

# Paper Reference List for ICES 2019 - Boston

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<b>ICES-2019-(#)</b>			
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2	101	Novel Concept for Detection of a Fluid Flow Fault in a Pumped Fluid Heat Rejection System	Pradeep Bhandari and Tyler Schmidt
3	101	Thermal Control Technologies for Europa Clipper Mission	Pradeep Bhandari, Mark Duran, Razmig Kandilian, Jenny Hua, A.J. Mastropietro, Tyler Schmidt, Woodmansee Paul and Sean Reilly
29	101	Thermal Design and Analysis of Europa Clipper's Radio Frequency Module	Robert Coker
30	101	Thermal Design and Analysis of the GUSTO Gondola	Robert Coker
42	101	Europa Clipper Thermal Control Valve Thermal and Hydraulic Analysis and Development Testing	Razmig Kandilian, Pradeep Bhandari, Arthur Mastropietro, Conan Zhang and Brian Carroll
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312	101	The Large UV/Optical/Infrared Surveyor Decadal Mission Concept Thermal System Architecture	Kan Yang, Matthew Bolcar, Jason Hylan, Julie Croke, Bryan Matonak, Andrew Jones, Joseph Generie and Sang Park
327	101	Mechanical Design and Stress Analysis Challenges Overcome to Ensure the Structural Integrity of Europa Clipper's Mechanical Pumped Fluid Loop Heat Redistribution System (HRS)	James Burdick, A J Mastropietro, Bertoni Leonardo, Bobby Lui, Brian Carroll, Bryant Gaume, Conan Zhang and Daniel Kolenz
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119	400	Revisiting the Mark III/AX-5 Suit "Fly-Off": Lessons Learned Applicable to Modern-Day Suits	David Akin
173	400	The "Space Activity Suit" – A Historical Perspective and A Primer On The Physiology of Mechanical Counter-Pressure	Shane Mcfarland, Amy Ross and Robert Sanders
179	400	Development of a Custom Space Suit for Orion	Shane Jacobs, Donald Tufts, Daniel Green and Dustin Gohmert
185	400	NASA Advanced Space Suit Pressure Garment System Status and Development Priorities 2019	Amy Ross, Richard Rhodes and Shane Mcfarland
277	400	Development and Testing of a 3D-Printed Spacesuit Elbow Assembly	Harrison Bartlett, Joe Bowser, Carlos Callejon-Hierro, Sarah Garner, Lawrence Guloy, Christina Hnatov, Jonathan Kalman, Baram Sosis and David Akin
298	400	Urine Removal from Suited Crew in Orion Vehicle Depressurization Scenario	Cory Kaufman, Samuel Anderson and Kirstyn Johnson
334	400	System Design for Tensioning Limb Sections in a Mechanical Counter Pressure Spacesuit	Akshay Kothakonda, Logan Kluis and Dava Newman
337	400	Testing of the NASA Exploration Extravehicular Mobility Unit Demonstration (xEMU Demo) Architecture at the Neutral Buoyancy Laboratory	Kristine Davis and Ian Meginnis
352	400	Development of Novel Helmet Support Assembly for NASA Orion Crew Survival Suit	Jeffrey Suhey, Dustin Gohmert and Shane Jacobs
371	400	Development of Human-Spacesuit Interaction Models	Sarah Jarvis, Linh Vu, Elizabeth Benson and Sudhakar Rajulu
<b>ICES401: Extravehicular Activity: Systems</b>			
21	401	Extravehicular Activity Framework for Exploration - 2019	Brian Alpert and Brian Johnson
26	401	Commercial EVA Space Suit System Development	Theodore Southern and Nikolay Moiseev
142	401	Parametric Analysis of Internal Heat Transfer for Full-body Radiative-cooled Space Suit Concepts	Jan Junker and David Klaus
175	401	Advanced Liquid Cooling and Ventilation Garment Using Thermally Conductive Tubing	Daniel Murphy, Brian Tucker and David Sykes
198	401	Optimal Cooling Garment Design Based on Analysis, Modeling, and Testing	Michael Izenson, Jerry Bieszczad and Ariane Chepko
