



# 43rd International Conference on Environmental Systems (ICES)

14–18 July 2013  
Vail Marriott  
Vail, Colorado

## Organized by

American Institute of  
Aeronautics and Astronautics

## Supported by

AIAA Life Sciences and Systems  
Technical Committee

AIAA Space Environmental  
Systems Program Committee

American Institute of Chemical  
Engineers (AIChE) Environmental  
Systems Committee

American Society of Mechanical  
Engineers (ASME) Crew  
Systems Technical Committee

ICES International Committee  
(INT)

**First Announcement/Call for Papers**

**Abstract Deadline: 1 November 2012**

**[www.aiaa.org/ices2013](http://www.aiaa.org/ices2013)**



Credit: ISS Expedition 30/NASA



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# SYNOPSIS

## Organizing Committee

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Texas Tech University

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NASA Johnson Space Center

The 43rd International Conference on Environmental Systems (ICES) will cover all topics related to humans living and working in hostile environments with applications inside or outside of terrestrial or outer space habitats or vehicles, including aerospace human factors, environmental control and life-support system technology, environmental monitoring and controls, planetary protection, EVA system technology, life sciences, planetary habitats and systems, and thermal control systems technology for both manned and unmanned vehicles. The conference is open to participants from any nation, from academic, government, or industry organizations. There will be four days of technical presentations, with approximately 50 sessions. The conference is organized by the American Institute of Aeronautics and Astronautics (AIAA), and supported by the American Institute of Chemical Engineers (AIChE), the American Society of Mechanical Engineers (ASME), and the ICES International Committee (INT)

## TRAVEL AND ACCOMMODATIONS

### Meeting Site

Visitors and residents alike enjoy 1,100 acres of open space within the town of Vail. Located at the base of Vail mountain and surrounded by 350,000 acres of White River National Forest, the town is home to just over 4,500 residents, counting among them part-time resident former astronaut John Glenn. With pleasantly warm summers and cold winters, Vail features diverse shops and restaurants, friendly neighborhoods, and breathtaking views – and it's easy to navigate on foot. See for yourself why Vail is a great destination to visit or attend a meeting! More information is at [www.visitvailvalley.com](http://www.visitvailvalley.com).

### Hotel Information

AIAA has made arrangements for a block of rooms at the Vail Marriott, 715 West Lionshead Circle, Vail, Colorado 81657. Room rates are \$179 plus applicable taxes, for single or double occupancy. A limited number of room nights are available at the prevailing U.S. government per diem rate at the time of the conference for those who qualify. To make a reservation, use the web link on the conference website or call 1.877.622.3140 and refer to the AIAA 43rd International Conference on Environmental Systems (ICES). Rooms at the AIAA rate will be held until **21 June 2013** while availability lasts. After 21 June 2013, any unused rooms will be released to the general public. You are encouraged to book your hotel room early. As an added bonus, you won't need a rental car once you get here. Vail is pedestrian-friendly and offers many activities within walking distance.

### Help Keep Our Expenses Down (and yours too!)

AIAA group rates for hotel accommodations are negotiated as part of an overall contract that also includes meeting rooms and other conference needs. Our total event costs are based in part on meeting or exceeding our guaranteed minimum of group-rate hotel rooms booked by conference participants. If we fall short, our other event costs go up. **Please help us keep the costs of presenting this conference as low as possible – reserve your room at the designated hotel listed in this Call for Papers and on our website, and be sure to mention that you're with the AIAA conference.** Meeting our guaranteed minimum helps us hold the line on costs, and that helps us keep registration fees as low as possible. **All of us at AIAA thank you for your help!**

### Airport Information

Vail Marriott is 127 miles from Denver International Airport (DEN), and just 35 miles from Eagle County Regional Airport (EGE).

### Shuttle Bus Information:

Colorado Mountain Express (CME) provides shared ride shuttles and private car services from both Denver International Airport (DIA) and Eagle/Vail Airport (EGE). CME provides door-to-door service for convenient and easy transportation from both DIA and EGE, and numerous daily departures. CME is pleased to offer FREE Wi-Fi in all of their vehicles.

### Car Rental

AIAA members can save up to 15% off your car rentals with Hertz. Wherever your travel takes you, close to home or around the world, your discount CDP#66135 is the key to special savings. Be sure to include it in all of your reservations. Visit Hertz at [www.hertz.com](http://www.hertz.com) for the lowest rates, special offers, and information about Hertz locations, vehicles, and services, or call Hertz at 1.800.654.2210.

# TECHNICAL TOPICS

## ICES101: AIAA SES

### Spacecraft and Instrument Thermal Design, Testing, and Technology

This session presents thermal design, testing, and on-orbit performance of near-earth and interplanetary unmanned/robotic spacecraft, instruments, and payloads, and the application of key new technologies.

