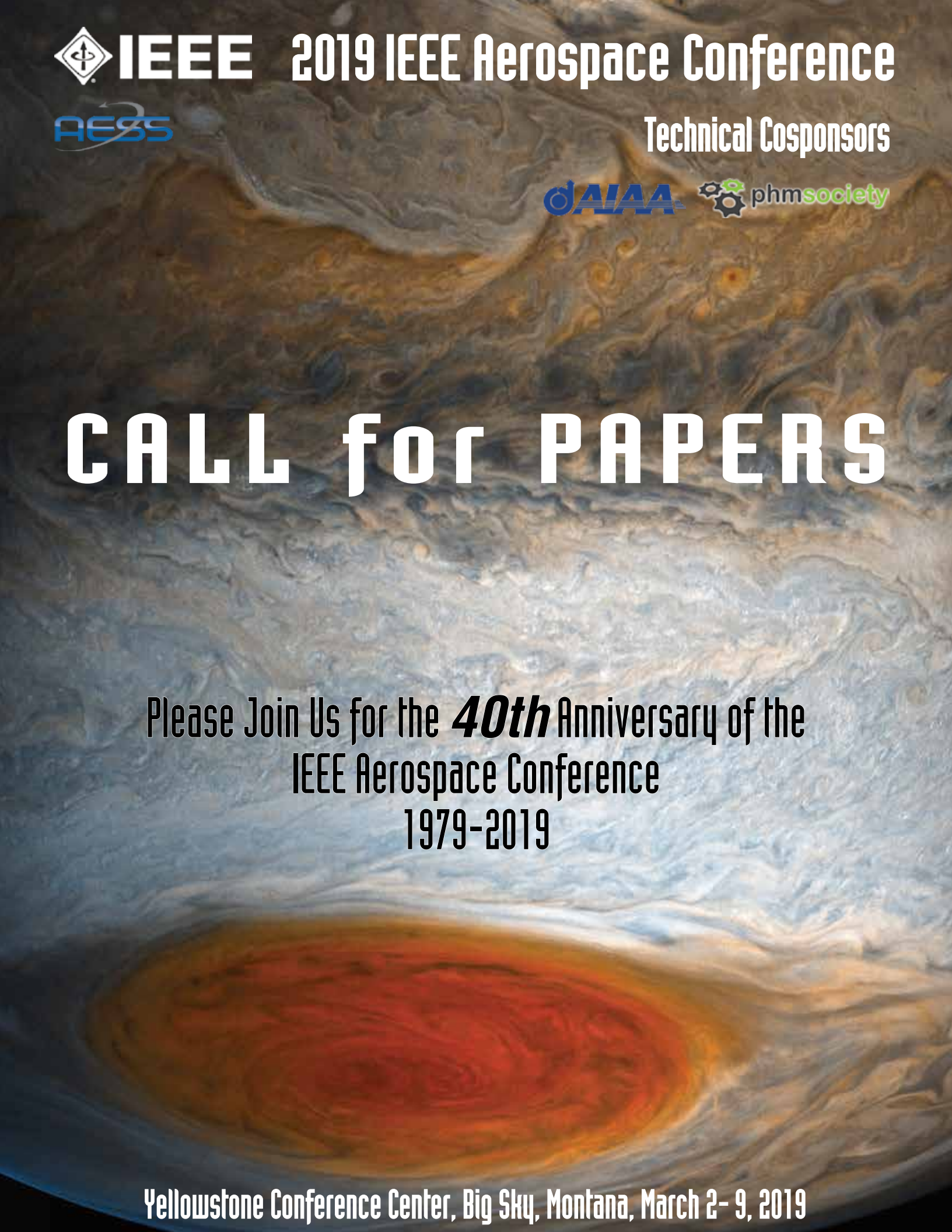
IEEE 2019 IEEE Aerospace Conference
AESS
Technical Cosponsors
AIAA
phmsociety
CALL for PAPERS
Please Join Us for the 40th Anniversary of the
IEEE Aerospace Conference
1979-2019
Yellowstone Conference Center, Big Sky, Montana, March 2- 9, 2019

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 2019 conference is the 40th in the conference series.

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 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.

Science and Aerospace Frontiers. The plenary sessions feature internationally prominent researchers working on frontiers of science and engineering that may significantly impact the world. 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 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. An electronic copy of the 4,000+ page Conference Proceedings is included in the registration package.

International Participation. Representatives of 30 countries participated in the 2018 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.

What Attendees Say: Simply the Best!

- No conference packs so much into one week.
- Never have I encountered such a concentrated and collaborative environment at a conference.
- The technical stature of this conference makes it one of the best places to present your ideas and receive competent comments.
- Allows me to interact with people in ways that are simply not possible otherwise. The benefit to my work has been tremendous.
- For my company, the networking and high profile of the conference are second to none!
- Beautiful facility, amazing staff, conference well organized. Junior conference amazingly well done.
- Highly acclaimed IEEE Conference Proceedings with peer review.
- A fantastic conference that fosters collaboration at the same time it encourages participants to strengthen their personal and family relations. Amazing achievement!
- I've made invaluable connections every year.
- I really enjoyed the collaborative and supportive atmosphere. The exchange of ideas that resulted was something that I have not seen in any other conference that I have attended.
- It is the most technical aerospace conference and incredibly useful for networking. The plenary talks were wonderful, and the diversity of subjects was fantastic.

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 2019 Conference are listed in the **Tracks, Sessions and Organizers** section, pages 7–30.

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.

Front Cover – *This striking Jovian vista was created by citizen scientists Gerald Eichstädt and Seán Doran using data from the JunoCam imager on NASA's Juno spacecraft. The tumultuous Great Red Spot is fading from Juno's view while the dynamic bands of the southern region of Jupiter come into focus. North is to the left of the image, and south is on the right. The image was taken on July 10, 2017 at 7:12 p.m. PDT (10:12 p.m. EDT), as the Juno spacecraft performed its seventh close flyby of Jupiter. At the time the image was taken, the spacecraft was 10,274 miles (16,535 kilometers) from the tops of the clouds of the planet at a latitude of -36.9 degrees.* ***Image Credit: NASA/JPL-Caltech/SwRI/MSSS/Gerald Eichstadt/Sean Doran.***

Abstract Submission

A 500-word abstract is due by **July 1, 2018** at the conference website 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 to personally present your paper. (See IEEE Policies on Presentation and Reuse below.)**

Paper Submission

Properly formatted papers of 6-20 pages must be submitted for review no later than **Friday, October 19, 2018**, a **firm** deadline! Each paper must be in final publishable format and submitted via the conference website as a PDF file. Use our format template to type your paper and see useful links: http://www.aeroconf.org/paper-submission. **Revised** papers responsive to reviewer comments must be submitted to the website by **Monday, January 7, 2019**. This is a **firm** deadline!

Questions regarding the review process may be directed to:

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

IEEE Copyright forms (see link on your "My Submissions" page) must be signed and submitted by **Monday, January 7, 2019.**

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 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 over 4 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 and other intellectual property rights can be found at:
https://www.ieee.org/publications/rights/section-822f.html

A list of IEEE journals can be found at:
ieee.org/publications_standards/publications/periodicals/journals_magazines.html

Registration

The conference registration fee includes:

- Access to all technical sessions
- Electronic copy of Conference Proceedings
- Electronic copy of 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

REGISTRATION FEES (US$) Including Activities & Meals Package	Received by Nov 30, 2018	Received after Nov 30, 2018	Received after Jan 24, 2019
IEEE & AIAA Members	840	1,010	1,230
Non-Members	1,075	1,320	1,520
Guests* and Jr. Engineers (Activities & Meals only)	250	275	300

*Spouse/partner/child of primary registrant

For Travel and Lodging, see page 4.

For More Information

Visit Our Web Site: aeroconf.org for updates, paper submittal instructions, and the latest information on the 2019 Conference.

