Instruments for Scientific Balloon Missions**

Scientific balloons are capable of testing new technologies and performing ground-breaking science for low cost. Topics include mission concepts (astrophysical, planetary, and terrestrial), instrument, sensor and infrastructure technologies (e.g., gondola mechanical structures, pointing/aspect systems, payload networking, data streaming techniques, power management schemes, and ground station operation enhancements and architectures) and cross-over technologies relevant for future orbital and deep space payloads. Also of interest are specific electronic developments related to long duration and ultra-long duration balloon flights, as well as related technologies applicable to balloon systems, testing, and performance.

**Jessica Gaskin**  256-961-7818  256-682-4739  jessica.gaskin@nasa.gov
Research Scientist, NASA - Marshall Space Flight Center

**Ira Smith**  210-522-3587  sismith@swri.edu
Sr. Program Manager/ R&D, Southwest Research Institute

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**Session 8.11 Enabling Systems and Technologies for CubeSat/Smallsats**

This session seeks papers covering technologies and systems for very small spacecraft (secondary platforms such as CubeSat, ESPA and ASAP-class) that enable “big” science and demonstration missions on a small budget. Papers that evaluate flight or testing results are strongly encouraged.

**Michael Swartwout**  314-977-8214  mswartwo@slu.edu
Assistant Professor, Saint Louis University

**John Enright**  416-979-5000 x 4174  jenright@ryerson.ca
Associate Professor, Ryerson University

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**Session 8.12 Fractionated and Distributed Systems**

This session seeks papers covering the assessment, development and implementation of fractionated and distributed space systems. These papers may cover techniques for developing or measuring the utility of these systems, prototype work done in implementing these systems or elements thereof, and applications of these fractionated or distributed systems.

**Steven Cornford**  818-354-1701  818-648-1800  steven.cornford@jpl.nasa.gov
Senior Engineer, Jet Propulsion Laboratory

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**Track 9 Air Vehicle Systems and Technologies**

**Christian Rice**  301-342-1380  christian.rice@navy.mil
CHIEF TEST ENGINEER
Naval Air Systems Command, Patuxent River, MD.
Chief Test Engineer, Rotary Wing, BS, Aerospace and Ocean Engineering; MS, Aviation Systems. Graduate of U.S. Naval Test Pilot School.

**Robin Locksley**  301-757-0605  robin.locksley@navy.mil
DIVISION HEAD, SYSTEMS TEST AND EXPERIMENTATION
Naval Air Warfare Center
23 years flight test engineering and engineering management experience. Graduate, U.S. Naval Test Pilot School. BSEE, Drexel U.; MSEE, Florida Institute of Tech.

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**Session 9.01 Air Vehicle Flight Testing**

Session focuses on the technology, techniques, and procedures of fixed and rotary wing aircraft flying qualities, performance, and mission systems testing at the installed system level.

**Robin Locksley**  301-757-0605  240-298-3429  robin.locksley@navy.mil
Division Head, Systems Test and Experimentation, Naval Air Warfare Center

**Andrew Lynch**  301-995-4447  andrew.lynch@navy.mil
Deputy Program Manager for H-60 International Programs, Navy
Session 9.02 UAV Systems & Autonomy

This session includes papers on all aspects of Unmanned Aerial Vehicle (UAV) systems and autonomy. All aspects of UAVs — from design to execution, from experimental to operational — are included. Autonomy related to UAVs and policy discussions related to UAVs are also represented.

Kendra Cook 703-674-1299 kendra.l.cook@gmail.com
Director - Corporate Compliance, Integrity Applications Incorporated

Session 9.03 Aircraft Systems & Avionics

The focus of this session is to introduce innovative concepts in the areas aircraft systems and avionics development, integration and testing for improving aircraft performance, survivability, situational awareness, energy state awareness, and airspace awareness.

Warren Jones 301-757-9447 410-231-8108 warren.jones@navy.mil
Aerospace Engineer, AMERICAN SYSTEMS

Session 9.04 Air Vehicle Flight Controls

This session focuses on the development, testing, and technologies of air vehicle flight controls, including fixed wing, rotary wing, and unmanned aerial vehicles.

Thomas Post 301-866-2070 240-577-5182 thomas.post@avianeng.com
Director of Consulting, AVIAN Engineering

Tom McAteer 301-757-4697 thomas.mcateer@navy.mil
Propulsion & Mechanical Systems Rotary Wing Branch Head, NAVAIR

Track 10 Software and Computing

Jeff Norris 818-354-5472 jeffrey.s.norris@jpl.nasa.gov
SECTION MANAGER, PLANNING AND EXECUTION NASA Jet Propulsion Laboratory
Responsible for systems engineering, software development, and flight operations for a variety of missions and robotic systems. Research interests include immersive visualization, haptics, and natural human-computer interfaces.