**Jose Rodriguez, NASA Jet Propulsion Laboratory**  
jose.i.rodriguez@jpl.nasa.gov

*Joe Gasbarre, NASA Langley Research Center*

*Wes Ousley, Genesis Engineering Solutions LLC*

*Dave Wasson, Orbital Sciences Corporation*

## ICES102: AIAA SES

### Thermal Control for Planetary Surface Missions and Systems

This session focuses on passive and active thermal control for planetary surface missions and systems such as Mars rovers, comet rendezvous systems, surface mapping and science instruments and systems, and in-situ resource mapping and processing.

**Gaj Birur, NASA Jet Propulsion Laboratory**  
gbirur@jpl.nasa.gov

*Paul McElroy, Touchstone Research Laboratory*

## ICES103: AIAA SES/INT

### Thermal and Environmental Control of Exploration Vehicles and Surface Transport Systems

This session covers environmental control, thermal control (passive and active), and thermal protection topics for vehicles used to transport crew and cargo to/from the moon, Mars, and asteroids, with emphasis on landers and surface crew transport vehicle systems. Papers on related systems within the U.S. and international programs are welcome. Potential topics include encountered space environment, thermal and environmental control and life support requirements, design, analysis, verification, and testing.

**Joe Chambliss, NASA Johnson Space Center**  
joe.p.chambliss@nasa.gov

**Tom Leimkuehler, Paragon Space Development Corporation,** thomas.o.leimkuehler@nasa.gov

*Burkhard Behrens, Astrium Space Transportation*

*Gualtiero Brambati, Thales Alenia Space*

*Jose Roman, NASA Marshall Space Flight Center*

*Ryan Stephan, NASA Johnson Space Center*

## ICES104: AIAA SES/INT

### On-Orbit Operations and Logistics of Thermal and Environmental Control Subsystems

This session focuses on operations and logistics aspects of thermal and environmental control subsystems for on-orbit spacecraft.

**Zoltan Szigetvari, Astrium Space Transportation**  
zoltan.szigetvari@astrium.eads.net

*Andrea Ferrero, Thales Alenia Space*

## ICES105: AIAA SES/INT

### Thermal and Environmental Control and System Integration for Surface Habitats

This session focuses on passive and active thermal control and life support for surface habitats. Included is the system engineering that integrates those functions with rovers, EVA systems, and surface utilities. Other potential topics include the transition from exploration to habitation, base heat rejection, dust mitigation, extreme long duration environment characterization, and advanced technologies to address habitat functionality.

**Darius Nikanpour, Canadian Space Agency**  
darius.nikanpour@asc-csa.gc.ca

**Joe Chambliss, NASA Johnson Space Center**  
joe.p.chambliss@nasa.gov

## ICES106: AIAA SES/INT

### Space Station and Manned Orbiting Infrastructures Thermal Control

This session addresses thermal control on board the current Space Station and future long term, manned (or man-tended) orbiting habitats, platforms, laboratories, and small scale prototypes. Topics range from system and component issues with the space station thermal control systems to thermal aspects of payloads and experiments that utilize the station as a science platform or as a test bed for future exploration applications, including advanced thermal control solutions and/or techniques

**Andrea Ferrero, Thales Alenia Space**  
andrea.ferrero@thalesaleniaspace.com

*Gary Adamson, Hamilton Sundstrand*

*Zoltan Szigetvari, Astrium Space Transportation*

*Dale Winton, Honeywell International*

## ICES107: AIAA SES/INT

### Thermal and Environmental Control Engineering Analysis and Software

This session addresses thermal and environmental control engineering analysis, including associated analysis methods, algorithms, modeling, software tools, integration with other engineering disciplines, and data exchange.

**Olivier Pin, European Space Agency**  
olivier.pin@esa.int

*Brian Briggs, Orbital Sciences Corporation*

*Nick Teti, Hawk Institute for Space Sciences*

*Henry Brouquet, ITP Engines UK*

## Who Should Submit a Paper?

- **Engineers**
- **Program Managers**
- **Academics**
- **Consultants**
- **Students**

## Why Submit a Paper? Networking

Build your professional network when you interact with peers during your paper presentation.

## Worldwide Exposure

Your paper will be added to the AIAA Electronic Library, the largest aerospace library in the world. More than two million searches are performed every year, with 150 institutions as subscribers.

## Respect

AIAA conference papers are cited in journal articles more often than those from any other aerospace-related conference. When you publish with AIAA, you know that your name is connected with the most prestigious publications in aerospace.

**ICES108: AIAA SES/INT****Advances in Thermal Control Technology**

This session addresses novel or advanced technologies and development activities pertaining to heat acquisition, transport, rejection, and storage, as well as cryogenic cooling and thermal protection systems not specific to any existing or future scientific instruments, spacecraft, or planetary systems. Some examples include advanced insulation, "smart" optical coatings, nano-particle based heat transfer enhancements, and multifunction thermal materials.