CONFERENCE-RELATED QUESTIONS

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Paper Review Chair
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GENERAL HELP
IEEE Aerospace Conference Info@aeroconf.org

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 at Big Sky (US$)*

Huntley Lodge

Room Type	# People	Net Rate	Total Taxes & Fees	Total
Deluxe (2 Queens)	1	$240.00	$34.77	$274.77
Deluxe	2	$275.00	$34.77	$309.77
First Class (2 Queens)	1	$230.00	$32.87	$262.87
First Class	2	$265.00	$32.87	$297.87
Loft (3 Queens)	1	$282.00	$42.75	$324.75
Loft	2	$317.00	$42.75	$359.75

Village Center

Room Type	# People	Net Rate	Total Taxes & Fees	Total
Studio (Queen/Sleeper)	1	$245.00	$35.72	$280.72
Studio (Queen/Sleeper)	2	$280.00	$35.72	$315.72

Summit Lodge

Room Type	# People	Net Rate	Total Taxes & Fees	Total
Studio (Queen)	1	$245.00	$35.15	$280.15
Studio	2	$280.00	$35.15	$315.15
Two Queen	1	$284.00	$42.56	$326.56
Two Queen	2	$319.00	$42.56	$361.56
1 King	1	$304.00	$46.36	$350.36
1 King	2	$339.00	$46.36	$385.36

Shoshone Condominium Hotel

Room Type	# People	Net Rate	Total Taxes & Fees	Total
1 BR (1King or Queen/Murphy/Sleeper)	1	$386.00	$62.51	$448.51
1 BR (1King or Queen/Murphy/Sleeper)	2	$421.00	$62.51	$483.51

Stillwater Condominiums

Room Type	# People	Net Rate	Total Taxes & Fees	Total
Studio (Sleeper or Murphy)	1	$199.00	$31.16	$230.16
Studio (Sleeper or Murphy)	2	$234.00	$31.16	$265.16
1 BR (1 Queen/Sleeper)	1	$251.00	$41.04	$292.04
1 BR (1 Queen/Sleeper)	2	$286.00	$41.04	$327.04
1 BR Loft (Queen/Varied Loft/Sleeper)	1	$324.00	$54.91	$378.91
1 BR Loft (Queen/Varied Loft/Sleeper)	2	$359.00	$54.91	$413.91

Whitewater Inn

Room Type	# People	Net Rate	Total Taxes & Fees	Total
2 Queens	1	$139.00	$19.76	$158.76
2 Queens	2	$174.00	$19.76	$193.76

The taxes and fees listed in the table above (4th column) represent: 7% state accommodation tax, 3% resort tax and 7% resort service fee.
Full breakfast included at: Huntley Lodge, Summit Hotel, Village Center, Shoshone Condominiums and Whitewater Inn only.
* Does NOT include $9 baggage handling gratuity.

More on Registration, Travel and Lodging at
www.aeroconf.org
After October 1, 2018

Huntley Lodge- Host Hotel

Located in the heart of Big Sky' s Mountain Village, this historic hotel was part of Chet Huntley's original vision for Big Sky Resort. Steps from the Explorer Lift and has concierge, dining, shopping, ski storage, meeting rooms, and Solace Spa. The Huntley Lodge features convenient access to pools and is dog friendly.

Village Center

Enjoy the innovative suites and condominiums in the slopeside Village Center. Located along the main pedestrian walkway in Big Sky's Mountain Village, guests have the convenience of shopping and dining just out their door. Village Center features fine finishes, designer decor, Boyne Beds and exclusive slopeside pool and hot tub.

Summit Lodge

The elegant Euro-Western Summit is one of the finest slopeside properties in the Rockies with primary lifts only 100 yards away. The Summit combines luxury appointments with Boyne Beds and a prime location in the heart of the Mountain Village Center.

Shoshone Condominiums

The Shoshone Condominium Hotel combines the service of a hotel with the comfort of a condominium. Dining and shopping are right out the doors in the heart of Big Sky's Mountain Village. Rooms feature full kitchens, living areas, balconies, scenic views and Boyne Beds.

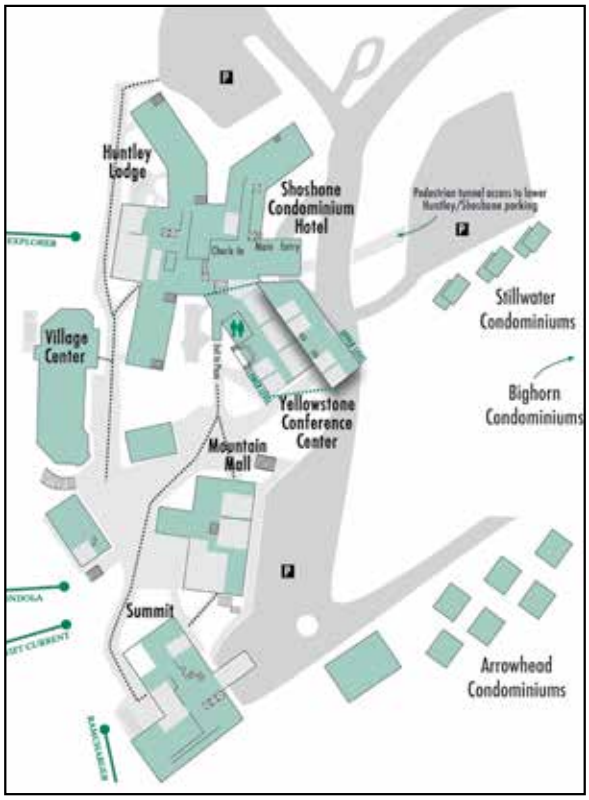
Stillwater Condominiums

Stillwater Condominiums are affordable, convenient, and only a short walk to the Mountain Mall, Plaza Area and shops and restaurants. Stillwater Condominiums include free WiFi.

Whitewater Inn

This hotel is conveniently located on Highway 191 near the turn-off to Big Sky, MT. It's family and dog friendly, on the banks of the Gallatin River, near local restaurants, and within 15 minutes of Big Sky Resort' s Mountain Village.

Map of the Yellowstone Conference Center and Lodging



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SCHEDULE OVERVIEW

6 Days of Presentations, Over 175 Hours of Technical Sessions, and 20 Hours of Conference-Sponsored Technical Networking Events

Registration and Icebreaker Wine & Cheese Reception
Saturday March 2, 6:30–9:00 PM

Sunday March 3	Monday March 4	Tuesday March 5	Wednesday March 6	Thursday March 7	Friday March 8
Continued Registration 8:45–11:30 AM	Technical Sessions 8:30 AM–Noon	Technical Sessions 8:30 AM–Noon	Technical Sessions 8:30 AM–Noon	Technical Sessions 8:30 AM–Noon	Technical Sessions 8:30 AM–Noon
Continued Registration 3:30–6:45 PM	Lunch Break Noon–1:00 PM	Catered Lunch Noon–1:30 PM	Lunch Break Noon–1:00 PM	Lunch Break Noon–1:00 PM	Lunch Break Noon–1:00 PM
	Panels 1:00–4:00 PM	Jr Engineering & Science Conference 2:00–4:30 PM	Panels 1:00–4:00 PM	Panels 1:00–4:00 PM	Ad Hoc Individual Track Planning Meetings
Java Jam 4:00–4:30 PM	Java Jam 4:00–4:30 PM	Ad Hoc Session Workshops (see announcement board for time and location)	Java Jam 4:00–4:30 PM	Java Jam 4:00–4:30 PM	Track/Session Organizers Planning Session for 2019 Conference 4:00–5:30 PM
Technical Sessions 4:30–5:45 PM	Technical Sessions 4:30–5:45 PM		Technical Sessions 4:30–5:45 PM	Technical Sessions 4:30–5:45 PM	
Plenary Session 5:50–6:35 PM	Plenary Session 5:50–6:35 PM		Plenary Session 5:50–6:35 PM	Plenary Session 5:50–6:35 PM	
Hosted Reception 6:35–7:05 PM	Hosted Reception 6:35–7:05 PM	Free Evening in Big Sky Village	Hosted Reception 6:35–7:05 PM	Hosted Reception 6:35–7:05 PM	Farewell Networking Catered Reception & Dinner 6:30–11:00 PM (Buffet open 6:30 –8:30 PM)
Catered Dinner 7:05–8:05 PM	Catered Dinner 7:05–8:05 PM		Catered Dinner 7:05–8:05 PM	Catered Dinner 7:05–8:05 PM	
Plenary Session 8:05–8.50 PM	Plenary Session 8:05–8.50 PM		Plenary Session 8:05–8.50 PM	Plenary Session 8:05–8.50 PM	
Technical Sessions 9:00–10:15 PM	Technical Sessions 9:00–10:15 PM		Technical Sessions 9:00–10:15 PM	Technical Sessions 9.00–10:15 PM	
Après Session Fireside Cheer and Chat 10:15–11:00 PM	Après Session Fireside Cheer and Chat 10:15–11:00 PM		Après Session Fireside Cheer and Chat 10:15–11:00 PM	Après Session Fireside Cheer and Chat 10:15–11:00 PM	

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)

David Woerner **818-393-2000** **david.f.woerner@jpl.nasa.gov**

Currently a manager for the Radioisotope Power System Program at NASA and the Nuclear Space Power Office at JPL. Previously manager of Launch Services and Multi-Mission Radioisotope Thermoelectric Generator for the Mars Science Laboratory mission. Was Chief Engineer of avionics, Mars Pathfinder mission. Worked on many deep space missions including Galileo, Cassini, and Magellan. Recipient of NASA's Exceptional Service and Exceptional Achievement Medals. Currently, Chair of the Board of Directors, of the IEEE Aerospace Conferences (IAC). IAC Conference Chair 1997, 2002-04, & 2006-13.

Track 2 Space Missions, Systems and Architectures

Marina Ruggieri **+39-320-439-1843** **ruggieri@uniroma2.it**

Full Professor of Telecommunications Engineering at the University of Roma "Tor Vergata" and therein member of the Board of Directors. IEEE 2018 Chair, TAB Strategic Planning Committee. IEEE 2017 Vice President, Technical Activities, IEEE Fellow. Author/co-author of 335 papers, 1 patent and 12 books.

Peter Kahn **818-354-3314** **peter.b.kahn@jpl.nasa.gov**

Manager of the Project Systems Engineering and Formulation Section at the Jet Propulsion Laboratory. Over 30 years systems engineering experience in space flight projects.