Sanda Mandutianu 626-318-1566 sanda.mandutianu@jpl.nasa.gov
Sr. SOFTWARE ENGINEER Jet Propulsion Laboratory
PI on software & systems engineering. Pioneered agent-based technologies for distributed spacecraft missions & flight-ground systems integration. Recent work includes information modeling & ontology engineering for outer planets missions.

Session 10.01 Computational Modeling

The focus of this session is Computational Modeling in any discipline, with emphasis on the mathematical model of the phenomenology and on the numerical algorithms used for solution. Disciplines include fluid dynamics and fluid/thermal sciences, earth and planetary physics, systems engineering studies, sensor management and sensor modeling, and radar and signal processing.

Darrell Terry 803-256-6332 darrell.terry@worldnet.att.net
Sensors Systems Engineer, Principal, The Mitre Corporation

Virgil Adumitroaie 818-393-7038 626-318-3467 virgila@jpl.nasa.gov
Scientific Applications Software Engineer, Jet Propulsion Laboratory

Session 10.02 Software Engineering

Software engineering practices are developed and used in the aerospace industry from initial concept of the project throughout all phases of the development life-cycle model. Processes, methods and tools are customized to build, deliver and sustain complex domain-specific software for use on spacecraft and missions. The challenge is to build quality, reliable software and encompass the latest technology within a shrinking schedule and budget, and to easily maintain the software after delivery. Suggested topics in this session include software engineering practices, methods, and tools used in the aerospace industry for project management, requirements modeling, design, configuration management, process models, process improvement, agile development, quality assurance, and validation and verification.

Kristin Wortman 240-228-9634 410-336-9962 kristin.wortman@jhuapl.edu
Senior Professional Staff - Embedded Applications, Johns Hopkins University/Applied Physics Laboratory
Session 10.03 Software Architecture and Design

Appropriate software architecture is critical to the design, development and evolution of all software systems, and its role in the engineering of software-intensive applications in the aerospace domain has become increasingly important. This session solicits novel ideas on the foundations, languages, models, techniques, tools, and applications of software architecture technology. Topics include software architecture for space mission systems; architecture across software, system and enterprise boundaries; architectural patterns, styles and viewpoints; architecture frameworks; architecture description languages and model driven architecture ontology-based approaches for architecture description; design reasoning, capturing and sharing design decisions; and open architectures, product-line architectures, and systems of systems software architects' roles and responsibilities.

Charles Lee 650-604-6054 charles.lee@nasa.gov
Computer Scientist, SGT / NASA Ames Research Center

Sanda Mandutianu 626-318-1566 sanda.mandutianu@jpl.nasa.gov
Sr. Software Engineer, Jet Propulsion Laboratory

Session 10.04 Model-based Systems and Software Engineering

This session is concerned with the application, or potential application, of model-based approaches, techniques, languages, and tools to the aerospace domain. Topics ranging from theoretical and conceptual work in these areas to specific, concrete applications, in scope from small software systems to large systems of systems, are welcome. This is a diverse session, with areas of interest including model-based architecture and analysis, design, control systems, verification and testing, simulation, domain specific languages and transformations, aircraft systems, flight systems, ground systems, planning and execution, guidance and navigation, and fault management.

Alexander Murray 818-354-0111 818-267-7576 alex.murray@jpl.nasa.gov
Senior Information Systems and Computer Scientist, Jet Propulsion Laboratory

Session 10.05 Implementing Artificial Intelligence for Aerospace

This session considers how to create state-of-the-art single and multi-agent technologies for creating 'intelligent' systems in both hardware and software. It will include papers related to all areas of single-craft aerospace mission autonomous control (ground station, spacecraft/satellite, unmanned aircraft and ground rovers) and papers related to partially and fully autonomous aerospace systems. Techniques considered will include, but are not limited to genetic algorithms, swarm intelligence, probabilistic AI, training & learning tools, and intelligent multi-agent systems. This session invites papers on best practices towards implementing new state-of-the-art autonomy and intelligence systems for aerospace. Papers on clustering, distributed, or formation flying missions and control techniques for low-cost, small-size craft are particularly welcomed.