**Jeff Farmer, NASA Marshall Space Flight Center**  
jeffery.t.farmer@nasa.gov

**Matthias Holzwarth, Astrium Space Transportation**  
matthias.holzwarth@astrium.eads.net

*Richard Briet, CNES*

*Brian O'Connor, NASA Marshall Space Flight Center*

*Olivier Pin, European Space Agency*

*Ryan Stephan, NASA Johnson Space Center*

**ICES109: AIAA SES****Space Structures for Exploration**

This session addresses the efficient use of in-situ resources as well as the application of reduced mass stowable/deployable structures to space and planetary exploration. Environmental robustness, effective storage, and the use/transformation of native resources will be considered as integral parts of these technologies, which range from materials and components to full-scale structures.

**Paul McElroy, Touchstone Research Laboratory**  
pmm@trl.com

*Rick Helms, NASA Jet Propulsion Laboratory*

**ICES110: AIAA SES****Thermal and Environmental Control of Commercial Spacecraft**

This session focuses on the thermal and environmental control aspects of commercial venture, crewed, or robotic spacecraft and systems.

**Nick Teti, Hawk Institute for Space Sciences**  
nicholas.m.teti@nasa.gov

*Brian Briggs, Orbital Sciences Corporation*

**ICES111: AIAA SES****Thermal Standards and Design/Development Practices**

This session focuses on current and future efforts and needs for development of spacecraft thermal control standards and reference documents dealing with such areas as design, analysis, testing, equipment, specifications, and processes. These standards might be dedicated to a specific company or applicable to entire programs like Constellation or agencies like NASA.

**Eric Grob, NASA Goddard Space Flight Center**  
eric.w.grob@nasa.gov

*Joe Gasbarre, NASA Langley Research Center*

*Art Avila, NASA Jet Propulsion Laboratory*

**ICES112: AIAA SES/LS&S****Orbital Debris Mitigation**

This session addresses all aspects of orbital debris reduction, effects on orbiting vehicles, spacecraft and components, protection schemes, and management of the debris risk.

**Eric Grob, NASA Goddard Space Flight Center**  
eric.w.grob@nasa.gov

*Mary Christine Desjean, CNES*

**ICES113: AIAA SES****Spacecraft Propulsion Systems Thermal Control**

This session features papers on thermal control design, analysis, testing, and flight performance of propulsion systems for rockets, spacecraft, orbiting platforms, space vehicles, and landers, including advanced propulsion techniques.

**Jose Roman, NASA Marshall Space Flight Center**  
jose.m.roman@nasa.gov

*Joe Chambliss, NASA Johnson Space Center*

**ICES114: AIAA SES****Thermal Control of Space Nuclear Power Systems**

This session includes papers on thermal control of nuclear power systems for spacecraft, orbiting platforms, space vehicles, landers, and rovers, including systems for power generation, propulsion, and heating.

**Joe Chambliss, NASA Johnson Space Center**  
joe.p.chambliss@nasa.gov

*Jose Roman, NASA Marshall Space Flight Center*

**ICES115: AIAA SES & INT****James Webb Space Telescope Thermal Control**

This session focuses on the thermal design, analysis, and testing of spacecraft, instrument, optical, and thermal protection systems for the international James Webb Space Telescope mission.

**Wes Ousley, Genesis Engineering Solutions LLC**  
wes.ousley@nasa.gov

*Jose Rodriguez, NASA Jet Propulsion Laboratory*

*Gerd Jahn, EADS Astrium GmbH*

**ICES200: INT****Physico-Chemical Processes: Air and Water**

This session covers technology studies, design, development, manufacturing, integration, testing and operations experience in the areas of water regeneration and treatment, air renewal and cleaning, human waste recycling, energy storage and transformation, and in-situ resource utilization, that apply physico-chemical processes.

**Cesare Lobascio, Thales Alenia Space Italia S.p.A.**  
cesare.lobascio@thalesaleniaspace.com

*W. Raatschen, EADS Atrium GmbH*

*Leonid Bobe, Niichimmash*

**ICES201: INT****Two-Phase Thermal Control Technology**

This session presents the latest developments and innovations of two-phase heat transport systems, modelling techniques, and on-orbit performances for space applications. It covers all variants of heat pipe technologies, capillary pumped loops, and loop heat pipes.

**Darius Nikanpour, Canadian Space Agency**  
Darius.Nikanpour@asc-csa.gc.ca

*Frank Bodendieck, OHB System AG*

*Tarik Kaya, Carleton University*

*Alejandro Torres, IberEspacio S.A.*

**ICES202: INT****Satellite, Payload, and Instrument Thermal Control**

This session covers the development and design of thermal control systems for satellites, payloads, and instruments.