Steven Scott **301-286-2529** **steven.s.scott@nasa.gov**

NASA Goddard Space Flight Center Chief Engineer. Over 25 years experience in Systems Engineering, including management of Flight Systems, Software Systems, Flight and Ground Software, Fault Management, Avionics, Spacecraft Engineering, Flight Instruments, Operations, Integration and Testing, Mission Assurance. AIAA Associate Fellow and IEEE Senior Member.

Session 2.01 Deep Space, Earth and Discovery Missions

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

James Graf **818-354-4765 818-625-7804** **james.e.graf@jpl.nasa.gov**

Deputy Director, Earth Science and Technology Directorate, Jet Propulsion Laboratory

Nick Chrissotimos **301-286-8212 301-775-4353** **nicholas.g.chrissotimos@nasa.gov**

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 **818-354-5113 714-488-3164** **robert.gershman@jpl.nasa.gov**

Principal Engineer, Jet Propulsion Laboratory

Patricia Beauchamp **818-354-0529 818-645-2479** **patricia.m.beauchamp@jpl.nasa.gov**

Chief Technologist, Jet Propulsion Laboratory

Session 2.03 System and Technologies for Landing on Planets, the Moon, Earth and Small Bodies

This session includes landing spacecraft, including precision and safe landing, atmospheric entry, descent, and landing/rendezvousing with small bodies.

Ian Clark **818-359-4965 818-359-4965** **ian.g.clark@jpl.nasa.gov**

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 development of new launch vehicles, 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

David Callen 571-594-3331 571-594-3331 dave.callen@tyvak.com
Launch Integration Manager, Tyvak Corporation

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
Chief Technologist, Jet Propulsion Laboratory

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

This session solicits papers that describe advanced Instrument concepts and/or innovative analytical protocols that characterize surface and subsurface chemistry and geology (elemental, isotopic, molecular, mineralogical composition), astrobiological potential, geophysical processes (tectonics, internal structure, heat flow, geochronology), atmospheric chemistry and dynamics, dust and particles, charged particles/plasmas, and magnetic fields.

Stephanie Getty 301-614-5442 stephanie.a.getty@nasa.gov
Deputy Director, NASA - Goddard Space Flight Center

Ricardo Arevalo 301-405-5352 rarevalo@umd.edu
Associate Professor, University of Maryland

Xiang Li 301-614-6016 xiang.li@nasa.gov
Assistant Research Scientist, University of Maryland, Baltimore County

Session 2.08 Q/V band connectivity and Alphasat experience

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.

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QV Band Telecommunications Program Manager, ASI, Italian Space Agency

Giorgia Parca +39-06-8567-620 giorgia.parca@asi.it
Telecommunications Engineer, Italian Space Agency

Session 2.09 Mission Design for Spacecraft Formations

Topics of this session include all aspects (like configuration analysis, orbital dynamics and control, operational issues) of the missions exploited by two or more spacecraft flying in formation, either about the Earth or other celestial bodies.

Giovanni Palmerini +39-06-4991-9760 +39-36-6675-0164 giovanni.palmerini@uniroma1.it
Professor, Guidance and Navigation, Sapienza Universita' di Roma

Session 2.10 Space Radiation and its Interaction with Shielding, Electronics and Humans

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, electronics, 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, shielding of electronics and humans, and benchmarking of measurements performed both in space and on ground for the verification and validation of the transport codes.

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Professor Dr, Technische Universität Wien

Maria De Soria Santacruz Pich 626-375-7831 626-375-7831 maria.de.soria-santacruz.pich@jpl.nasa.gov
Systems Engineer, Jet Propulsion Laboratory

Session 2.11 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-milliscale 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 interest.

Kaushik Iyer 240-228-8936 (240) 338-7607 iyerka1@jhuapl.edu

Materials Physicist, Johns Hopkins University/Applied Physics Laboratory

Douglas Mehoke 443-778-5104 240-475-8289 doug.mehoke@jhuapl.edu

SEM Group Supervisor of the Mechanical Systems Group, Johns Hopkins University Applied Physics Laboratory (JHU/APL)

Session 2.12 Asteroid Detection, Characterization, Sample-Return, and Deflection

This Session invites papers on flight and ground system concepts, mission concepts, and technologies that address the need to detect, characterize and deflect asteroids that could pose an impact hazard to Earth. Papers on instrument technologies and technologies for proximity operations near, and landing on, asteroids are also sought.

Jeffery Webster 818-653-8360 818-653-8360 jeff.webster@aeroconf.org

Project Support Lead, Jet Propulsion Laboratory

Paul Chodas 818-354-7795 paul.chodas@jpl.nasa.gov

Senior scientist, Jet Propulsion Laboratory

Session 2.13 Orbital Robotics: On-Orbit Servicing and Active Debris Removal

On-going and future missions involving orbital robotic systems. Orbital robotic systems operations, to include On-Orbit Servicing, Active Debris Removal, Assembly, and Astronaut Assistance. All designs and methods to accomplish robotic tasks in orbit, as for example mobility, manipulation, assembly or maintenance, are of interest. Specific aspects may be addressed, such as hardware design, open-loop or closed-loop control, rendezvous trajectory generation, computer vision, autonomy, tele-operation, experimental facilities on ground, or others of relevance. Mission concept papers are to include technical development toward ground testing or flight operation.

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Guidance and Control Systems Engineer, Jet Propulsion Laboratory

Track 3 Antennas, RF/Microwave Systems, and Propagation

Farzin Manshadi 818-354-0068 farzin.manshadi@jpl.nasa.gov

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 Engineer in JPL's Radar Science and Engineering Section. Over 10 years experience in microwave instrument design for remote sensing applications. Currently the RF System Lead for the NI-SAR radar mission (NASA-ISRO) 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.

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Senior Research Engineer, Georgia Tech Research Institute

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Professor, University of Magdeburg

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 subsytems.

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Farzin Manshadi 818-354-0068 818-486-4312 farzin.manshadi@jpl.nasa.gov
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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.

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Professor, Eindhoven University of Technology

Melissa Soriano 818-393-7632 626-298-5305 webguru@aeroconf.org
Senior Engineer, Jet Propulsion Laboratory

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

Papers in all fields that advance the state-of-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.

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Sr Electronics Engr, Space Vehicles Directorate

Track 4 Communication & Navigation Systems & Technologies

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Dr. Dafesh is a principle engineer at the Aerospace Corporation where he leads the development and application of GPS, wireless, and software-defined-radio technology. He has 52 publications, and has been awarded 12 patents. Dr. Dafesh received M.S. and Ph.D. degrees in electrical engineering from UCLA.

Shirley Tseng 714-832-5373
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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, including ground infrastructure and support and interactions between terrestrial and space networks. Innovative concepts and game changing approaches with a system view are especially sought.

Shervin Shambayati 650-852-7322 818-434-0461 shervin.shambayati@sslmda.com
Senior Systems Engineering Specialist, SSL

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, enable new exploration/applications, provide more secure systems, and 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.

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Session 4.03 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.

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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 4.04 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.

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Mgr, Program Formulation Office, Mars Exploration Directorate , Jet Propulsion Laboratory

David Israel 301-286-5294 301-789-3339 dave.israel@nasa.gov

Exploration and Space Communications Projects Division Architect , NASA - Goddard Space Flight Center

Session 4.05 Space Communication Systems Roundtable : Networking the Solar System

The roundtable will provide a forward-looking view of the development of a Solar System Internetwork - a layered architecture aimed at offering ubiquitous, high-bandwidth communication throughout the solar system in support of robotic and, ultimately, human exploration in deep space. Panelists will assess trends in physical layer capabilities, including migration to higher RF frequencies (Ka-band) and/or to optical wavelengths, as well as higher layers in the protocol stack, including networking protocols such as DTN, suited for use in long light-time applications. Based on assessment of forecasted commercial satcom trends, and building on the multi-hop relay capabilities operating today at Earth and at Mars, the roundtable will describe the evolution towards a true Solar System Internetwork in the coming decades.

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Mgr, Program Formulation Office, Mars Exploration Directorate , Jet Propulsion Laboratory

Session 4.06 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, advance receivers, deployable antennas, relay satellites, Ka and Optical communications, novel signal formats, new coding methods, and CubeSat communications and tracking techniques.

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Technical Group Supervisor, Jet Propulsion Laboratory

Alessandra Babuscia 626-437-7286 617-800-5219 alessandra.babuscia@jpl.nasa.gov

Telecommunication Engineer, Jet Propulsion Laboratory

Session 4.07 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; Inertial navigation.

Amir Emadzadeh 310-845-6016 amire@ucla.edu

Senior software engineer, Nvidia

Session 4.08 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, traffic 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.

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Senior Engineering Specialist, Aerospace Corporation

Session 4.09 Wideband Communications Systems

This session solicits innovative contributions about wideband communication systems in terrestrial, satellite, and hybrid Space-terrestrial communications systems transmitting information at high data rates. Papers dealing with modelling and simulations of communications systems, evaluating performance, or describing hardware/software implementation of communication system components are welcome. Detailed topics include, but are not limited to: Broadband satellite and aerospace transmission; Broadband terrestrial wireless transmission; Millimeter wave communications; Spread-spectrum and CDMA communications; TV and HDTV broadcasting over satellite; Modulation and channel coding techniques; MIMO techniques; Antenna design; Multi-carrier communications; Multi-user transmission; Channel equalization; Carrier and timing synchronization; Radio resource management and scheduling; Emerging technologies for safety-critical and emergency communications; Emerging standards for terrestrial and satellite communications (LTE, LTE-A, WiMax, DVB-S2, IEEE 802.11x); Energy-efficient terrestrial and satellite communications; and networking.