232	401	BioBot: Investigating an Alternative Paradigm for Planetary EVA	David Akin, Kate Melone, Brady Sack and Jeffrey Zhu
<b>ICES402: Extravehicular Activity: PLSS Systems</b>			
286	402	Monolithic Trace-Contaminant Sorbents Fabricated from 3D-printed Polymer Precursors	Marek A. Wójciewicz, Joseph E. Cosgrove, Michael A. Serio, Andy Carlson and Cinda Chullen
338	402	Critical Review of Thermal Management Technologies for Portable Life Support Systems	Jeremy Stroming and Dava Newman
353	402	Metal Oxide Sorbent Deactivation Study	Sandra Guerrero, James Auman, Robert Boyle, Thomas Chase, Daniel Goberman, Brian Macias and Timothy Nalette
385	402	A User-Driven Tool for Predicting Contaminant Loading Profiles in the Thermal Control Loop of the Exploration PLSS	Tsvetelina Baryakova
386	402	Updates to the Metabolic Rate Computation Methods Employed by the Caution and Warning System in the Exploration PLSS	Tsvetelina Baryakova
388	402	Modeling of Complex Oxygen Compression Heating Scenarios for the Exploration Extravehicular Mobility Unit Umbilical	Margot Steely and Thomas Paul
389	402	Exploration PLSS Thermal Desktop Modeling	Bruce Barnes, Brittany Abraham, Bruno Miranda, Latham Speasmaker and Quoc Nguyen
390	402	Design and Analysis of a Fan Outlet Check Valve for the Exploration Portable Life Support System	Glenn Waguespack, Anthony Hanford and Bruce Barnes
400	402	Rapid Cycle Amine Testing History	Rachel Sturtz, Bruce Conger and Cinda Chullen
401	402	Robust Liquid Volume Sensor for Flexible Bladders in Microgravity	Marc Ramsey, Cinda Chullen, Eric Desjardins, David Callender, Jed Wilbur, Nicolas Espinosa and Jay Buckley
<b>ICES403: Extravehicular Activity: Operations</b>			
80	403	Relevant Environments for Analysis and Development (READy): Enabling Human Space Exploration Through Integrated Operational Testing	David Coan, Trevor Graff, Kelsey Young and Marc Reagan
322	403	Mission Safety for Repair of the Alpha Magnetic Spectrometer using the Extravehicular Mobility Unit Space Suit Assembly	Jinny Ferl, Mallory Jennings, Patrick Lynn, Steve Wyatt and Trent Barrett
357	403	Pushing the limits beyond 2020- Extending the life of the Extra-Vehicular Mobility Unit (EMU) to 50 years.	Jenn Matty
<b>ICES404: International Space Station ECLS: Systems</b>			
12	404	Controls and Automation Research in Space Life Support	Harry Jones
36	404	Status of ISS Water Management and Recovery	Layne Carter, Jill Williamson, Daniel Gazda, Chris Brown, Ryan Schaezler, Frank Thomas, Jesse Bazley and Sunday Molina
43	404	Upgrades to the International Space Station Urine Processor Assembly	Jill Williamson, Layne Carter, Jimmy Hill, Rex Graves, Davey Jones and Danielle Morris
49	404	Chemical Analysis of Return-To-Ground Node 1 Charcoal Air Filters From ISS	David Jackson, Elizabeth Bowman, Samuel Manuel, Kevin Brame, Susan Snyder, Alyssa Sherman and Danielle Bowman
53	404	Microbial Analysis of Return-To-Ground Node 1 Charcoal Air Filters From ISS	Darren Dunlap, Natalee Weir, Mark Wilson, Kevin Brame, Susan Snyder and Elizabeth Bowman
59	404	Methane and Carbon Monoxide Concentration Dynamics of the International Space Station's Cabin Atmosphere	Jay Perry
307	404	International Space Station Major Constituent Analyzer (MCA) On-orbit Performance	Ben Gardner, Phillip Erwin, Stephen Denson and Bettylynn Ulrich
373	404	International Space Station (ISS) Environmental Control and Life Support (ECLS) System Overview of Events 2018-2019	Steven Balistreri and Zachary Bryant