**Patrick Hugonnot, Thales Alenia Space France**  
patrick.hugonnot@thalesaleniaspace.com

*Marco Molina, Selex Galileo*

*Hiroyuki Ogawa, Japan Institute of Space and Astronautical Science*

*Johannes van Es, NLR*

**ICES203: INT****Thermal Testing**

The thermal testing session focuses on all aspects of thermal tests, test methods, test correlation, and test facilities. Tests for all kinds of spacecraft, instruments, equipment, and materials are of interest. Special attention is given to sharing lessons learned from thermal test and test analysis and correlation activities, and also to innovative test methods, set-ups, and approaches to testing and verification of the hardware and of the analysis.

**Gerd Jahn, EADS Astrium GmbH**  
gerd.jahn@astrium.eads.net

*Steve Price, EADS Astrium GmbH*

*Hiroyasu Mizuno, JAXA*

**ICES204: INT/AIAA LS&S****Bioregenerative Life Support**

This session focuses on the design and development of ground-based facilities and experiments, and flight hardware designs and experiments associated with integrated systems which incorporate biological, physical, and chemical processors.

**Mark Kliss, NASA Ames Research Center**  
mark.h.kliss@nasa.gov

*Masato Sakurai, JAXA*

*Cesare Lobascio, Thales Alenia Space Italia S.p.A.*

**ICES205: INT/AICHe**

**Advanced Life Support Sensor and Control Technology**

This session includes papers describing approaches to monitoring water and air in enclosed habitats, thermal control of habitats, chemical sensors and sensing devices for detection of chemical constituents in water and air, and systems and system concepts for environmental monitoring and control.

**Abhijit V. Shevade, NASA Jet Propulsion Laboratory**  
abhijit.v.shevade@jpl.nasa.gov

*Darrell L. Jan, NASA Jet Propulsion Laboratory*

*Timo Stuffer, Kayser-Threde GmbH*

**ICES300: AICHe**

**ECLSS and Thermal Modeling and Test**

This session reports on applications of and advances in modeling physiochemical and biochemical life support processes, as well as in numerical modeling of atmospheric pressure, cabin ventilation, and composition distributions in closed space habitats, such as the International Space Station, the deep exploration spacecraft, the lunar habitat, and commercial crewed and cargo space transport vehicles.

**Chang Hyun Son, The Boeing Company**  
chang.h.son@boeing.com

*Nikolay Ivanov, Saint Petersburg State Polytechnic University, Russia*

*Brian Dunaway, The Boeing Company*

**ICES301: AICHe**

**Advanced Life Support Systems Control**

The Advanced Life Support Systems Control session reports on advanced life support system control topics, such as controller technology; control theory and application; autonomous control; integrated system control; control software; and modeling, simulation, and emulation for control development.

**David Kortenkamp, TRAC Labs Inc.**  
kortenk@trac labs.com

*Chang Hyun Son, The Boeing Company*

**ICES302: AICHe**

**Physio-Chemical Life Support Process Development**

This session addresses research issues and development of physio-chemical technology for the Air Revitalization System (ARS), Water Recovery System (WRS), Waste Management System (WMS), and integration of these systems for space vehicles and planetary habitats. Reports on performance of technologies for processing air, water, and solid wastes, on cross-cutting technologies demonstrating the integration of the systems together with reduction of mission costs, and on performance of hardware in microgravity conditions are also presented.

**K. Wignarajah, NASA Ames Research Center**  
Wiggy.Wignarajah@nasa.gov

*John Fisher, NASA Ames Research Center*

*Mike Flynn, NASA Ames Research Center*

*John Hogan, NASA Ames Research Center*

*Mark Kliss, NASA Ames Research Center*

**ICES304: AICHe**

**Development for Space Missions and Terrestrial Applications**

This session focuses on NASA derived technologies that have terrestrial applications towards air purification, water treatment, and solid waste management. Papers should clearly demonstrate the original NASA application and conclude with the modifications taken to transform the original technology for terrestrial applications. In addition, papers should cover the terrestrial market, bench-scale, and pilot/full-scale data if available. Papers that discuss the development of terrestrial applications that have potential for NASA applications are also solicited.

**David Mazyck, University of Florida**  
dmazyck@ufl.edu

*Kristen Riley, University of Florida*

**ICES305: AICHe**

**In-Situ Resource Utilization**

This session addresses research and development issues in utilization of in-situ lunar, planetary, and asteroidal resources to produce consumables and propellants for future human or robotic space missions. Presentations will include, but are not limited to, hardware development and testing, system integration, trade studies, process simulations, and ISRU reliability and safety.

**Tim Nalette, Hamilton Sundstrand**  
t.nalette@hs.utc.com

*Jean Hunter, Cornell University*

**ICES306: AICHe/ASME**

**Environmental and Thermal Control for Commercial Crewed and Cargo Transport Spacecraft**

This session seeks papers that describe the environmental control and thermal control systems and subsystems being developed for commercial suborbital and orbital crewed spacecraft and commercial cargo transport vehicles, the differences in driving requirements for these commercial vehicles as compared to traditional governmental spacecraft, and reliable but cost-efficient design solutions.