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Assistant professor, University of Trento

Session 4.10 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 wireless communications.

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Rajendra Kumar **562-985-1556 714-670-7453** **rajendra.kumar@csulb.edu**

Professor, California State University

Session 4.11 Global Navigation Satellite Systems

This session focuses on recent advances in satellite navigation. Current and future envisioned applications of GPS, GLONASS, Galileo, and Compass global navigation satellite systems (GNSSs) are addressed, as well as global, regional and local augmentation systems. The topics covered include next generation GNSSs, receiver technologies, interoperability, orbit computation, multi-sensor fusion, and navigation model, methods and algorithms.

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Lin Yi **818-393-6420** **lin.yi.dr@ieee.org**

Technologist, Jet Propulsion Lab

Session 4.12 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.

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Session 4.13 CNS Systems and Airborne Networks for Manned and Unmanned Aircraft

This session focuses on communications, navigation and surveillance systems, including on-board 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.

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Session 4.14 Aviation Cyber Security and Cyber-Physical Systems

Wireless communications, data networks, information systems, and cyber security are significant emerging topics in aerospace, including aviation. Systems that integrate with the cyberspace and enable safe, efficient and/or profitable operation and performance, with minimal or no human intervention, are of growing interest to the community. This session focuses on related timely topics including, but not limited to, security, privacy, and safety issues/developments in the following areas: aerospace software, data and multimedia distribution; next-generation air traffic control systems; IVHM; aeronautical networks; commercial wireless networks; information flows; UAVs and commercial space vehicles; airport and airline information systems; cloud computing; RFID systems; large-scale enterprise systems; aircraft certification; incident response strategies; and risk assessment and management.

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Branch Chief, NASA Glenn Research Center

Session 4.15 Civil and National Security Space Panel: Joint NASA/DoD Technology Initiatives

This panel will focus on the intersection of technology between NASA and the DoD. We are seeing an increased emphasis on sharing technology between governmental agencies, including communications, navigation, launch services, hosted payloads, small sats, etc. Come join us to hear the latest technology areas where this collaboration is currently being demonstrated.

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Track 5 Observation Systems and Technologies

Gene Serabyn 818-393-5243 gene.serabyn@jpl.nasa.gov

Senior Research Scientist at JPL developing high-contrast coronagraphic and interferometric techniques for direct exoplanet imaging, as well as digital holographic microscopy for life detection.

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Program Director, Magdalena Ridge Observatory (MRO), New Mexico Institute of Mining and Technology (NMT) at Socorro, New Mexico. Current projects include the Magdalena Ridge Observatory Interferometer (MROI), being developed with the University of Cambridge, UK, Cavendish Laboratory. B.Arch. from the Welsh School of Architecture in Cardiff; Ph.D. in Architectural Science from the University of London.

Session 5.01 Space Based Optical Systems and Instruments

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

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Systems Engineer, Jet Propulsion Laboratory

Session 5.02 Ground Based Telescopes, Instruments and Technologies

This session covers the design, build, assembly, integration, test, and operation of ground based optical telescopes and telescope arrays. Papers discussing new and proposed telescopes, optical instruments and systems and techniques such as adaptive optics are welcome, together with results and future plans.

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Optical Engineer, Jet Propulsion Laboratory

Session 5.03 Exoplanet Instruments, Missions and Observations

Future missions such as TESS, JWST and WFIRST, as well as potential missions such as Exo-C, HabEx and LUVOIR promise to revolutionize exoplanet science, and astrophysics in general. All such missions involve new technological approaches that provide access to new regions of observational parameter space. This session focuses on the new technologies, and the missions and observations thereby enabled.

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Senior Astrophysicist, NASA Goddard Space Flight Center

Session 5.04 Atmospheric Turbulence: Propagation, 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.

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Senior Research Scientist, Jet Propulsion Laboratory

Jack Mc Crae 937-255-3636 x4739 jack.mccrae@afit.edu

Research Assistant Professor, Air Force Institute of Technology

Session 5.05 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.

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EO, IR and Laser Technical Expert, USAF

Session 5.06 Optical Detection and Analysis for Space Situational Awareness (SSA)

This session focuses on systems, data products, and processes related to the optical detection, characterization, and tracking of near-Earth man-made space objects. Possible topical areas include: small automated optical systems for the tracking of man-made objects and space debris, methods for characterizing and analyzing unresolved objects, multi-site and multi-operator cooperative data fusion and analysis, and operational image processing capabilities that contribute to SSA. The aim of this session is to provide a forum for discussion and collaboration between satellite owners/operators and providers of SSA data.

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Physicist/System Engineer, Boeing Company

Session 5.07 Photonics and Lasers

Papers on active (including LEDs, lasers, and photodetectors) and passive (such as optical waveguides, filters, and fiber) optical components, integration of photonic components with Si electronics and optoelectronic subsystems that have applications in aerospace are solicited.

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Aleksandr Sergeyev 906-487-2258 906-231-7050 avsergue@mtu.edu

Associate Professor, Michigan Technological University

Session 5.08 Microscopy for Life Detection

Microscopic imaging can be used to search for evidence of both extant and past life in a variety of environments, such as Mars and the Ocean Worlds. This session addresses the various microscopy techniques that can potentially play a role in life detection, as well as instrument delivery, sample preparation approaches, and associated data processing. These techniques can include terrestrial and biomedical methods that can be extended to life detection on planetary missions.

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Systems Engineer, Jet Propulsion Laboratory

Track 6 Remote Sensing

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Deputy Director for Engineering and Science at JPL. Previously the Mars Science Laboratory - Deputy Flight System Manager. Development experience with space projects at both NASA Goddard and JPL, including FUSE, WFC3, GLAST, LISA, and MSL along with numerous architecture studies.

Darin Dunham 804-519-5480
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Systems Engineer Principal with Lockheed Martin. Served almost 10 years in the Marine Corps ending career at the Marine Corps Systems Command. He received his MSEE from the Naval Postgraduate School and his BSEE from Carnegie Mellon. He currently works on the Missile Defense National Team at Lockheed Martin in Huntsville, Alabama.

Session 6.01 Systems Engineering Challenges and Approaches for Remote Sensing Systems

The need to make a particular measurement from a particular vantage point drives us to build sophisticated remote sensing instruments and launch them on similarly sophisticated spacecraft, aircraft, submersibles, balloons, etc. This session explores the highly coupled nature of the instrument, platform architecture, flight path design, ground system and mission operations, and the systems engineering challenges and solutions employed. Topics include instrument influences on platform architectures and flight path design, platform-to-instrument integration, trade studies, trends and novel solutions.

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Spacecraft System Engineer, Johns Hopkins University/Applied Physics Laboratory

Session 6.02 Instrument and Sensor Architecture, Design, Test, and Accommodation

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

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Engineer, JPL

Keith Rosette 818-354-0660 626-898-1742 keith.a.rosette@jpl.nasa.gov
Product Delivery Manager, Jet Propulsion Laboratory

Session 6.03 Imaging Spectrometer Systems, Science, and Science Applications

This session covers the design, assembly, integration, calibration, and operation of imaging spectrometer instruments as well as the processing and interpretation of data acquired with them. Proposed instruments, science and applications, and lessons learned from all phases are included.

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Electrical Engineer, Jet Propulsion Laboratory

Session 6.04 Radar Signal Processing

This session focuses on radar signal processing. Topics include Doppler, Direction of Arrival (DoA), Synthetic Aperture Radar (SAR), Space-time Adaptive Processing (STAP), multi-static radar, compressive sensing, target, clutter, and interference models, and any other radar processing technique of interest. We are inclusive of the theoretical aspects of radars, as well as the engineering problems of practical importance.

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Radar Engineer, Waymo

Thomas Backes 4044835236 404-483-5236 tdbackes@gmail.com
Engineer, Thomas D. Backes

Session 6.05 Information Fusion

This session focuses on exploitation of all sources of information, including physical sensor data, context information, and human inputs. Methodologies for effective multi-sensor multi-target tracking of highly disparate sources are of interest, as are algorithms and advances in downstream analysis of track data for situational awareness.

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Principal Scientist, Systems & Technology Research

Craig Agate 805-869-1076 805-908-2094 cagate@toyon.com
Senior Staff Analyst, Toyon Research Corporation

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 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 or multisensor resource management are also sought.

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Laura Bateman 240-228-6849 301-503-0121 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).

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Systems Engineer, Raytheon Company

Session 6.08 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) 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.