374	404	Design and Implementation of Combination Charcoal and HEPA Filters for the International Space Station Cabin Air Ventilation System	Kevin Braman and Susan Snyder
<b>ICES405: Human/Robotics System Integration</b>			
108	405	Development of an Augmented Reality System for Human Space Operations	Carlos Pinedo, Jordan Dixon, Christine Chang, Donna Auguste, Mckenna Brewer, Devin Desilva, Chris Hill, Cassidy Jensen, Amanda Jones, James Voss and Allison Anderson
287	405	Development of a Heads-Up Display for Extravehicular Activities	Katheryn Fox, Radhika Karsalia, Jillian Kunze, Christoph Neisess, Zachary Peters, Roshan Rao, Brady Sack, Matthew Sieh, Ryan Skoletsky, Shelly Szanto, Matthew Wilkin and David Akin
<b>ICES500: Life Science/Life Support Research Technologies</b>			
92	500	Microalgae-based Photobioreactors for a Life Support System of a Lunar Base	Johannes Martin, Gisela Detrell, Jochen Keppler, Harald Helisch, Stefanos Fasoulas and Reinhold Ewald
139	500	Close the gap – Potential of microalgal biomass for closed ECLSS and future in-situ resource utilization in space	Harald Helisch, Frédéric Lapiere, Juy-Kieu Chak, Stefanos Fasoulas and Arnd Heyer
195	500	Astro Garden™ Aeroponic Plant Growth System Design Evolution	Sam Moffatt, Robert Morrow and John Wetzel
199	500	An ISS testbed approach to passive fluid phase separator device development for life support	Logan Torres, Ryan Jenson and Mark Weislogel
242	500	Omni-gravity Hydroponics for Space Exploration	Rihana Mungin, Mark Weislogel, Tyler Hatch and John McQuillen
328	500	Troubleshooting Performance Failures of Chinese Cabbage for Veggie on the ISS	Samuel Burgner, Robert Morrow, Gioia Massa, Raymond Wheeler, Matthew Romeyn and Cary Mitchell
<b>ICES501: Life Support Systems Engineering and Analysis</b>			
16	501	Program Promotion Can Distort Space Systems Engineering and Deny Risk	Harry Jones
17	501	Moon Base Life Support Design Depends on Launch Cost, Crew Size, and Mission Duration	Harry Jones
62	501	CO <sub>2</sub> -Recycling for Future Exploration Missions	Jochen Keppler and Stefanos Fasoulas
126	501	Astronaut Mass Balance for Long Duration Missions	Michael Ewert and Chel Stromgren
158	501	Self-Sustainable Smart City Design on the Red Planet	Hiroyuki Miyajima
160	501	Development Status of the Virtual Habitat (V-HAB) Simulation System	Daniel Pütz, Claas Olthoff, Jonas Schnaitmann and Ulrich Walter
201	501	Mitigation of Micro-Droplet Ejections During Open Cabin Unit Operations Aboard ISS	Caleb Turner, Mark Weislogel, Jesse Goodman, Sam Mohler, Rihana Mungin, Eugene Ungar and Jennifer Buchli
236	501	Water Recovery Trades for Long-Duration Space Missions	Melanie French and Kevin Lange
239	501	Quantifying ECLSS Robustness for Deep Space Exploration	Christine Escobar, James Nability and Adam Escobar
347	501	Planetary Water Recycling Systems Trade Study	Michael Flynn, Amanda Delos Reyes, Freddie Begabovic, Carlos Flores, Josh Hinkle and Soomin Choi
<b>ICES502: Space Architecture</b>			
23	502	Gateway Gravity Testbed (GGT)	A Scott Howe, Brent Sherwood, Theodore Hall and Damon Landau
113	502	Payload Faring Geometries as Space Stations with Flexible "Plug and Play" Rack System	Leonardo Guzman
121	502	Application of Multi-Mission Single-Person Spacecraft (MMSPS) to Gateway Mission	Kazuhiro Momose and Olga Bannova
163	502	Improvements to On-Orbit Sleeping Accommodations	Brandon Maryatt
205	502	Application of Composite Materials to Reduce Mass of Internal and External Exploration Habitat Structures	Matthew Simon, Lemuel Carpenter, Glenn Hinda, Andrew Bergan, Jamshid Samareh and Anatoli Mitrou
268	502	Mars X-House: Design Principles for an Autonomously 3D-Printed ISRU Surface Habitat	Melodie Yashar, Christina Ciardullo, Michael Morris, Rebecca Pailes-Friedman, Robert Moses and Daniel Case
275	502	Development and Testing of an Inflatable Airlock Module for Gateway Station and Beyond	David Akin
280	502	Moon Village Reference Masterplan and Habitat Design	Georgi Petrov, Daniel Inocente, Max Haney, Neil Katz, Colin Koop, Advenit Makaya, Marlies Amhof, Hanna Lakk, Aidan Cowley, Claudie Haignere, Piero Messina, Valentina Sumini and Jeffrey Hoffman
302	502	SIRONA: Sustainable Integration of Regenerative Outer-space Nature and Agriculture. Part 1 - Architecture and Technology	Heather Hava, Larissa Zhou, Elizabeth Lombardi, Kaixin Cui, Heeyeon Joung, Sarah Aguasvias Manzano, Abby King, Hayley Kinlaw, Kyri Baker, Andy Kaufman and Nikolaus Corell
309	502	Bringing Nature into Space: The Restorative Potential of Virtual Environments for Long Term Space Travel	Elizabeth Lockard and Andrew Kaufman
<b>ICES503: Radiation Issues for Space Flight</b>			
18	503	Geomagnetically-Trapped and Galactic Cosmic Radiation Environments and Absorbed Dose Calculations for a Hypothetical Sounding Rocket Trajectory	Bill Atwell, Kyle Copeland and Francis Badavi
35	503	Estimates of Radiation Exposures to Crews on Missions in Cis-Lunar Space and on the Lunar Surface from the August 1972 SEP Event	Lawrence Townsend, Wouter de Wet and Fahad Zaman
237	503	Using Plants and Trash to Mitigate Radiation Dose	Elizabeth Marandola, John Wetzel and Robert Morrow
367	503	CRaTER Observations from Lunar Orbit of the Galactic Cosmic Radiation Environment Through the Complete Solar Cycle 24	Wouter de Wet, Fatemeh Rahmanifard, Lawrence Townsend, Nathan Schwadron and Harlan Spence
406	503	ARMAS Flight System for Operational Aerospace Radiation Measurements	Kent Tobiska, Leonid Didkovsky, Kevin Judge, David Bouwer, Seth Wieman, Brad Gersey, Bill Atwell and Rick Wilkins
<b>ICES504: Management of Air Quality in Sealed Environments</b>			
9	504	Enhanced AQM: Development of an Exploration Compatible Air Quality Monitor	William Wallace, Thomas Limero, Kenneth Clark, Ariel Macatangay, Paul Mudgett and Daniel Gazda
37	504	History of NASA's Determination of Offgassed Products (Test 7)	Benjamin Greene, Vanessa Buchanan and Susana Tapia Harper
65	504	Re-generable and functionalised charcoal for submarine atmosphere control	Charles Cummings, Timothy Taylor and Paul O'Mahony
93	504	Seeking the Tricorder: Evolution of the NASA Anomaly Gas Analyzer	Paul Mudgett, Mary Coan Skow, Thomas Limero, Steven Beck and Jeffrey Pilgrim
157	504	Advanced Nanostructured Catalysts For Efficient In-Cabin Air Purification	Tanya Shirman, Elijah Shirman, Sissi Liu, Anna Shneidman, Judith Lattimer, Yamin Htet, Keeve Gurkin, Michael Aizenberg and Joanna Aizenberg
171	504	Innovative Environmental Control System for Aircraft	Erica Zavaglio, Mathieu Le Cam, Catherine Thibaud, Giusi Quararone, Yonghua Zhu, Giovanni Franzini, Paul D. Roux, Marilena Dinca, Andreas Walte and Peter Rothe