**Barry Finger, Paragon Space Development Corporation**  
bfinger@paragonsdc.com

*Chang Hyun Son, The Boeing Company*

*David Williams, NASA Johnson Space Center*

**ICES307: AICHe/AIAA LS&S**

**Orion Multi-Purpose Crew Vehicle Environmental Control and Life Support System**

This session addresses Crew Exploration Vehicle current configuration and status.

**John Lewis, NASA Johnson Space Center**  
john.f.lewis@nasa.gov

*Grant Anderson, Paragon Space Development Corporation*

*Tim Nalette, Hamilton Sundstrand*

**ICES308: AICHe**

**Education and Outreach**

The Education and Outreach session features papers that link human activities in space with human activities on earth. The session provides educators the opportunity to share experiences and present the most recent methodologies for linking students and the general public to human exploration of space.

**Jean Hunter, Cornell University**  
jhh5@cornell.edu

*Dean Muirhead, Barrios Technology*

**ICES400: ASME**

**Extravehicular Activity: Space Suits**

This session covers topics related to space suit pressure garments. It includes advanced development work, as well as ongoing efforts towards the Constellation Program flight space suit design.

**Lindsay T. Aitchison, NASA Johnson Space Center**  
lindsay.t.aitchison@nasa.gov

**ICES401: ASME/AIAA LS&S**

**Extravehicular Activity: Systems**

This session includes topics describing aspects of EVA systems, technologies, and studies that envision the space suit as a system. Concepts and testing of advanced space suit systems are also included.

**Robert Trevino, NASA Johnson Space Center**  
robert.c.trevino@nasa.gov

*Shawn Macleod, David Clark Company*

**ICES402: ASME**

**Extravehicular Activity: PLSS Systems**

This session covers topics describing design studies and new technology development or significant experience and lessons learned with existing systems in the area of portable life support systems and associated support hardware. Also, this session will deal with emerging technology and concepts relating to Orion or other Constellation systems.

**Edward W. Hodgson, Hamilton Sundstrand**  
ed.hodgson@hs.utc.com

*Bruce Webbon, NASA Ames Research Center*

*Gregory Quinn, Hamilton Sundstrand*

**ICES403: ASME**

**Extravehicular Activity: Operations**

This session addresses EVA operational activities associated with the Space Shuttle, the International Space Station (ISS), and future human spacecraft. Lessons learned on the logistics, maintenance, and conduct of EVA operations that may apply to the future of EVA are also of interest.

**Bill West, Hamilton Sundstrand**  
william.w.west@nasa.gov

**ICES404: ASME****International Space Station ECLS: Systems**

This session addresses ECLS System issues and lessons learned from the International Space Station.

**Gregory Gentry, The Boeing Company**  
gregory.j.gentry2@boeing.com

*David Williams, NASA Johnson Space Center*

*Zoltan Szigetvari, Astrium Space Transportation*

**ICES405: ASME****International Space Station ECLS: Air and Water Systems**

This session addresses ECLS water and air issues and lessons learned from the International Space Station.

**Gregory Gentry, The Boeing Company**  
gregory.j.gentry2@boeing.com

*David Williams, NASA Johnson Space Center*

*Zoltan Szigetvari, Astrium Space Transportation*

**ICES406: ASME****Human/Robotics System Integration**

This session addresses the design and development of robotics for space exploration and how these robotic systems will work together with humans.

**Loel Goldblatt, Hamilton Sundstrand**  
loel.goldblatt@hs.utc.com

*Shane McFarland, Wyle*

**ICES407: ASME/AICHe****Spacecraft Water/Air Quality: Maintenance and Monitoring**

This session addresses recent developments in spacecraft air and water quality monitoring technology.

**John Schultz, Wyle Laboratories**  
john.r.schultz@nasa.gov

*Darrell Jan, NASA Jet Propulsion Laboratory*

*John Straub, Wyle Laboratories*

**ICES408: ASME****Regenerable Life Support Processes and Systems**

This session addresses recent developments of regenerable life support processes and systems for spacecraft.

**Loel Goldblatt, Hamilton Sundstrand**  
loel.goldblatt@hs.utc.com

*Tim Nalette, Hamilton Sundstrand*

*Morgan Abney, NASA Marshall Space Flight Center*

**ICES409: ASME****Airliner Cabin Air: Monitoring, Control, and Environmental Health Issues**

This session addresses recent developments in airliner cabin air monitoring, control, and environmental health issues.

**Ruel Overfelt, Auburn University**  
overfra@auburn.edu

*David R. Space, The Boeing Company*

**ICES500: AIAA LS&S****Life Science/Life Support Research Technologies**

This session emphasizes research technologies to support astrobiology, habitation and life support system design. Life sciences-related hardware developments, experiment designs, and flight experiment results for manned spaceflight, unmanned systems such as free flying platforms and planetary spacecraft, and terrestrial analogs will be presented.

