

Paper Reference List for ICES 2020*

* These manuscripts were PUBLISHED but not presented due to the postponement of the 50th International Conference on Environmental Systems as a result of the COVID-19 Pandemic

Paper #	Session	Paper Title	Authors
ICES-2020-(#)		click on the linked title to access the manuscript	

ICES101: Spacecraft and Instrument Thermal Systems

5	101	Large-Scale Development Testing of a Dual MLI Concept for the Europa Clipper Mission	Tyler Schmidt, Mark Duran, Jenny Hua and Pradeep Bhandari
92	101	Flight Correlation and characterisation of Sentinel-2 A/B satellite and MSI instrument thermal behaviour	Anja Huchler, Martin Altenburg and Alejo Ares
94	101	Europa Clipper Passive Thermal Control Valve Test and Analysis	Razmig Kandilian, Pradeep Bhandari, Arthur Mastropietro and Paul Woodmansee
117	101	Early Mission Thermal Performance of Parker Solar Probe through Orbit Four	Carl Ercol and G. Allan Holtzman
164	101	Thermal design, analysis and testing of Solar Orbiter Stood-Off Radiator Assembly	Stefan Herndler, Christian Ranzenberger-Stindl, Mark Grimminck and Claudio Damasio
279	101	Thermal Design, Analysis, and Testing of Europa Clipper's Radio Frequency Module	Robert Coker
563	101	Psyche Magnetometer Engineering Model Test and Thermal Model Correlation to Validate Operational Thermal Requirement	Elham Maghsoudi, Maria De Soria-Santacruz Pich, David Leneman and Ryan Caron

ICES102: Thermal Control for Planetary and Small Body Surface Missions

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95	102	Thermal System and Environmental Testing of the Mars Helicopter	Stefano Cappucci and Michael Pauken
120	102	Data Assimilation Applied Thermal Analysis of Mars Airplane for High-altitude Flight Test (MABE2)	Hiroto Tanaka, Takashi Misaka and Hiroki Nagai
160	102	Dragonfly: Thermal Design Overview	Gary Holtzman, Carl Ercol, Robert Coker, Loren Zumwalt and Doug Adams
209	102	Thermal control of a light-weight rover system in the permanently shadowed regions of the lunar south pole	Dmitri Ivanov and Domingos Fernandes
288	102	Lunar Traverse Planning with Integrated Thermal Simulation	Matthias Killian
291	102	Thermal Analysis and Early Design Considerations for ESA's ProSPA Package on-board the Roscosmos Luna-27 Lander	Emily Tipper, Philipp Hager and Andrew Quinn
561	102	Efficient Thermal Management for Sampling Arm Actuators	Elham Maghsoudi, Ben Furst, Jay Jasper, Takuro Daimaru and Kimhide Odagiri

ICES103: Thermal and Environmental Control of Exploration Vehicles and Habitats

201	103	Thermal Concept for Planetary Ice Melting Probe	Calin Tarau, Kuan-Lin Lee, William Anderson, Christopher Morrison and Terry Hendrick
576	103	Gateway PTCS Integrated Thermal Math Model	Jonah Smith

ICES104: Advances in Thermal Control Technology

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145	104	High Performance Thermal Switch for Lunar and Planetary Surface Extreme Environments	David Bugby and Jose Rivera
165	104	Development of highly efficient Spacer for MLI	Stefan Herndler and Christian Ranzenberger-Stindl
183	104	Thermal Characterization of additive manufactured Integral Structures for Phase Change	Dominik Wild, Johannes Schrezenmeier, Markus Czupalla and Roger Förstner
210	104	VO2-based Thin-Film Smart Radiator Device for improved Passive Thermal Control of Space Systems	Emile Haddad, Roman Kruzelecky, Piotr Murzionak, Kamel Tagziria, Ian Sinclair, Gregory Schinn, Boris Le Drogoff, Chaker Mohamed, Jean-Francois Thibault, Paul Burbulea and Eric Choi
317	104	Development of Variable View Factor and Deployable Two-Phase Radiator	Jeff Diebold, Calin Tarau, Andrew Lutz and Srujan K. Rokkam
524	104	Performance Testing and Modeling of a Scaled Fusible Heat Sink Test Article for Exploration Vehicles	Alexander Hillstrom, Christopher Massina, Lauren Foley, Brittany Abraham and Kambiz Andish
579	104	Advanced Hot Reservoir Variable Conductance Heat Pipes for Planetary Lander	Kuan-Lin Lee, Calin Tarau, Andrew Lutz, William Anderson, Cho-Ning Huang, Chirag Kharangate and Yasuhiro Kamotani