172	504	Carbon Monoxide Release From Whole Bean Roasted Coffee in Storage	Alan McCarrick, Benjamin Letter and Sara Jane Neal
266	504	Testbed for Characterizing the Adsorptive Capacities of Pleated Panel Filters	Oscar Monje and Joshua Finn
323	504	Disabled Submarine Escape and Rescue Considerations	Stephanie Mohundro, Sara Jane Neal and Steve Thoresen

### ICES506: Human Exploration Beyond Low Earth Orbit: Missions and Technologies

168	506	From Simulations Towards a Functional Base: the Moon and Mars Base Analog (MaMBA)	Christiane Heinicke
260	506	New Frontiers in Food Production Beyond LEO	Oscar Monje, Tom Dreschel, Matthew Nugent, Mary Hummerick, Lashelle Spencer, Matthew Romeyn, Gioia Massa, Raymond Wheeler and Ralph Fritsche
297	506	NASA Environmental Control and Life Support Technology Development and Maturation for Exploration: 2018 to 2019 Overview	Molly Anderson, Miriam Sargusingh, Robyn Gatens, Jay Perry, Walter Schneider, Ariel Macalangay, Nikzad Toomarian, Melissa McKinley and Laura Shaw
305	506	In-Flight Maintenance Design Philosophy for Gateway and Deep-Space Life Support Systems	Jake Rohrig, Jonathan O'Neill and Tom Stapleton
329	506	Expanded Set of Criteria for Life Support Comparative Assessment	Robert Morrow, John Wetzel and Christopher Loyd
363	506	International Space Station as a Development Testbed for Advanced Environmental Control and Life Support Systems	Laura Shaw