**Bob Morrow, Orbital Technologies Corporation (ORBITEC)**  
morrow@orbitec.com

**ICES501: AIAA LS&S****Life Support Systems Engineering and Analysis**

This session addresses life support for future crewed space missions, including defining systems architecture and selecting technology options. Life support systems engineering and analysis should help guide overall design and selection, development, and integration of technologies to produce complete systems.

**Harry Jones, NASA Ames Research Center**  
hjones@mail.arc.nasa.gov

*John Hogan, NASA Ames Research Center*

**ICES502: AIAA LS&S****Space Architecture**

This session focuses on the application of architectural principles to the design of facilities beyond Earth, to provide for comfortable lodging, productive work, and enjoyment of life, in full recognition of the technical challenges presented by the environment.

**Ondrej Doule, International Space University**  
doule@isu.isunet.edu

*Tedd Hall, University of Michigan*

**ICES503: AIAA LS&S****Radiation Issues for Space Flight**

This session addresses radiation major issues in space radiation and analysis, tools, and research that are being developed and applied to support the space exploration initiative to insure astronaut radiation protection and safety.

**Bill Atwell, The Boeing Company**  
william.atwell@boeing.com

*Lawrence Townsend, University of Tennessee*

**ICES504: AIAA LS&S****Management of Air Quality in Sealed Environments**

This session enables experts who manage submarine, spacecraft, and airliner air quality to share new research findings on the control of air pollutants in these sealed or semi-sealed environments to include air quality standards, hazards associated with specific compounds, and monitoring of those compounds to protect the health of crew and passengers.

**John James, NASA Johnson Space Center**  
john.t.james@nasa.gov

*Thomas Limer, Wyle Laboratories*

**ICES505: AIAA LS&S/ASME****Microbial Factors Applied to Design**

This session focuses on the dynamic effects of microorganisms on materials and systems in order to minimize hardware performance issues.

**Monserate Roman, NASA Marshall Space Flight Center**  
monsi.roman@nasa.gov

*Rebekah Jean Bruce, Wyle Laboratories*

*Letty Vega, Jacobs Technology*

**ICES506: AIAA LS&S****Human Exploration Beyond Low Earth Orbit: Missions and Technologies**

There are many potential destinations for human exploration beyond Low Earth Orbit (LEO), each with specific mission requirements, capabilities, and other attributes that may be common or unique. This session addresses mission designs, technology needs, vehicle systems and analyses for sending humans to destinations beyond LEO including geosynchronous orbit, libration points, the moon, near Earth objects (comets and asteroids), Mars, and its moons. Relevant subjects include mission requirements, concepts, and architectures, technology development needs, challenges, and gaps, and candidate system designs. Special attention will be given to Environmental Control and Life Support Systems (ECLSS), habitability, unique environmental considerations, and architectures.

**Dan Barta, NASA Johnson Space Center**  
daniel.j.barta@nasa.gov

*James Chartres, Carnegie Mellon*

**ICES507: AIAA LS&S****Human Factors for Space Missions Ground and Flight Operations**

This session presents human factors topics applicable to space missions with special emphasis on ground assembly, deployment, logistics, maintenance, and operations for both Earth-bound preflight as well as extraterrestrial planetary missions. Topics may include (but are not limited to) procedures, tools, human-automation interaction, remote operation, team performance, design assessment techniques, translating test results into design, temporary structures for preflight ground assembly, and training. The session will include papers reporting research as well as descriptions of design, methods, tools, and lessons learned or past successes.

**Grant Anderson, Paragon Space Development Corporation**  
ganderson@paragonsdc.com

**ICES508: AIAA LS&S****Mars and Beyond**

This session is dedicated to general matters concerning Mars: the environment and surroundings encountered on the planet, vehicles and vehicle behavior, problems and solutions found to sustain operations and life in this particular environment, and all Mars-related technologies. Also appropriate are ECLSS perspectives on Jupiter, asteroids, and other planets.

**Marie-Christine Desjean, CNES**  
marie-christine.desjean@cnes.fr

**Andrew Jackson, Texas Tech University**  
andrew.jackson@ttu.edu

**ICES509: AIAA LS&S****Fire Safety in Spacecraft and Enclosed Habitats**

This session covers all aspects of fire safety in closed environments including prevention, detection, and suppression. Relevant subjects include material controls for fire prevention; fire suppression; fire detection; fire signatures and toxicity; post-fire cleanup; risk assessment; material selection; fire related combustion research; lessons learned and design status of current systems; and life support and control system designs to enable fire detection and suppression. Applicable environments include EVA suits; past, present, and future space transportation vehicles; different gravitational levels; extraterrestrial habitats; aircraft; ships; and submarines.