Christopher Bridges +44 (0)1483 689137 c.p.bridges@surrey.ac.uk
Lecturer in On-Board Data Handling, Surrey Space Centre

Jeremy Straub 701-777-3460 jeremy.straub@my.und.edu
Researcher, University of North Dakota

Session 10.06 Human-Computer Interaction

Technologies and techniques for creating more effective interfaces between humans and spacecraft, robots, and other aerospace systems. Specific topics of interest include visualization, haptics, situational awareness, intent capture, natural user interfaces, and design methodologies.

Jeff Norris 818-354-5472 818-640-8490 jeffrey.s.norris@jpl.nasa.gov
Section Manager, Planning and Execution, NASA Jet Propulsion Laboratory

Session 10.07 Cloud Computing

Cloud computing is becoming increasingly prevalent in the aerospace community. This session consists of papers regarding the latest advances in cloud computing and techniques to effectively utilize cloud computing capabilities.

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Technical Advisor, Amazon Web Services

Tomas Soderstrom 818-354-5896 818-298-1505 tom.soderstrom@jpl.nasa.gov
IT Chief Technology Officer, Jet Propulsion Laboratory

Jamie Kinney 206-265-9439 jkinney@amazon.com
Principal Solution Architect, Amazon Web Services

Session 10.08 PANEL: Software Architecture

Gathering of practitioners and researchers interested in learning about and improving the state of practice of software architecture in the context of the aerospace domain. Discussions will be moderated by the organizers and will debate the main topics addressed by the papers presented at the conference.

Kristin Wortman 240-228-9634 410-336-9962 kristin.wortman@jhuapl.edu
Senior Professional Staff - Embedded Applications, Johns Hopkins University/Applied Physics Laboratory
**Session 10.09** PANEL: Cloud Computing

Cloud Computing is a disruptive technology that has completely revamped industry approach to IT, and the journey has just begun. By providing secure and effective access to virtually limitless capacity, cloud computing has the potential to serve as the enabler to numerous NASA missions. In fact, several NASA mission, including Mars Exploration Rovers and Mars Science Laboratory are already soaring in the clouds. What potential does cloud computing hold for NASA? Is it real? Does it make economical sense? And how should we really approach it? In this panel, we will ask thought provoking questions, hear insights from industry and NASA leaders with extensive hands-on experience in cloud computing, and discuss its near- and long-term impact on and potential for NASA.

Khawaja Shams 206-557-8218 818-393-0037  
Technical Advisor, Amazon Web Services

Tomas Soderstrom 818-354-5896 818-298-1505  
IT Chief Technology Officer, Jet Propulsion Laboratory

Jamie Kinney 206-265-9439  
Principal Solution Architect, Amazon Web Services

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**Track 11** Diagnostics, Prognostics and Health Management (PHM)

**Session 11.01** PHM for Aerospace Subsystems, Components and Structures

Advanced Diagnostics and PHM can be and is applied separately or concurrently at the device, component, subsystem, structure, and/or total platform levels. This session will give PHM developers, practitioners, integrators, and users a chance to discuss their capabilities and experiences at any or all of these application levels. Discussion of the integration of PHM capabilities across these various levels of application is welcome and encouraged. Applications involving propulsion systems, fuel management, flight control, EHAs, drive systems, and structures are particularly solicited.

Andrew Hess 301-605-7625 240-355-8915  andrew_hess@comcast.net  
President, The Hess PHM Group, Inc.

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**Session 11.02** Prognostics for Electronics and Avionic Systems

This session focuses on prognostics and health management (PHM) pertaining to electronics and avionic systems. Topics include parameter and sensor selection, data collection, data processing/mining and feature extraction, pattern recognition, anomaly detection, parameter isolation, remaining useful life estimation, decision making, system verification and validation, and implementation.

David Kleinman 831-626-4065 831-760-2196  kleinman@nps.edu  
Professor, Univ of Connecticut

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**Session 11.03** Physics-based Modeling as a Core Technology for Prognostics

Diagnostic and PHM capabilities can generally be characterized as being derived from data driven or model based approaches. Physics-based modeling has evolved as a core technology for achieving predictive and prognostic capabilities. This session is intended to focus on the physics of failure and the use of physics-based modeling to contribute to and enable predictive, prognostic, and remaining useful life capabilities. These physics-based models could be applied to individual or groups of devices, components, subsystems, structures, or to the complete platform system. All related applications are welcome.