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Christopher Elliott 817-935-3054 christopher.m.elliott@lmco.com

LM Fellow, Lockheed Martin Aeronautics Company and University of Texas at Arlington

Session 6.09 Fusion Integration of Sensor Harvesting

Methods for situation awareness/assessment, threat/impact analysis, sensor/processing refinement, user/man-machine interfaces, and mission awareness/responsiveness. Techniques for system design leveraging information fusion for Command, Control, Communications, Computers, and Cyber Intelligence, Surveillance and Reconnaissance (C5ISR) over multi-domain sensor data and intelligence collections. Applications focusing on space, air, and architecture developments for efficient and effective distributed net-centric operations, edge computing, and complex networks. Approaches for software/hardware dynamic data-driven applications systems (DDDAS) improvements, context-enhanced results, and avionics protocols for big data scenarios. Use of information fusion to optimize and coordinate machine analytics with users for human-machine teaming.

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Engineer, Air Force Research Laboratory

Track 7 Avionics and Electronics for Space Applications

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48+ years experience in onboard processing for space and airborne applications. More than 50 publications in the area of onboard processing systems and architectures. Senior Member IEEE, Associate Fellow AIAA.

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JPL EEE Parts Program Office Manager. 30 years experience in Radiation Effects and Collisional Atomic Physics R & D. At AF Research Labs directed and executed 60M/yr Space Electronics Program. PhD, atomic physics, University of Heidelberg.

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Experience in spacecraft & payload systems engineering and avionics design & test on Kepler, WISE, JUNO, IBEX, RBSP, MMS, SPP, Solar Orbiter, CYGNSS, and multiple DOD projects. BSEE, Johns Hopkins University; MSEE, Georgia Institute of Technology.

Session 7.01 High Performance Computing, Data Processing, and Interconnects for Space Applications

Explore innovations and new developments in hardware, network and software aspects of spacecraft on-board and embedded computing architectures and software. Example hardware topics: processors, peripherals; data handling and companion processing ASICs and FPGAs; network connections architectures; on-orbit reconfiguration; high speed interconnects; and new or applied standards for embedded space electronics applications. Example software topics: machine learning techniques; embedded cluster computing; on-board big data analytics; power aware optimal reconfiguration algorithms; Reconfigurable Software Implemented Hardware Fault Tolerance algorithms and designs; evolutionary platforms; and autonomous computing designs. Papers should address: processing and network performance; size, weight and power comparisons of different components and architectures; standardized form factors, protocols and interfaces utilized; radiation hardness by design, process, or technology; mitigation of other spacecraft environmental factors; software support; and integration and test of elements, as applicable. Descriptions and performance of actual development, test, flight, or mission usage are highly sought.

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Staff Scientist, Honeywell

Joseph Marshall 571-364-7799 571-762-3815 joe.marshall@baesystems.com
Engineering Fellow, BAE Systems

Session 7.02 Peripheral Electronics and Data Handling for Space Applications

This session explores novel concepts for hardware and software technologies that support but are peripheral to the main computing core. Example topics include: novel instrument or payload hardware and software technologies; mixed signal and systems-on-a-chip technologies; onboard signal, data, and command processing; telecommand reception, decoding, and distribution; payload data pre-processing; 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; emerging and novel designs and tests for high performance embedded computing platforms; temporal and spatial reuse of systems' resources; sensor, detector, and imager readout circuits; high resolution/ high speed ADCs and DACs; novel SOC designs 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.

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Session 7.03 Memory and Data Storage for Space Applications

This session explores 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.

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Session 7.04 Avionics for Small Satellites, Nano-Satellites, and CubeSats

This session presents a survey of newly designed and heritage electrical and avionics subsystems for application in smaller spacecraft, including CubeSats. Example 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.

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Session 7.05 Power Electronics for Space Applications

This session explores advanced power electronics designs and systems for space applications. Example topics include: power devices; wide bandgap power semiconductors; power electronics; electro-magnetic devices; photo-voltaic modules; energy storage and battery management systems and power systems. Papers discuss technical aspects of power electronics including extreme thermal and power requirements, radiation hardening, efficiency and power management, tolerance to space environments, and reliability.

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Session 7.06 Electronics for Extreme Environments

This session explores innovations in electronics technologies and packaging that help enable operation of electronics in extreme environments, including space. Technologies resilient to extremes in temperature, radiation, and launch vehicle environments are relevant. Example topics include: materials and techniques for assembling and testing microelectronics; component packaging, attachment, and connectors; thermal/mechanical/electrical/radiation performance comparisons; reliability and failure analyses; adaptation of manufacturing methods for space applications; and integration of diverse modules such as MEMS, power electronics, sensors, optics, RF and microprocessors.

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Manger, Componnent Engineering and Assurance, Jet Propulsion Laboratory

Sung Kyu Lim 4048940373 limsk@ece.gatech.edu

Dan Fielder Professor, Georgia Institute of Technology

Session 7.07 Fault Tolerance, Autonomy, and Evolvability in Spacecraft and Instrument Avionics

This session explores adaptation, including Fault Tolerance, Autonomy, and Evolvability, in space electronics. Adaptation 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 and instrument avionics with the scope of papers encompassing theoretical considerations, design solutions, and actual techniques applied to space flight operations.

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Principal, Member Technical Staff, Jet Propulsion Laboratory

Session 7.08 Guidance, Navigation, and Control Technologies for Space Applications

This session explores sensor, actuator, and processing innovations related to the guidance, navigation, and control of space vehicles. This session welcomes manuscripts that discuss technologies applicable to satellites, probes, landers, launchers, and other space-related missions.

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Professor, Guidance and Navigation, Sapienza Universita' di Roma

Session 7.09 Emerging Technologies for Space Applications

This session explores a wide range of advanced, novel, and cutting edge avionics and electronic device technologies for space. Example topics include: advanced MEMS devices; 3D circuit printing; innovative embedded electronics applications (including multi-functional components); as well as the leveraging of advanced commercial electronics for space application. This session also serves as a catch-all for unique advanced technology topics that do not fit cleanly into other sessions or are multi-disciplinary in nature.

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Executive Director, Space Systems Directorate, Southwest Research Institute

Session 7.10 COTS Utilization for Reliable Space Applications

This session explores the use of commercial, off-the-shelf electronics and technologies in a space environment. Using commercial electronics not intended for an application in a space environment is becoming increasingly common. Topics of interest include: adaptations of COTS electronics for fault tolerance and environmental resilience; flight proven COTS electronics; novel implementations of electrical functions using COTS components; and results of COTS component use. Papers address theoretical considerations, design solutions, and actual techniques applied to space flight operations.

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Track 8 Spacecraft & Launch Vehicle Systems & Technologies

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Principal Engineer, JPL Systems Engineering and Formulation Division. Previously at JPL: Assistant Program Manager, Exploration Systems Engineering Office; Planetary Advanced Missions Manager; Galileo Science and Mission Design Office. At MDAC: Saturn & Skylab propulsion systems design, Launch Team member for three Apollo missions.

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Lead system engineering and programmatic assessments of advanced space systems. Previously at NASA, led design and analysis studies of human exploration in missions to the Moon, Near-Earth Objects, and Mars. BS., Aerospace Engineering, University of Texas at Austin.

Session 8.01 Human Exploration Beyond Low Earth Orbit

This session seeks papers addressing the broader aspects of human exploration including planning, development, system concepts, and execution of missions beyond low Earth orbit. Sample topics include systems architecture studies of human missions to the Moon, Asteroids, and Mars, design reference mission analyses, strategic concepts, and broader trade study and systems engineering analyses for any aspect of human space exploration systems beyond low-Earth orbit. New approaches and unique applications of systems concepts are sought.

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John Guidi 202-358-1644 202-701-9302 john.guidi@nasa.gov

Deputy Director, Advanced Exploration Systems, HEOMD, NASA

Session 8.02 Human Exploration Systems Technology Development

This session seeks papers dealing with technology development for human 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.

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Technology Development Lead, Human Spaceflight Architectures, Exploration Mission Planning Office, NASA - Johnson Space Center

Session 8.03 Advanced Launch Vehicle Systems and Technologies

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.

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NASA Systems Engineering Technical Fellow, NASA

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Program Manager, United Launch Alliance

Session 8.04 Human Factors & Performance

This session seeks papers on human performance, integration, and operations within complex spacecraft systems. Suggested human factors topics may include cockpit and flight deck displays and controls, handling qualities and flight performance, human-robotic interaction and performance, team performance and dynamics, training, countermeasures technologies/systems, and behavioral health and performance during short- and long-duration spaceflight. Papers including operations to experimental and modeling approaches, both in the laboratory and in spaceflight analog locations are of interest.

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Group Lead, Human Systems Integration, The Charles Stark Draper Laboratory, Inc.

Jessica Marquez 650-604-6364 jessica.j.marquez@nasa.gov

Human System Engineer, NASA Ames Research Center

Session 8.05 Space Human Physiology and Countermeasures

This session focuses on the physiological aspects of humans in space and current or future countermeasures to maximize human health and performance in the space environment. Suggested topics include (but are not limited to) bone loss, muscle atrophy, psychological effects, sensory-motor deconditioning, extravehicular activity, cardiovascular adaptation, Spaceflight Associated Neuro-ocular Syndrome (SANS), decompression sickness, radiation, exercise, or artificial gravity. Physiological and psychological aspects of missions at Space Analogue sites are also of interest. Both experimental and modeling approaches are welcome.

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Lead, EVA Physiology Laboratory, NASA Johnson Space Center

Session 8.06 Mechanical Systems, Design and Technologies

This session seeks papers on spacecraft configurations, 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.