**David Urban, NASA Glenn Research Center**  
david.lurban@nasa.gov

*James Russell, Lockheed Martin Corporation*  
*Gary A. Ruff, NASA Glenn Research Center*

**ICES510: AIAA LS&S****Lunar and Martian Dust Properties and Mitigation Technologies**

This session focuses on the properties and mitigation technologies for lunar and Martian dust. The effects of dust will pose significant challenges to space operations for crewed and robotic missions. Papers are solicited on mitigation strategies for life support systems and dust encountered in planetary surface environments. Mitigation strategies may involve cleaning and repelling approaches for the protection and nominal performance of susceptible hardware, and the capture and filtration of airborne lunar dust that may enter the pressurized volumes of spacecrafts and habitats. Measurements of lunar and/or Martian dust properties that provide engineering data for the development of mitigation technologies are also of interest. This session will bring together government, industrial, and academic participants in the space research and technology development community to present their ideas and concepts on this focused topic.

**Juan H. Agui, NASA Glenn Research Center**  
juan.h.agui@nasa.gov

*Mark Hyatt, NASA Glenn Research Center*

**ICES511: AIAA LS&S****Reliability for Space Based Systems**

This session covers testing and analysis for system reliability and maintainability. Relevant subjects include verification and validation, risk assessment, accelerated life testing and aging, environmental screening, acceptance testing, and qualification testing. Special attention is given to failure modes and mechanisms associated with electronic devices, mechanical assemblies, chemical processing, and life sciences.

**Todd H. Treichel, Orbital Technologies Corporation (ORBITEC)**  
treichel@orbitec.com

**Greg Davis, NASA Jet Propulsion Laboratory**  
gregory.l.davis@jpl.nasa.gov

**ICES512: AIAA LS&S****Human Rating for Space Systems**

This session engages industry, government, and academia in the definition and analysis of safety and mission assurance parameters as they relate to the design and operations of spacecraft intended for human occupancy. One key objective is to assess the relevancy and commonality of requirements and policies for NASA and FAA commercial human spaceflight missions.

**David Klaus, University of Colorado**  
klaus@colorado.edu

*Rene Rey, FAA*

**ICES513: AIAA LS&S****Computational Modeling for Human Health and Performance Analysis**

This session covers practical application of computational modeling (deterministic and probabilistic) for analysis of human health and performance risks, and countermeasure development. Discussion areas include modeling and simulation of physiologic, biomechanical and behavioral responses to reduced gravity, radiation, spacecraft environment, planetary environment, extravehicular activity, crew dynamics, ergonomics, work-load, and countermeasure prescriptions (exercise and non-exercise).

**Lealem Mulugeta, Universities Space Research Association,** mulugeta@dsls.usra.edu

*Grant Schaffner, University of Cincinnati*  
grant.schaffner@uc.edu

**ICES600:****Other**

If you are not sure of the best placement for your abstract, please submit to ICES600.

## STUDENT POSTER COMPETITION

The ICES student poster competition is a program targeted to stimulate the participation of students and provide an excellent forum for students to present their work in an informal and interactive setting. Posters are ideal for presenting speculative or late-breaking results, or for giving an introduction to interesting, innovative work. Posters are intended to provide students and ICES participants with the ability to connect with one another and discuss the work presented.

Each poster will be judged on both the format of the poster and the student's ability to convey the poster content to the judges. University/college students are invited to submit abstracts on their proposed poster by 1 June 2013 per the abstract submittal procedures described below. The student's abstract and poster should be pertinent to ICES; that is, they should follow the same theme of the general conference, focusing on humans living and working in hostile environments with applications inside or outside of terrestrial or outer space habitats or vehicles.

*Abstracts of approximately 300 words must include poster title, author name(s), mailing and e-mail addresses, phone and fax numbers, and university or college. The first author and the presenting author of the poster must be students. Abstracts must not be more than one page in length and must be double-spaced. Adherence to this format is required. Abstracts that do not adhere to this format will be rejected. Poster abstracts should be emailed as an attachment to Chang Hyun Son by 1 June 2013.*

Authors will be notified of poster presentation acceptance by **10 June 2013**. Each participating student will receive a ticket to Wednesday night's banquet. For questions on the student poster competition, please contact Chang Hyun Son at [chang.h.son@boeing.com](mailto:chang.h.son@boeing.com).



Authors who wish to contribute a paper to the conference must submit a 300-word abstract. Papers should present technical developments and progress in any of the fields of environmental systems listed in this Call for Papers and should make a new and original contribution to the state of the art, or be a constructive review of the technical field. Authors need not be affiliated with any of the co-sponsoring societies. Papers proposed will be evaluated solely on the basis of their suitability for inclusion in the program. Please note that only written papers will be accepted, except for sessions indicated as panels.