José Celaya 650 605-4596  jose.r.celaya@nasa.gov  
Scientist, NASA Ames Research Center

Chetan Kulkarni 615-715-6938  chetan.s.kulkarni@nasa.gov  
Research Engineer II, SGT. Inc NASA Ames Research Center
Session 11.04 Algorithms and Advanced Concepts for Diagnostics and PHM

Diagnostics and PHM is a rapidly evolving research area. This session focuses on novel algorithms for solving PHM problems and advanced concepts applied to these problems.

Matthew Daigle 650-604-4583 matthew.j.daigle@nasa.gov
Research Computer Scientist, NASA Ames Research Center

Session 11.05 Metrics and Evaluation Methods for Diagnostics & PHM Systems

Development of metrics and evaluation methods and associated verification and validation approaches. Case studies of the application of tools and methods at component, sub-system, system or platform level. Engagement of the audience and perhaps wider community in identifying common issues and sources of data and collaboration. Topic development discussion is encouraged with the session organizers.

Craig Davison 613-991-0931 613-229-5348 craig.davison@nrc-cnrc.gc.ca
Research Officer, National Research Council Canada
Pervez Canteenwalla 613-990-0652 pervez.canteenwalla@nrc.ca
Research Officer, National Research Council of Canada

Session 11.06 Design Attributes for Diagnostics and Prognostics

Design of complex systems, such as aircraft and space vehicles, requires complex trade-offs among requirements related to performance, safety, reliability, and life cycle cost. This session will focus on the application of methods such as testability, diagnosability, embedded sensors, prognostics, and remaining useful life estimation to the design of complex aerospace systems. We invite papers discussing new methodologies, lessons learned in application of health management methods in system design, and operational experience with health management capabilities embedded into systems early in the design process.

Andrew Hess 301-605-7625 240-355-8915 andrew.hess@comcast.net
President, The Hess PHM Group, Inc.

Session 11.07 PHM Technologies for Reliability and System Maintenance

With a focus on CBM+ and RCM, papers are welcome exploring methods and tools for understanding and managing reliability and maintenance, including the selection and validation of PHM approaches with consideration of the broader sustainment imperative of total life cycle systems management (TLCSM) for enhanced system cost effectiveness.

Richard Millar 301-757-0517 rcmillar@nps.edu
Associate Professor, Naval Postgraduate School

Session 11.08 Systems Health Management for Space Systems and Operations

This session focuses on advances pertinent to space operations. The need for semi-autonomous or autonomous operations, communication delay, short contact periods as well as the need for survival in harsh environments poses unique challenges to systems health management. Additional challenges come from the application areas that include cryogenic operations, fuel reloading, ground operations, deep space habitats, and similar.

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Post Doctoral Research Scholar, SGT, Inc.
Indranil Roychoudhury 650-604-0448 indranil.roychoudhury@nasa.gov
Computer Scientist, SGT, Inc.

Session 11.09 MEMS and Sensor Technologies for System Diagnostics, IVHM & PHM

This session is designed to bring together researchers and engineers developing sensors applicable to SHM and IVHM. Papers are invited on MEMS, MOEMS, nanotechnology, BIOS, quantum dots, chemical sensors, optical sensors, and imaging sensors that can be integrated with nondestructive testing applications for structural health monitoring and diagnostics.

Morteza Safai 206-544-7590 206-304-4618 morteza.safai@boeing.com
Sensors Engineer, Boeing Company

Session 11.10 Maturation of Health Management Technologies via Ground/Flight Testing and Research

Health management technologies are difficult to advance in technology readiness level not only because of technological hurdles, but also because of the difficulties in conducting meaningful health management tests. Health management system tests can be difficult because of the necessity of not only testing the technology in a nominal situation but also for faulting the aircraft system to confirm health management efficacy. Papers are requested that describe the maturation of Diagnostics, Prognostics and Health Management (PHM) technologies through ground and flight testing in relevant environments.

Michael Venti 661-276-2513 714-749-1520 mike.venti@nasa.gov
Senior Technical Advisor, NASA DFRC Jacobs Engineering Corporation
John Lekki 216-433-5650 john.d.lekki@nasa.gov
Instrumentation Research Engineer, NASA - Glenn Research Center
Session 11.11 PHM for Astronauts and Pilots
This session is an effort to bridge Prognostics and Health Management (PHM) with the Aerospace Medicine (ASM) domains. While ASM are about maintaining crew health and ensuring success of manned exploration-class missions and safe air transportation by means of predictive diagnostics in terms of the medical autonomy paradigm, PHM focuses on the fundamental principles of system failures. Papers are sought that show how PHM techniques, such as predictive analytics, predictive diagnostics, root cause analysis, and data mining can serve as a scientific and engineering foundation to build an evidence-based medicine for aerospace.