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ICES106: Thermal Control for Space Launch Vehicles, Propulsion, and Nuclear Power Systems

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17	107	Practical Considerations of Integrating a Passive Thermal Control System onto Small-Satellites - The Ten-Koh Case Study	Roger Dudziak, Sean Tuttle, Kei-Ichi Okuyama, Aleksander Lidtke, Jesus Gonzales and Isai Fajardo Tapia
167	107	The Preliminary Thermal Design for the SPEQTRF CubeSat	Coraline Dalibot and Samuel Tustain
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365	107	Influence of Orbit and Thermal Design Parameters on the Temperature Behaviour of CubeSats - Implications for Thermal Analysis and Thermal Hardware Demands	Philipp Hager and Katja Janzer
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358	108	Interdisciplinary Development of the METimage Cryogenic Sub-System Thermo-Mechanical Design	Robert Schweikle, Armin Hauser, Nadine Buhl and Raphael Naire
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133	109	Design and Flight Performance of the Combined Thermal Control System of the BOLIDE Experiment in Balloon Mission PMC Turbo/2018	Volodymyr Baturkin, Bernd Kaifler, Dimitry Rempel, Natalie Kaifler, Tom Spröwitz, Fabian Henning and Philipp Roßi
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265	109	Considerations Regarding Radiative Estimations of High Altitude Balloon Systems	Arturo González-Llana, Isabel Pérez-Grande and Ángel Sanz-Andrés
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339	201	A Concept Demonstrator for an Additively Manufactured Li-ion Battery Case with Embedded Heat Pipes	Benjamin Furst, Ratnakumar Bugga and Scott Roberts
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466	201	Evaluation results of a prototype vapor chamber for high heat flux	Kenichiro Sawada, Soumei Baba, Kohsuke Tanaka, Atsushi Okamoto and Hiroyuki Ogawa
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268	204	Implications of different plant cultivation techniques for food production in space based on experiments in EDEN ISS	Paul Zabel, Vincent Vrakking, Conrad Zeidler and Daniel Schubert
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351	205	Advanced Aerosol Separator for PM2.5 Chemical Composition and Size Distribution Analysis	David Keicher, Marcelino Essien, Fa-Gung Fan, Nicolas Verdier, Jean-Baptiste Renard, Jurij Simcic and Dragan Nikolic
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405	302	Power Optimization of Cryogenic CO2 Deposition Capture in Deep Space	Pranav Jagtap, Grace Belancik, Darrell Jan, Scott Hall and Weibo Chen
510	302	On-orbit Testing of the Advanced Closed Loop System ACLS	Johannes Witt, Scott Hovland, Daniele Laurini, Carsten Matthias, Frank Boettcher, Tiziano Bevilacqua and Carlos Redondo

ICES303: Physio-Chemical Life Support- Water Recovery & Management Systems- Technology and Process Development