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Engineer, Jet Propulsion Laboratory

Session 8.07 Spacecraft Propulsion and Power Systems

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 in-space robotic satellite applications and is not intended for human spaceflight topics or launch vehicles.

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Session 8.08 Nuclear Space Power Generation

The Nuclear Space Power Generation session invites papers on all things nuclear and related to space power: concepts for dynamic power systems and static generators at all scales, conversion technologies, fuel processing, reactors for manned and unmanned space missions, lessons learned, plans for future devices, models and simulations, test results, government policies, nuclear launch safety, infrastructure, and technologies on any scale that address the future success of space missions.

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NASA RPS Program Planning and Assessment Manager, NASA - Glenn Research Center

Session 8.09 Autonomy for Aerospace Applications

This session covers theoretical developments and applications of autonomous systems technologies across a wide range of aerospace systems. Topics include, but are not limited to, autonomous guidance, navigation, and control solutions for spacecraft proximity operations and docking, spacecraft system health management, autonomous planetary landing and mobility, incorporation of autonomy into vehicle avionics and planning systems, autonomous data management, and vehicle systems manager technologies. System level concepts and results from demonstrations and field tests are encouraged, in addition to more theoretical contributions.

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Robonaut Project Manager, NASA - Johnson Space Center

Session 8.10 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.

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Small Satellite Portfolio Mission Manager, Air Force Research Laboratory

Session 8.11 Planetary Exploration Using Small Spacecraft

This session will explore technologies and mission concepts for planetary science and exploration throughout the solar system, addressing innovative science and exploration concepts and solutions to technical challenges associated with small spacecraft, such as: power generation in low insolation environments, thermal management in extreme environments, long-distance communications, radiation tolerance, and ways to improve spacecraft longevity given long transit times.

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Program Officer, NASA - Headquarters

Andrew Petro 202-358-0310 andrew.j.petro@nasa.gov

Program Executive, NASA - Headquarters

Session 8.12 Systems and Technologies for Ascent from Planetary Bodies, a Multidisciplinary Problem

This session covers both the individual technologies, the system level interactions and trades, and the issues that influence the design of ascent systems leaving the surface of planetary bodies, such as the Moon, Mars, Phobos or other bodies within our solar system. It addresses issues like the impacts of thermal constraints, propulsion design and performance, GN&C, aerodynamic impacts, and packaging constraints on ascent vehicle design.

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Track 9 Air Vehicle Systems and Technologies

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Systems Engineer, Jet Propulsion Laboratory, and Owner/Principal of C2 International. Served 7 years as an Officer in the U.S. Air Force, specializing in UAVs and air-launched weapons systems. Prior work includes NOAA's Lead Systems Engineer on the COSMIC-2 joint US-Taiwan satellite program, design of UAV prototypes at the National Geospatial Intelligence Agency, and Information Assurance for the Navy's Distributed Common Ground System. B.S. in Aerospace Engineering, Boston University; M.S., Astronautical Engineering and Computer Engineering, Air Force Institute of Technology.

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 full-system system level.

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Christopher Gavin 301-342-1381 christopher.gavin@navy.mil

Commanding Officer, AIRTEVRON TWO ONE

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.

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Senior Lecturer, Queensland University of Technology

Session 9.03 Aircraft Systems & Avionics

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

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Program Manager, PMA-226, Naval Air Systems Command

John Ennis 301-342-1381 240-434-6215 john.ennis@navy.mil

Chief Test Pilot, USMC

Session 9.04 Air Vehicle Flight Controls

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

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Propulsion & Mechanical Systems Rotary Wing Branch Head, NAVAIR

Christopher Elliott 817-935-3054 christopher.m.elliott@lmco.com

LM Fellow, Lockheed Martin Aeronautics Company and University of Texas at Arlington

Track 10 Software and Computing

Sanda Mandutianu 626-318-1566 sanda.mandutianu@jpl.nasa.gov

Senior technical staff at Jet Propulsion Laboratory. Has been task lead and PI on systems and software architectures, autonomy and control, information architecture, artificial intelligence, agent-based and semantic technologies. Currently working on JPL and NASA missions and systems engineering model-based tasks.

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Principal professional staff, Space Exploration Sector's Space Mission Assurance group at Johns Hopkins University Applied Physics Laboratory. Currently, software assurance engineer for Solar Probe Plus, Europa Clipper and AIDA/DART space missions. Adjunct professor, C.S. Department, University of Maryland University College, 2001.

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.

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Virgil Adumitroaie 818-393-7038 626-318-3467 virgila@jpl.nasa.gov

Data Scientist, Jet Propulsion Laboratory

Session 10.02 Innovative Software Engineering and Management Techniques and Practices

Practices followed during development and management of aerospace software systems vary across the industry. This divide seems to be growing as emerging markets, such as commercial space and cubesats, adopt techniques from other software domains while the traditional aerospace market works to tailor existing processes. Suggested topics include experiences and research in software engineering and management techniques with both flight/embedded and ground system development, code reuse, project management, COTS integration and programming languages. Other software engineering topics will also be considered in this session.

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Director - R&D, Southwest Research Institute

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.

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Session 10.04 Software Quality, Reliability and Safety Engineering

The focus of this session is to share systematic practices followed in aerospace to ensure an adequate confidence level that a software system conforms to its requirements and will perform in a safe and reliable manner. Software quality, reliability and safety engineering covers methodologies and techniques used for assessment of the development cycle, verification, validation and test programs, standards, models, certifications, tools, data analysis and risk management.

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Staff Analyst, Southwest Research Institute

Session 10.05 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 system-of-systems, are welcome. Other driving current themes include: the coordination and usage of multiple types of models, e.g., descriptive versus behavioral models; the use of MBSE simulations and analyses in the support of architectural decision making; the application of information visualization techniques for improved MBSE deliverables; the use of MBSE in specialized domains such as electrical systems engineering. Overall, 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.

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Systems Architect, Jet Propulsion Laboratory

Session 10.06 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 welcome.

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On-Board Data Handling Group Lead, Surrey Space Centre

Jeremy Straub 701-231-8562 jeremy.straub@ndus.edu

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Session 10.07 Human-Systems Interaction

Humans are the most critical element in system safety, reliability and performance. Their creativity, adaptability and problem-solving capabilities are key to resilient operations across the different aerospace applications. This session focuses on the technologies and techniques leading to effective interfaces and interaction between humans and spacecraft, robots, and other aerospace systems. Specific topics of interests include HCI-HMI, multimodal sensory integration such as vision, haptics and audio, situational awareness, tele-operation interfaces, visualization, virtual and mixed reality environments, augmented reality and natural user interfaces as applied to design, production, operations, and analysis, as well as training and for decision support. Application of novel solutions from other domains and how they can be applied to aerospace domain, specifically contributing to an efficient human systems interaction are also of interest.

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Head of Department, German Aerospace Center

Session 10.08 Cloud Computing, Big Data Analytics, and Enterprise Software Related Systems

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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Distinguished Engineer, Cisco Systems Inc

Session 10.09 Data Compression

The focus of this session is both theoretical and experimental work on Data Compression in aerospace applications with limited bandwidth and storage. The disciplines include, but not limited to lossy, lossless compression of different data type (sensors, images, 3D images, hyperspectral images, videos, etc.), entropy coding, coding and limitations, computational complexity, adaptive compression algorithms, video coding (e.g., MPEG, H.265), hardware limitations, and etc.

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Electricall Engineer, Boeing

Track 11 Diagnostics, Prognostics and Health Management (PHM)

Andrew Hess **301-605-7625**
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Consultant to government and industry on advanced diagnostics, prognostics, predictive analytics, health and asset management of machines and engineering systems. Previously program office lead for the JSF PHM effort. Current President of the PHM Society.

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Associate Professor and Edward & Maria Keonjian Endowed Chair, University of Arizona. Visiting Associate in Physics, California Institute of Technology. Visiting Research Associate Professor of Ophthalmology and Neurological Surgery, University of Southern California. Ph.D., Theoretical Physics, University of Tübingen, Germany.

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

Advanced Diagnostics and PHM can be and is applied separately or concurrently at the device, component, subsystem, structure, system 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.

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President, The Hess PHM Group, Inc.

Session 11.02 PHM for Autonomous and Control Systems Applications

This session focuses on diagnostics and prognostics for autonomous system applications and control systems. This would include autonomous system architectures, electronic controls, control systems, and electronic systems for both the item under control and the controlling system. Methods for autonomous decision making, fault detection, rate of progression, and consequence or mission risk are encouraged. The session also is looking for novel technical approaches to use diagnostic and prognostic information to provide control input adjustments that can slow or reverse fault progression.

Derek De Vries **435-863-6693 435-720-2458** **derek.devries@orbitalatk.com**

Senior Fellow, Orbital ATK, Inc.

Session 11.03 PHM System Design Attributes and Architectures

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. The development of effective architectures and implementation strategies are extremely important. This session will focus on the application of methods such as testability, diagnosability, embedding sensors, prognostics, remaining useful life estimates used to design complex aerospace systems, and architectures to design, enable, and implement 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.

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Session 11.04 Sensor Technologies for PHM Applications

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. Description of novel and disruptive sensor technologies is solicited.