Alexandre Popov 450-926-6537 514-692-6896 alexandre.popov@asc-csa.gc.ca
Operations Engineer, International Space Station Program at CSA

Wolfgang Fink 818-395-7769 wfk@email.arizona.edu
Associate Professor, University of Arizona

Session 11.12 Probabilistic Design for Reliability of Aerospace Electronics
The probabilistic-design-for-reliability (PDfR) approach enables improvements in the existing PHM practices by quantifying, at the design stage and on a probabilistic basis, the expected operational reliability of a material, device or a system. Session topics include, but are not limited to, design for reliability (DFR), testability, and manufacturability; failure oriented accelerated testing (FOAT) at the development stage; predictive modeling; optimization studies and sensitivity analyses; mission success and safety; design for harsh and uncertain environments; and various anticipated off-normal situations.

Ephraim Suhir 408-410-0886 suhire@aol.com
Professor, University of California, Santa Cruz

Laurent Bechou 33 5 4000 2767 +33 6 6419 3401 laurent.bechou@ims-bordeaux.fr
Full Professor, Research Group Manager, IMS Laboratory, University Bordeaux 1

Session 11.13 PHM for Autonomous Systems
The field of autonomous systems is rapidly evolving, spanning space, aerial, ground, and subsurface applications. While autonomous decision making and control are of key importance, of equal importance is the health management of these systems to sustain their operation. PHM capabilities, particularly in prognosis, can help with fault accommodation and control system reconfiguration. Contributions regarding the use of PHM in the field of autonomous systems (space, air, ground, subsurface) are welcome.

Wolfgang Fink 818-395-7769 818-395-7769 wfk@email.arizona.edu
Associate Professor, University of Arizona

Session 11.14 PHM for Propulsion Systems
Advanced Diagnostics and PHM can be and is applied to propulsion systems. This session will give PHM developers, practitioners, and users a chance to discuss their capabilities and experiences with PHM applied to propulsion systems. Discussion of the integration of PHM capabilities in the field of propulsion systems is welcome and encouraged. Applications involving propulsion systems, fuel management, flight control, and structures are particularly solicited.

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President, The Hess PHM Group, Inc.

Nick Cripps +44 1332 261431 nick.cripps@rolls-royce.com
Tech Lead - EHM Capability, Rolls-Royce plc

Session 11.15 Panel: PHM from a User-Perspective - A Potpourri
Career practitioners in the PHM field are solicited to share their experiences and observations as part of a distinguished panel of experts. A short presentation will be required of all participants that describes their focus topic within the PHM/EHM domain. This session will cover a broad range of research, lessons-learned experiences and application topics covering the challenges and innovative engineering and/or business approaches associated with the development and implementation of PHM capabilities and CBM+ architectures. The session will feature presentations by senior leaders in the field and a panel discussion. Panel members from PHM communities, academic, government, and industry, will focus on strategies that have or will resolve historical issues and challenges. Interested parties should contact the session organizers.

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President, The Hess PHM Group, Inc.

Richard Friend +44 1332 823 746 richard.friend@rolls-royce.com
Global Chief of EHM, Rolls-Royce
Track 12  Ground and Space Operations

**Session 12.01** Spacecraft Development and Flight Operations: Challenges, Successes, Failures and Lessons Learned

Designing, developing and flying spacecraft is a challenging endeavor; it is “Rocket Science.” These challenges, when experienced during development, pose risks to cost and schedule. When anomalies occur in flight, the challenges are even greater, imparting risks to mission success. This session solicits outstanding papers describing some of the difficult challenges mission teams have faced and how they’ve resolved them. Spacecraft development and operations challenges, in-flight anomaly resolution, process improvement, automation and lessons learned for future missions are highlighted.

**Allan Cheuvront**  
Spacecraft Engineer, Lockheed Martin  
303-971-4483  
allan.r.cheuvront@lmco.com

**Mona Witkowski**  
Flight Director / Operations Mission Manager, Jet Propulsion Laboratory  
818-354-4203  818-983-4727  
mona.m.witkowski@jpl.nasa.gov

**Session 12.02** Flight/Ground Systems, Mission Planning and Operations

This session entertains papers with topics related to ground systems design and architectures, flight/ground interfaces and software tools, as well as current and emerging methods and technologies to support all aspects of mission design, planning and operations. We would like to hear about ideas and approaches for “doing more with less,” such as efficient ground systems integration and automation!