Abstract submissions will be accepted electronically through the AIAA website at [www.aiaa.org/ices2013](http://www.aiaa.org/ices2013). Once you have entered the conference website, click "Submit A Paper" and follow the instructions listed. The deadline for receipt of abstracts via electronic submittal is **1 November 2012, 2359 hrs Eastern Time Zone, USA**.

The electronic submission process is as follows.

1. Access the AIAA website at [www.aiaa.org/ices2013](http://www.aiaa.org/ices2013).
2. On the right-hand side, click the "Submit Paper" button.
3. You will be prompted to log in. If you do not have an AIAA account you will be asked to create one.
4. After you log in, you will be in the ScholarOne Abstracts submission site.
5. Click the Submission tab at the top of the page to begin your submission.
6. To begin the submission, click the "Create a New Submission" link on the left side. Please Note: If you have previously visited the site and begun a draft submission, click the "View Submissions" link on the left-hand side to resume your submission.

Special Notes:

**Submitted abstracts and submission metadata may be revised, but only before the abstract submission deadline.** To do so, return to the submission site, click Submission > View Submissions and then select "Return to Draft." Once in draft status, click the edit button to open the submission and make the necessary changes. Authors then **must resubmit at Step 6** for the submission to be eligible for consideration.

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

Authors having trouble submitting abstracts electronically should contact ScholarOne Technical Support at [ts.acsupport@thomson.com](mailto:ts.acsupport@thomson.com), 434.964.4100, or (toll-free, U.S. only) 888.503.1050. Questions pertaining to the abstract or technical topics, or general inquiries concerning the program format or policies of the conference, should be referred to the corresponding Program Chair:

AIAA SES: Wes Ousley, Genesis Engineering Solutions LLC, [wes.ousley@nasa.gov](mailto:wes.ousley@nasa.gov)

ASME: Amy Ross, NASA Johnson Space Center, [amy.j.ross@nasa.gov](mailto:amy.j.ross@nasa.gov)

AIAA LS&S: Grant Anderson, Paragon Space Development Corporation, [ganderson@paragonsdc.com](mailto:ganderson@paragonsdc.com)

AICHe: Tim Nalette, Hamilton Sundstrand [t.nalette@hs.utc.com](mailto:t.nalette@hs.utc.com)

INT: Markus Huchler, EADS Astrium GmbH, [markus.huchler@astrium.eads.net](mailto:markus.huchler@astrium.eads.net)

Authors will be notified of paper acceptance or rejection on or about **6 December 2012**. An Author's Kit, containing detailed instructions and guidelines for submitting papers to AIAA, will be made available to authors of accepted abstracts. Authors of accepted abstracts must provide a draft manuscript by **4 March 2013**. Authors of accepted draft manuscripts must then provide a complete final manuscript to AIAA by **10 June 2013** for inclusion in the conference proceedings and for the right to present at the conference. It is the responsibility of those authors whose papers or presentations are accepted to ensure that a representative attends the conference to present the paper. Sponsor and/or employer approval of each paper is the responsibility of the author(s). Government review, if required, is the responsibility of the author(s). Authors should determine the extent of approval necessary early in the paper presentation process to preclude paper withdrawals or late submissions.

### "No Paper, No Podium" and "No Podium, No Paper" Policies

If a written paper is not submitted by the final manuscript deadline, authors will not be permitted to present the paper at the conference. It is the responsibility of those authors whose papers or presentations are accepted to ensure that a representative attends the conference to present the paper. If a paper is not presented at the conference, it will be withdrawn from the conference proceedings. These policies are intended to eliminate no-shows and to improve the quality of the conference for attendees.

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### Publication Policy

AIAA will not consider for presentation or publication any paper that has been or will be presented or published elsewhere. Authors will be required to sign a statement to this effect.

Please note: AIAA policy precludes an abstract or paper from being submitted multiple times to the same conference. Also, once a paper has been published, by AIAA or another organization, AIAA will not republish the paper. Papers being submitted to the Student Paper Competition being held in conjunction with this conference may not be submitted to the general sessions. Author(s) must choose to submit to the Student Paper Competition OR to the conference. If your paper is selected for competition it will be published along with the conference proceedings.

### WARNING – Technology Transfer Considerations

Prospective authors are reminded that technology transfer guidelines have considerably extended the time required for review of abstracts and completed papers by U.S. government agencies. Internal (company) plus external (government) reviews can consume 16 weeks or more. Government review if required is the responsibility of the author. Authors should determine the extent of approval necessary early in the paper preparation process to preclude paper withdrawals and late submissions. The conference technical committee will assume that all abstracts papers and presentations are appropriately cleared.

### International Traffic in Arms Regulations (ITAR)

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

### Important Dates

<b>Abstract Deadline</b>	<b>1 November 2012</b>
<b>Author Notification:</b>	<b>6 December 2012</b>
<b>Draft Manuscript Deadline</b>	<b>4 March 2013</b>
<b>Final Manuscript Deadline:</b>	<b>10 June 2013</b>



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