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39	303	Chitosan-based Biocides for Water Disinfection	Larry Martinelli, Krishnaswamy Rangan and Komal Vig
40	303	Nanotechnology for Beyond Earth Water Treatment	Tanya Rogers, Alessandro Alabastri, Naomi Halas, Jacques Mathieu, Pedro Alvarez, Layne Carter, Michael Wong, Rafael Verduzco, Jordín Metz and Pratiksha D. Dongare
42	303	A Preliminary Modeling Study of Biofilm Accumulation in the Water Recovery System	Angie Diaz, Wenyan Li, Tesia Irwin, Luz Calle, Geoffrey Angle, Yo-Ann Velez Justiniano, Mononita Nur and Michael Callahan
43	303	g-C3N4 Photocatalyst based Water Purification System for Crewed Space Missions	Jordan Terrazas, Krishnaswamy Rangan and Danmeng Shuai
96	303	BioMoSS: ROS-generating Photocatalysts for the Disinfection of Potable Water Systems	John Abdou, John Vance, Anna Lu and Lance Delzeit
128	303	Silver Foam: A Novel Approach for Long-Term Passive Dosing of Biocide in Spacecraft Potable Water Systems – Update 2020	Tesia Irwin, Wenyan Li, Angie Diaz, Luz Calle and Michael Callahan
131	303	A Literature Review of Antifouling Surfaces and Treatments for Long-term Synergistic Biofilm Control	Angie Diaz, Wenyan Li, Tesia Irwin, Luz Calle and Michael Callahan
132	303	Literature Review of Disinfection Techniques For Water Treatment	Nilab Azim, Angie Diaz, Wenyan Li, Tesia Irwin, Luz Calle and Michael Callahan
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522	303	Chemistry of Ionic Silver and Implications for Design of Potable Water Systems	Dean L. Muirhead, Amy Button-Denby, Christopher M. Smyth, Jason Nelson and Michael R. Callahan
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ICES304: Physio-Chemical Life Support- Waste Management Systems- Technology and Process Development

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228	304	Space Mission Waste Conversion Experiments at the Zero Gravity Facility	Anne Meier, Malay Shah, Jaime Toro Medina, David Rinderknecht and Ray Pitts
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353	304	Technical Risks Associated with Heat Melt Compaction Systems	Jeffrey Lee, Tra-My Justine Richardson, Kevin Martin, Janine Young, Gregory Pace, Jurek Parodi, Serena Trieu, Ben Helvensteijn and Michael Ewert
361	304	Inductively Heated Plasma Generator-based Waste Decomposition for Long Duration Crewed Space Missions	Samuel Anih, Adam Pagan, Helmut Koch, Peter Martinez, Rene Laufer and Georg Herdrich
374	304	Gas Effluent Analysis of the Heat Melt Compactor	Janine Young, Serena Trieu, Jurek Parodi, Tra-My Justine Richardson, Jeffrey Lee, Kevin Martin and Gregory Pace
390	304	Development of an Adsorption System for the Trash Compaction Processing System designed for operation in the International Space Station Express Rack	Gregory Pace, Jeff Lee, Jurek Parodi, Justine Richardson, Serena Trieu, Janine Young and Kevin Martin
416	304	Development Status of Logistics Reduction Technologies for Exploration Missions	James Broyan, Michael Ewert, Melissa McKinley, Patrick Fink, Julia Badger and Jeffrey Lee
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63	305	Water Removal Performance of the Humidity Control Subassembly with Variable Vacuum Orifice Sizing	Joshua Hecht, Barry Finger, John Lumpkin, John Gray, Zexuan Zhang, Steve Giangrande and Don Varanauskis
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ICES307: Collaboration, Education Outreach, and Public Engagement

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ICES308: Advanced Technologies for In-Situ Resource Utilization

71	308	Analysis of a Cold Trap as a Purification Step for Lunar Water Processing	Jordan Holquist, Patrick Pasadilla, Chad Bower, Philipp Tewes, Laura Kelsey and Thomas Cognata
148	308	A parametric study on the effect of acidity and pressure on electrochemical stripping of ammonia from wastewaters	Matthew Liu and William Tarpeh

151	308	Demonstration of Advanced Mars ISRU CO2 Recovery System	Gokhan Alptekin, Ambalavanan Jayaraman, Michael Bonnema, Sarah Devoss and Andrew Hagen
204	308	Chemical Lidar Science Payload for the Lunar Volatile and Mineralogy Mapping Orbiter	Roman Kruszewski, Piotr Murzionak, Ian Sinclair, Yang Gao, Chris Bridges, Andrea Luccafabris, Edward Cloutis and Amelie St-Amour
498	308	Design of Anaerobic Digestion Systems for Closed Loop Space Biomanufacturing	Alexander Benvenuti, Saige Drecksler, Soumyajit Sen Gupta and Amor Menezes
499	308	Effects of Space Biomanufacturing on Fuel Production Alternatives for Mars Exploration	Saige Drecksler, Soumyajit Sen Gupta, Alexander Benvenuti and Amor Menezes