**Judith Furman**  
Principal Analyst, Southwest Research Institute  
210-522-6040  210-382-0732  
jfurman@swri.org

**Manfred Bester**  
Director of Operations, University of California, Berkeley  
510-643-1014  707-803-8811  
mbester@berkeley.edu

**Session 12.03** Managing Life Cycle Cost and Risk - Affordability, Operability, Sustainability, and Automation

Large program costs for payload, spacecraft, and launch vehicles are crippling U.S. competitiveness in the world market. Papers are sought to highlight lessons learned and innovative approaches to lowering life cycle cost and risk, including previous, existing, and emerging programs. Topics can be from any phase of the system life cycle (from concept design to termination) that may have an impact on project life cycle costs. The goal is to explore how affordability, operability, sustainability, and automation can make an impact on lowering life cycle costs of current and future programs.

**Nancy Zeitlin**  
Technology Integration Manager, NASA - Kennedy Space Center  
321-867-2817  
nancy.p.zeitlin@nasa.gov

**Session 12.04** Human Space Flight Operations and Processing

This session focuses on aspects of ground processing and preparations for manned spacecraft launch, mission, and landing operations and mission operations support of manned suborbital, orbital and extra-orbital spaceflight missions. It includes manned flight hardware assembly and checkout, launch site operations, flight operations including IVA and EVA activities, associated support equipment and personnel, and landing and recovery operations of crewed spacecraft, as well as physiological and psychological aspects of human spaceflight on the flight crew.

**Michael Lee**  
AST, Mission Operations Integration, NASA  
321-861-2568  321-431-4766  
michael.r.lee@nasa.gov

**Session 12.05** Payload and Instrument Operations and Processing

This session incorporates all aspects of payload operations, including techniques and tools for planning, scheduling, commanding, processing, analyzing, and optimizing, as well as payload delivery systems engineering.

**Radu Popescu**  
Data Analysis and Information Management, Laboratory for Atmospheric and Space Physics  
303-492-5689  303-589-5143  
radu.popescu@lasp.colorado.edu

**David La Vallee**  
Project Leader, Johns Hopkins University Applied Physics Laboratory  
240-228-4546  
david.lavallee@jhuapl.edu
Session 12.06 PANEL - Current Topics in Operations
Mission and Instrument Planning Tools.

Jonathan Gal Edd 301-286-2378 443-799-3819 jonathan.s.gal-edd@nasa.gov
LDCM Ground system Chief Engineer, NASA Goddard Space Flight Center

Track 13 Management, Systems Engineering and Cost

Henry Stone 818-354-9051
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DEPUTY PROJECT MANAGER/FLIGHT SYSTEM MANAGER
Jet Propulsion Laboratory
Deputy Project Manager/Flight System Manager for the InSight Mission. Formerly, Deputy Manager of the Systems and Software Division, Project Element Manager for Mars Pathfinder Rover and Mars Exploration Rover (MER) Avionics Subsystems; Spacecraft/Rover Team Chief for MER.

Robert Kellogg 310-336-0324
robert.kellogg@aero.org
Senior Engineer, Senior Technical Manager
Aerospace Corporation
Over 25 years experience in systems engineering of optical and other sensors. Cost and technical evaluation of space systems for the Air Force, NASA, and other customers.

Session 13.01 System Simulation and Verification
This session addresses the use of techniques, methods and case studies to verify that complex simulations and systems models are developed and structured as intended.

Michael Baxter 310-336-8572 310-529-6412 michael.j.baxter@aero.org
Director, Modeling and Simulation Department, Aerospace Corporation

Session 13.02 Risk Management: Application and Lessons Learned
This session is dedicated to the practice of risk management in aerospace endeavors. It solicits outstanding papers that provide new insights from the successful application of risk management, and lessons learned when risk management did not prevent realization of consequences.

Mark Powell 208-521-2941 208-521-2941 attwater@aol.com
Consultant, Attwater Consulting

Session 13.03 Cost and Schedule Tools, Methods and Processes
This Session addresses cost and schedule analysis tools, methods, processes, and results including design trades for design concepts and technologies throughout a project’s life cycle. Topics addressed include cost or schedule model development, regression analysis and other tools, historical studies addressing trends, databases, government policies, industry training, mission cost analysis, operations and supporting/infrastructure cost, mission portfolio analysis, case histories, lessons learned, process control, and economic and affordability analysis that assesses program/project viability.