### ICES509: Fire Safety in Spacecraft and Enclosed Habitats

32	509	Development of a Carbon Dioxide Removal Bed and a Combustion Products Removal Bed for Saffire	Michael Casteel and John Graf
101	509	Flammability limits from BASS-II testing in microgravity compared to normal gravity limits	Sandra Olson, Paul Ferkul, Carlos Fernandez-Pello, Fletcher Miller, Indrek Wichman, Subrata Bhattacharjee and James T'ien
180	509	Development and Validation of a Model to Account for Gaseous HCl and Aluminum Surface Interactions for Spacecraft Fire Safety Applications	Justin Niehaus, Suleyman Gokoglu, Sandip Mazumder, Gordon Berger and John Easton
188	509	Characterization of Laptop Fires in Spacecraft	Rosa Padilla, Daniel Dietrich, Kelly Lynch, Alfredo Juarez, Susana Harper, Christopher Nagel, Gary Ruff and David Urban
220	509	A Comparison of CFD and Lumped Capacity Analyses of Fires in Spacecraft	John Brooker, Dan Dietrich, Suleyman Gokoglu, Gary Ruff and David Urban
263	509	The Effect of Buoyancy on Upward-Concurrent Flame Spread over Thin Paper	Maria Thomsen, Carlos Fernandez-Pello, David Urban and Gary Ruff
313	509	Pre-Filter Development for Protecting Emergency Mask Respirator Filters in Fire-Generated Environmental Conditions	Gokhan Alptekin, Andrew Hagen and Trevor Haanstad
395	509	Orion Laptop Fire Thermal Analysis	Thomas Paul

### ICES510: Planetary and Spacecraft Dust Properties and Mitigation Technologies

87	510	Stainless Steel HEPA and SuperHEPA Cabin Environment Crossflow Filters for Deep Space Manned Missions	Nicos Andreas, Christopher Cox, Masaaki Tamura and Katsuji Azuma
102	510	Measurement of fungi and bacteria from dust collected on the International Space Station (ISS)	Sarah R. Haines, Ashleigh Bope, Nick Nastasi, John M. Horack, Marit E. Meyer and Karen C. Dannemiller
181	510	The Mars Global Dust Storm of 2018	Michael Smith and Scott Guzewish
223	510	DTVAC Dusty Planetary Thermo-VACuum Simulator and LN2 Commissioning	Roman Kruzelecky, Piotr Murzionak, Jonathan Lavoie, Martin Mena, Ian Sinclair, Gregory Schinn, Edward Cloutis, Nadeem Ghafoor and Josh Newman
246	510	Further Characterization of Aerosols Sampled on the International Space Station	Marit Meyer
295	510	Scroll Filter System Development for Crewed Deep Space Missions	Juan Agui

### ICES511: Reliability for Space Based Systems

11	511	Cost-Effective High Reliability for Space Life Support Requires Using Storage	Harry Jones
14	511	High Reliability Requires More Than Providing Spares	Harry Jones
66	511	How Much Testing is Needed to Manage Supportability Risks for Beyond-LEO Missions?	Andrew Owens and Olivier de Weck
224	511	The Unrealized Potential of Superhydrophobic Substrates in Advanced Life Support Systems	Rawand Rasheed and Mark Weislogel
265	511	In-Space Manufacturing Production Rate and Reliability Targets for On-Demand Fabrication of ECLSS Spares	Matthew Moraguez and Olivier de Weck

### ICES513: Computational Modeling for Human Health and Performance Analysis

169	513	Assessment of Age-Related Organ Size Changes in Various Populations & The Assessment of Tissue Distribution in The Human Body	Jan Weber
170	513	Length and Circumference Assessment of Body Parts – The Creation of Easy-To-Use Predictive Formulas	Jan Weber
225	513	Comparative Assessment of Wearable Surface EMG Electrode Configurations for Biomechanical Applications	J. Walter Lee, Alireza Golgouneh and Lucy Dunne