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Session 11.05 PHM for Electronics

This session invites contributions in the areas of advanced diagnostics and PHM for electronics, electronic systems, and their components. This would include, but is not limited to: real time, onboard, in-flight and during mission, as well as off-board, off-line, repair center and depot applications with a specific focus on remediation of No Fault Found (NFF) test results in electronic systems.

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Session 11.06 PHM for Non-Aerospace Applications

This session seeks contributions in non-aerospace but related applications, e.g., automotive industry, trains, marine, oil & gas, etc. Both programmatic and technology presentations are solicited, particularly those focused on capabilities, cost benefits, and lessons learned.

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Joseph Thorp 832-457-6861 832-457-6861 joseph.thorp@aramcoservices.com

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Session 11.07 PHM for Human Health and Performance

This session is an effort to bridge PHM to Space Medicine as part of Integrated System Health Management (ISHM) and healthcare domains as applied to High Value Human Asset health support. PHM for HH&P is focused on tracking status of very healthy individuals 24/7, as well as ensuring a sustained top-level performance required on manned space exploration missions, safe aircraft operation, etc. Papers are sought that show how PHM techniques and methodologies, such as predictive analytics, predictive diagnostics, root cause analysis, virtual sensors, data and information fusion, data mining, and big data analytics with computationally generated biomarkers can serve as a scientific and engineering foundation for building both evidence-based and analytics-based individual health maintenance/support for human assets. Objectives include developing and demonstrating PHM capabilities for assessing, tracking, predicting, and ultimately improving long-term individual human health status to ensure mission success.

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Session 11.08 PHM for Commercial Space Applications

This session seeks papers on diagnostics, prognostics, health management (PHM) and autonomous fault management for satellites and other commercial space applications. Papers are sought in the areas of satellites, launch vehicles, and other new space ventures (e.g., tourism, natural resource exploitation). Papers may address research, actual flight experience, and future planning related to satellite and launch vehicle PHM and fault management.

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Associate Professor, University of Arizona

Andrew Hess 301-605-7625 240-355-8915 andrew_hess@comcast.net

President, The Hess PHM Group, Inc.

Session 11.09 PHM For Precision Agriculture And Natural Resource Prospecting

This session invites contributions in all technical areas associated with precision agriculture and natural resource prospecting, such as, but not limited to: remote sensing, multi-modal multi-sensors, data inference, deep learning, machine learning, prediction. Examples are crop health monitoring and prediction, as well as methods to enhance the probabilities for successful drilling enterprises.

Joseph Thorp 832-457-6861 832-457-6861 joseph.thorp@aramcoservices.com

Engineering Consultant, Aramco

Stan Martin 984-888-6922 984-888-6922 stanmartin@scienceapps.org

Data Scientist, Bayer

Thomas George tg4786125@gmail.com

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Session 11.10 Panel: PHM from a Practitioner's Perspective – a Potpourri of Capabilities, Experiences, Issues, and Lessons Learned

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 and CBM+ domains. 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, academia, government, and industry, will focus on strategies that have or will resolve historical issues, and challenges, and provide insight. Interested parties should contact the session organizers.

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President, The Hess PHM Group, Inc.

Michael Houck 301-995-2945 301-643-9951 michael.houck@navy.mil

Division Director, Mechanical Sys, Controls and Diagnostics, NAVAIR 4.4.2, Propulsion & Power

Track 12 Ground and Space Operations

Carlos Gomez Rosa 301-614-5228
carlos.gomez@nasa.gov

Mission Readiness Manager for the Landsat 9 Mission. Formerly Mission Operations Manager for the GOES-O mission and Mission Director for MAVEN. 29 years at NASA's Goddard Space Flight Center. BS in EE, University of Puerto Rico; MS in Engineering, Johns Hopkins University.

David La Vallee 240-228-4546
david.lavallee@jhuapl.edu

Senior Professional Staff, Space Department's Science Information Systems group, JHU/APL. Over twenty years experience with NASA ground systems, including operational systems and R&D. Currently Science Operations Center Lead of NASA's Mini-RF instrument, Juno's JEDI instrument and Cassini's MIMI instrument.

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, inflight anomaly resolution, process improvement, automation and lessons learned for future missions are highlighted.

Mona Witkowski 818-354-4203 818-983-4727 mona.m.witkowski@jpl.nasa.gov

Flight Director / Operations Mission Manager, Jet Propulsion Laboratory

Allan Cheuvront 303-915-0812 303-915-0812 allan.cheuvront@gd-ms.com

Consultant, General Dynamics C4 Systems

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 210-522-6040 210-382-0732 jfurman@swri.org

Principal Analyst, Southwest Research Institute

Carlos Gomez Rosa 301-614-5228 240-595-2168 carlos.gomez@nasa.gov

Mission Director, NASA - Goddard Space Flight Center

Session 12.03 Operations Management

Papers are sought to highlight innovative approaches and lessons learned towards reducing operations cost and risk. Topics such as managing single or multi-mission operations, team development and staffing, logistics and infrastructure may cover any phase of the system life cycle from concept design to mission termination, including previous, existing, and emerging programs.

Carlos Gomez Rosa 301-614-5228 240-595-2168 carlos.gomez@nasa.gov

Mission Director, NASA - Goddard Space Flight Center

Amalia Morusiewicz 240-204-0815 amalia.p.morusiewicz@nasa.gov

Mission Director, NASA - Goddard Space Flight Center

Session 12.04 Human Space Flight Development, Operations and Processing

This session focuses on all aspects of Human Spaceflight processing and operations across all mission regimes, including the design and development of manned spacecraft hardware and support systems, as well as operations research focused on pre-flight, in-flight and post-flight activities. Research dedicated to flight operations including IVA and EVA, landing and recovery of crewed spacecraft, and the physiological and psychological effects on human beings is also encouraged.

Michael Lee 321-861-2568 321-431-4766 michael.r.lee@nasa.gov

Mission Manager, NASA - Kennedy Space Center

Matthew Miller 912-674-6722 912-674-6722 matthew.j.miller-1@nasa.gov

Exploration Research Engineer, Jacobs/NASA JSC

Session 12.05 Payload and Instrument Operations and Planning

This session incorporates all aspects of payload, instrument, and sensor operations, including techniques, tools, procedures, and concepts for planning, scheduling, commanding, processing, analyzing, and optimizing command and telemetry data, as well as payload delivery and support systems engineering.

Radu Popescu 303-492-5689 303-589-5143 radup@outlook.com

Senior Systems Engineer, Radiant Solutions

David La Vallee 240-228-4546 david.lavallee@jhuapl.edu

Project Leader, Johns Hopkins University APL

Session 12.06 Information Technology and Cyber Security Roles in Operations

Efficient network design and implementation are necessary for the protection of space system assets and mission execution capabilities. This session welcomes approaches for IT design, including security engineering to prevent intrusions and situational awareness tools to monitor the system and detect attacks, mission resilience to cyber attack, unique cyber vulnerabilities/solutions for space systems, implementation of network security and information security techniques, advanced CONOPS, implications for NIST's Risk Management Framework for Space, analytics applied to space systems, and lessons learned..

Jon Handiboe 240-228-3302 jon.handiboe@jhuapl.edu

Group Supervisor, JHU/APL

Gabrielle Griffith 443-778-8207 443-250-5111 gabrielle.griffith@jhuapl.edu

Senior Systems Engineer, Johns Hopkins University APL

Session 12.07 Panel: Herioc Moments in Mission Operations: The Role of People, Systems, and Processes (Part 2)

This continuing panel features a moderator and three presenters, each of whom will share a brief story of an heroic mission operations event they were involved with. Following panel discussions, the moderator will request questions and stories from the audience. Who knows who might attend and be willing to share? That is why we will do the panel again!!

Carlos Gomez Rosa 301-614-5228 240-595-2168 carlos.gomez@nasa.gov

Mission Director, NASA - Goddard Space Flight Center

Track 13 Management, Systems Engineering and Cost

Jeffery Webster
818-653-8360 jeff.webster@aeroconf.org

Project Support Specialist, Project Support Office at JPL; Senior Systems Engineer, Mission Systems Concepts Section; Mars Trace Gas Orbiter, Project Planner & Systems Engineering; Associate Engineer, Mission & Systems Concepts Section.

Torrey Radcliffe
310-336-0013 torrey.o.radcliffe@aero.org

Associate Director, Space Architecture Department, The Aerospace Corporation. Background in preliminary spacecraft design, space architecture development and portfolio analysis of manned and unmanned systems. S.B, S.M. and PhD in Aeronautics and Astronautics from MIT.

Session 13.01 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 system engineering processes (e.g., Architecture Descriptions, Model Based Systems Engineering, Architecture Decision Support), 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.

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CEO, Murphian Consulting LLC

Inki Min 310-336-2452 inki.min@aero.org

Principal Engineering Specialist, Aerospace Corporation

Daniel Selva 617-682-6521 617-6826521 ds925@cornell.edu

Assistant Professor, Cornell University

Session 13.02 Management and Risk 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 analyzing risks; managing all life cycle phases of programs/projects; using project-level management disciplines including project management, systems engineering, scheduling, safety and mission assurance, and configuration management; and improving training and capability retention (passing expertise between generations of systems engineers); and managing aerospace technology development programs. Applications include commercial, military and civil space systems, and commercial and military aircraft systems. This session also covers the topic of risk management in aerospace endeavors, including new insights from the successful application of risk management, and lessons learned when risk management did not prevent realization of consequences.