Robert Bitten 310-336-1917 robert.e.bitten@aero.org
Principal Engineer, Aerospace Corporation

Stephen Shinn 301-286-5894 stephen.a.shinn@nasa.gov
Deputy Director for Business Management, Flight Projects Directorate, NASA - Goddard Space Flight Center

Session 13.04 Management Tools, Methods and Processes
This session addresses tools, methods, and processes for managing aerospace system development programs/projects, mission operations, technology development programs, and systems engineering organizations. Topics include managing all life cycle phases of programs/projects; project-level management disciplines including project management, systems engineering, scheduling, safety and mission assurance, and configuration management; aerospace systems engineering - including training and capability retention (passing expertise between generations of systems engineers); managing aerospace technology development programs; commercial, military, and civil space systems; and commercial and military aircraft systems.

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Senior Systems Engineer, Jet Propulsion Laboratory

Jeremiah Finnigan 240-228-5725 240-498-6686 jeremiah.finnigan@jhuapl.edu
Senior Professional Staff, Johns Hopkins University/Applied Physics Laboratory
Session 13.05  Mission Modeling, Concept Optimization and Concurrent Design

This session is dedicated to the discussion of the topics related to the current state of practice and future advances in conceptual design across the aerospace domain including design tools, optimization techniques, design study results, results visualization, trade space exploration and lessons learned.

Robert Oberto  310-336-1203  310-923-5779  bob@boboberto.com
Senior Engineering Specialist, Aerospace Corporation

Eric Mahr  202-358-5118  eric.m.mahr@aero.org
Senior Engineering Specialist, Aerospace Corporation

Session 13.06  Systems Architecture, Engineering and System of Systems

This session is dedicated to papers dealing with the fundamental challenges associated with architecting and high level systems engineering of large scale systems and systems of systems, including development and application of tools and techniques that support both architecting and systems engineering processes (e.g., Architecture Descriptions, Model Based Systems Engineering), maintaining the integrity of “the architecture” across the project lifecycle, and discussions of successful (and not so successful) architecting and systems engineering endeavors with an emphasis on the lessons learned.

Henry Stone  818-354-9051  818-635-3741  henry.w.stone@jpl.nasa.gov
Deputy Project Manager/Flight System Manager, Jet Propulsion Laboratory

Kathleen Fontaine  301-286-8161  301-408-8937  kathy.fontaine@nasa.gov
GEOSS Liaison for GOES-R Ground Segment Project, NASA Goddard Space Flight Center

Session 13.07  Technology Transfer and Commercialization

This session provides information on infusing aerospace technologies into both government agencies as well as the broader marketplace. We will discuss the legal and operational issues in effective technology transfer as well as challenges to efficient commercialization. In addition, we will discuss private and public funding challenges to accelerated technology development.

Andrea Belz  626-429-4301  626-429-4301  abelz@marshall.usc.edu
Lecturer, USC Marshall School of Business

Howard Neely  310-770-5789  neely@threebirdssystems.com
Chief Technology Officer, Three Birds Systems

Session 13.08  Promoting (and Provoking) Cultural Change

Culture is a byproduct of habits. This session explores the “soft side” of engineering - the environment and nutrients that can help great things grow.

David Scott  256-544-3226  256-227-0339  scotty@nasa.gov
Computer Engineer, NASA - Marshall Space Flight Center

Track 14  Government Plans, Policies and Education

Dave Lavery  202-358-4684  dave.lavery@nasa.gov
Program Executive for Solar System Exploration, NASA Headquarters

Program Executive for Mars Exploration in the Science Mission Directorate of NASA Headquarters. Instrumental in the development and application of robotics and rover technology, and director of NASA participation in robotics competition for education/outreach.

Session 14.01  PANEL: Competition Robotics for Education and Workforce Development

The use of robotics as a focusing technology topic for K-12 and college-level education, and how extracurricular robotics competition programs can be used to focus and integrate in-class activities.

Dave Lavery  202-358-4684  202-329-0144  dave.lavery@nasa.gov
Program Executive for Solar System Exploration, NASA Headquarters

Session 14.02  PANEL: Technology Needs for the Next Generation of NASA Science Missions

The panel will discuss the technology needs for the next generation of NASA science missions. Topics will include technology developments and mission implementation options being pursued by NASA technology programs.

David Anderson  216-433-8709  216-337-1601  david.j.anderson@nasa.gov
Project Manager, NASA Glenn Research Center
Session 14.03 PANEL: Emerging Technologies for Mars Exploration
This panel will discuss the unique technology needs for future Mars exploration, including those for robotics explorers as well as ground-breaking technologies for future human missions. Panelists will highlight a variety of emerging technologies that can enable these future pathways for Mars exploration.