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Senior Professional Staff, Johns Hopkins University/Applied Physics Laboratory

Robin Dillon Merrill 202-687-5398 rld9@georgetown.edu

Professor, Georgetown University

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 Operationally Driven Design, Development, and Testing of Space Systems

This Session addresses lean, operationally driven design, development, and testing methods for space systems. Examples include human space vehicles, EVA methods, EVA tools, NASA's Evolvable Mars Campaign, and NEEMO.

Steven Chappell 303-903-6528 303-903-6528 steven.p.chappell@nasa.gov

Research Specialist, KBRwyle

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 , The Aerospace Corporation

Eric Mahr 310-336-5329 310-951-8659 eric.m.mahr@aero.org

Senior Engineering Specialist, Aerospace Corporation

Session 13.06 System Simulation and Verification

This session addresses the design, implementation, and use of system-level simulations to measure or verify the performance and utility of space, ground, and related systems.

Virgil Adumitroaie 818-393-7038 626-318-3467 virgila@jpl.nasa.gov

Data Scientist, Jet Propulsion Laboratory

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

Director, Modeling and Simulation Department, Aerospace Corporation

Session 13.07 Verification & Validation and Integration & Test

This session focuses on the Verification & Validation and Integration & Test processes and case studies for flight systems, subsystems, and systems of systems.

Benjamin Solish (818) 354-9116 (818) 4422546 bsolish@jpl.nasa.gov

Systems Engineer, Jet Propulsion Laboratory

Leslye Boyce 2404293824 leslye.a.boyce@nasa.gov

Code 470, NASA

Session 13.08 Probabilistic Risk Modelling for Space Missions, including Humans-in-the-Loop

This session addresses probabilistic risk modeling of aerospace mission success and safety, for both robotic and human space systems and missions.

Andrew Hsu 310-336-2547 310-426-0498 andrew.hsu@aero.org

Senior Engineering Specialist, The Aerospace Corporation

Session 13.09 Technology Transfer and Infusion

This session provides information on infusing aerospace technologies into government agencies as well as the broader marketplace. We discuss technology transfer into NASA and DoD, as well as federally funded technology transfer into commercial markets. This session includes review of the legal and operational issues in effective technology transfer, challenges to efficient commercialization, and private and public funding challenges to accelerated technology development.

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Deputy Director for Flight, Space Technology and Human Exploration, NASA - Langley Research Center

Daniel Lockney 202-341-5006 202-341-5006 daniel.p.lockney@nasa.gov
Technology Transfer Program Executive, NASA

Session 13.10 Promoting (and Provoking) Cultural Change

Culture is a byproduct of habits. This session explores how to create environments and add nutrients that help great things grow.

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

Sreeja Nag 617-710-1845 6177101845 sreeja.nag@nasa.gov
Research Engineer, NASA Goddard Space Flight Center / Ames Research Center (BAERI)

Track 14 Government Plans, Policies and Education

Dave Lavery 202-358-4684 dave.lavery@nasa.gov

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 Development for Science-Driven Missions

Planning for and developing technology is an ongoing process for Planetary Science Missions. The panel will discuss areas of topical interest to the community and solicit feedback and discussion.

Patricia Beauchamp 818-354-0529 818-645-2479 patricia.m.beauchamp@jpl.nasa.gov
Chief Technologist, Jet Propulsion Laboratory

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 groundbreaking 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
Mgr, Program Formulation Office, Mars Exploration Directorate , Jet Propulsion Laboratory

Session 14.04 PANEL: 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 development of new launch vehicles, 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

Session 14.05 PANEL: Model-based Engineering – Paradigm Shift or Business as Usual?

The panel will discuss directions and implications of model-based engineering initiatives across large government organizations: policies, processes, technologies, and application domains.

Sanda Mandutianu 626-318-1566 626-318-1566 sanda.mandutianu@jpl.nasa.gov

Sr. Systems Software Engineer, Jet Propulsion Laboratory

Sebastian Herzig 404-247-0290 404-247-0290 sebastian.j.herzig@jpl.nasa.gov

Systems Software Engineer, Jet Propulsion Laboratory

Session 14.06 PANEL: Progress and Plans for the Deep Space Human Exploration Architecture

NASA has been charged with leading a sustainable program of exploration with commercial and international partners to enable human expansion beyond low-Earth orbit (LEO). Realizing this vision requires advancement of key capabilities and an implementation approach that pulls from the best NASA and the global industry can offer. NASA's human exploration activities are driving the development of high-priority technologies and capabilities using a combination of unique in-house activities and public-private partnerships to develop and test prototype systems that will form the basis for future human spaceflight missions. This panel will discuss the current plans and status of the NASA exploration programs implementing the deep space architecture including progress toward the first flights of SLS and Orion, development of the Gateway, and plans for cislunar and lunar surface capabilities.

Jason Crusan 703-338-5448 703-338-5448 jason.crusan@nasa.gov

Director, Advanced Exploration Systems Division, NASA - Headquarters

Session 14.07 PANEL: NASA Innovative Advanced Concepts Program

The NASA Innovative Advanced Concepts program is NASA's most advanced technology program. NIAC funds studies of futuristic, almost sci-fi like concepts that, if successful, could one day transform future missions. This panel will provide an introduction to the NIAC program and highlight the visionary efforts of several NIAC Fellows.

Jason Derleth 202-358-0987 jason.e.derleth@nasa.gov

NIAC Program Executive, NASA - Headquarters

Session 14.08 PANEL: Astronaut - Robot Cooperation

Robotics is a technology that aims to extend man's manipulation skills to hazardous and distant places. Extra-vehicular activities in orbit or on a planet belong to these places. This panel will discuss cooperation of astronauts and robots during EVAs, in orbit, or possibly also on the Moon or on Mars, addressing issues such as technology, operations and safety. Key questions to be addressed include: What are typical astronaut tasks during EVAs? What functionality do orbital and planetary robots nowadays offer and where are they heading? What are the fundamental limitations in having robots support or even substitute for astronauts? What could astronauts do better with support from robots? Panelists: Steve Chappell (KBR Wyle); Roberto Lampariello (DLR Germany); Matthew Miller (Jacobs Technology, , Inc./NASA JSC); John Ratti (MDA Corporation, Canada). Agenda: i. Introduce all speakers;ii. Each speaker gives a five minutes presentation; iii. Open discussion.

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Research scientist, German Aerospace Center - DLR

Session 14.09 PANEL : The Ocean Worlds and the Search For Life In The Solar System

A roadmap for the next several decades of astrobiological exploration of the ocean worlds could lead us stepwise from the current stage of exploration, discovery, and scouting of the habitability conditions of ocean worlds (e.g. NASA Europa Clipper and Lander), to the future steps of the discovery and confirmation of life, and eventually to the characterization and understanding of alien biology in the target ocean worlds of the solar system. Mission concepts that could form this roadmap include plume and surface in-situ investigations and sample return, shallow subsurface probing, and eventually deep subsurface and ocean exploration. Due to the challenging and resource-intensive nature of such a roadmap, international cooperation will be key. The programmatic and technological challenges for this roadmap will be discussed during the panel.

Konstantinos Konstantinidis +49-89-6004-3592 k.konstantinidis@unibw.de

Research assistant, Bundeswehr University Munich

Session 14.10 PANEL : Mars Exploration Science in the Next Decade

An update on the NASA Mars Exploration Program, from the scientists' point of view. Where are we going with, and what are we expecting from, projects like Insight, Mars 2020 Rover, and the future of sample return? What will they find as they investigate RSLs, methane seeps, and possible future human landing sites?

Michael Meyer 202-358-0307 202-257-4264 michael.a.meyer@nasa.gov

Lead Scientist, Mars Exploration Program, NASA HQ

BACK COVER – *Falcon Heavy Side Boosters Landing at the Same Time: the Falcon Heavy rocket has successfully launched on its maiden flight (test flight) from Launch Complex 39A (LC-39A), Kennedy Space Center, Florida, starting with 3:45 p.m. EST (20:45 UTC), 6 February 2018. The Falcon Heavy side core boosters are "flight-proven", used by SpaceX on the Thaicom 8 mission in May 2016 and during the CRS-9 mission in July 2016. After liftoff, the two side boosters separated from the center core and landed at LZ-1 and LZ-2 landing sites. Photo Credit and Copyright: SpaceX and "Go to Space" YouTube channel, https://youtu.be/pO_j9Amy8u4*

Junior Engineering & Science Conference

Yellowstone Conference Center
Big Sky, Montana March 5, 2019

Junior Conference Submission Deadlines

Junior Abstract Deadline : January 8, 2019

Junior Presentation Deadline : February 12, 2019

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 will be limited to 30. 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 Tuesday, January 8, 2019**. 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 Tuesday, February 12, 2019**. 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 an electronic copy of the Junior Engineering & Science Conference Proceedings.

2019 Junior Engineering & Science Conference Contacts

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2019 IEEE Aerospace Conference

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