Charles Edwards 818-354-4408 818-687-8623 chad.edwards@jpl.nasa.gov
Chief Telecommunications Engineer, Mars Exploration Program, Jet Propulsion Laboratory

Session 14.04 PANEL: Technology Management in Science-Driven Organizations: Leveraging
This panel will discuss technology development in environments where leveraging across and outside organizational boundaries is desired or required. Tactical and strategic leveraging approaches will be discussed along with the associated challenges and rewards.

Tibor Kremic 216-433-5003 tibor.kremic@nasa.gov
Science Manager, NASA

Session 14.05 PANEL: Mission Options and Technologies for Human Exploration
NASA is pursing “Human-Robotics” technologies that can assist humans in missions with: robots as crew precursors, robots that work during crewed mission phases, or robots that work following a crewed mission. In each of these three cases, the robots must work effectively with humans on earth, typically with people supervising the robots across time delay. This panel will examine these technologies, and discuss them in the context of recently-announced human exploration missions.

Robert Ambrose 281-244-5561 robert.o.ambrose@nasa.gov
Branch Chief, NASA - Johnson Space Center

Session 14.06 PANEL: Access To Space and Emerging Mission Capabilities
Getting the word out - both what government programs are doing, and how one goes about designing to such mission options. This Panel focuses on aspects of commercially hosted payloads, from both the DoD and NASA perspective.

Eleni Sims 505-846-8147 505-440-1132 sam.sims@aero.org
Project Engineer, Aerospace Corporation

Kenneth Reese 505-853-3095 505-966-6676 kenneth.reese@kirtland.af.mil
Mission Manager, Space Development and Test Directorate, Kirtland AFB

Session 14.07 PANEL: Public Policy Implications in Aerospace
Acknowledging that technology development and application do not exist within a vacuum of politics, finances, or regulatory impedance is the first step in formulating meaningful, long-term, sustainable strategies within the aerospace industry. This panel brings together high-level leaders from the aerospace and aeronautics industry to discuss their experience and roles in developing long-term strategies and promoting technological cooperation between academia, industry, and government. Specifically, understanding how government and public awareness impact new technologies or missions will have rewarding effects as engineers and analysts move forward in their respective fields. The goal of this discussion is to allow engineers, scientists, and those hoping to operate in a policy function to understand how new technologies are initiated, matured, proposed, integrated, and evaluated by public interests as those technologies are followed through the integration life-cycle.

Harrison Wolf 310-342-1352 harrison.wolf@gmail.com
Officer of Special Programs, University of Southern California
WHO MAY PARTICIPATE
Any student, kindergarten through high school, who is registered at the conference as an official guest of a primary registrant, is eligible to present a paper as a Junior Engineering & Science Speaker.

NUMBER OF PARTICIPANTS
To provide sufficient time for each presentation, the number of participants may be limited. If so, preference will be given to the earliest submissions.

TOPICS
Topics with direct or tangential relationship to science, engineering, or mathematics are encouraged.

STUDENT’S RESEARCH
The presentation should describe one of the following:
1. An original idea accompanied by supportive reasoning and data
2. An experiment, invention or field work
3. A review summarizing a topic of interest.

HOW TO SUBMIT YOUR PRESENTATION
1. Write a short abstract describing your topic.
2. Have your parent or guardian who is registered for the conference register you as a junior engineer, complete a release form, and submit your abstract to Session 15.01 (Junior Conference) on the conference website, www.aeroconf.org (select Session 15.01 Junior Engineering Conference). The abstract cut-off date is Sunday, January 12, 2014. You will receive an email confirmation of acceptance.
3. Prepare a 5–10 slide PowerPoint presentation of your work. The title slide should include your name, age, grade, special interests, and (if you choose) a photo of yourself. You may have help from an adult, but the presentation should be primarily your own work.
4. Once your abstract is confirmed, submit your PowerPoint presentation to the conference website as soon as possible. The presentation deadline is Sunday, February 2, 2014. No late presentations will be included in the conference.
5. Prior to the conference all Junior Engineering & Science presentations will be loaded onto a single laptop. You will have an opportunity to practice before giving your presentation.
6. After the last presentation, all participants will receive a CD-ROM Proceedings of the Junior Engineering & Science Conference.

2014 Junior Engineering & Science Conference Contacts

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