ICES400: Extravehicular Activity: Space Suits

69	400	xEMU Lower Torso Assembly (LTA) Brief Fleet Sizing Study	Kristine Davis, Richard Rhodes, Han Kim, Elizabeth Benson, Yaritza Hernandez, Linh Vu and Sudhakar Rajulu
175	400	Development and Evaluation of the Active Response Gravity Offload System as a Lunar and Martian EVA Simulation Environment	Omar Bekdash, Paul Valle, Kyoung Jae Kim, Sarah Jarvis, Jocelyn Dunn, Jason Norcross and Andrew Abercromby
182	400	Towards Large-area On-body Force Sensing Using Soft, Flexible Materials: Challenges of Textile-Based Array Sensing	Crystal Compton, Alireza Gougouneh, Brad Holschuh and Lucy Dunne
187	400	Evaluating the Effect of Spacesuit Glove Fit on Dexterity and Cognitive Task Performance	Seamus Lombardo, Shane Jacobs, Kevin Duda and Leia Stirling
196	400	Development and Optimization of EVA Space Suit Ball Bearing Ferrofluid Pressure Seals and Hybrid A/X Race Geometry	Milo Hughes, Andrew Redd and Nikolay Moiseev
234	400	Thermal Modeling of Mechanical Counterpressure Spacesuit EVA	Jeremy Stroming and Dava Newman
327	400	Advanced Thermal, Radiation, and Dust Protection for Spacesuits and Space Systems	Cody Paige, Dava Newman and Jonah Peter
349	400	Preliminary Investigation of the Design of a Mechanically Antagonistic, Actuating, Countermeasure Garment	Rachael Granberry, Julianna Abel and Brad Holschuh
389	400	A Biomechanical Design Framework to Improve Spacesuit Boot Fit	Abhishektha Boppana and Allison Anderson
430	400	Range of Motion (ROM) Analysis for Pressure Garments (EVA and LES) using 3D Photogrammetric Motion Capture	Dillon Hall, Bonnie Dunbar, Paul Burke and Callen Hajda
480	400	Reassessing the Purge Valve Architecture in the Exploration Extravehicular Mobility Unit	Margot Steely

ICES401: Extravehicular Activity: Systems

336	401	Continued Development and Validation of the Virtual Spacesuit Using Apollo 17 Data	Claas Olthoff
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ICES402: Extravehicular Activity: PLSS Systems

83	402	High-Accuracy Oxygen Flow Meter for the Exploration Portable Life Support System	Michael Izenson, Amelia Servi, Sheldon Stokes, Theodore Beach, Carl Kirkconnell, Leon Huynh, Tessa Rundle and Steven Lee
84	402	Compact Oxygen Heat Exchanger for the Exploration Portable Life Support System	Michael Izenson, Amelia Servi, Sheldon Stokes and Tessa Rundle
456	402	The Effect of Carbonization Conditions on the Performance of Ammonia Sorbents Derived from Polyether Ether Ketone (PEEK)	Marek A. Wójciewicz, Joseph E. Cosgrove, Michael A. Serio, Andrew E. Carlson, Nicolas J. Espinosa, John M. Hostetler and Cinda Chullen
519	402	Exploration Portable Life Support System Hatch Component Design Challenges and Progress	Kristina Todd, John Hostetler, Nicolas Espinosa and Cinda Chullen
573	402	Gas Bubble Dissolution Within the Thermal Control Loop of the Exploration Portable Life Support Subsystem	Torie Miller
574	402	Flowrate Reduction Analysis of the Ventilation Loop in the Exploration Portable Life Support Subsystem	Torie Miller

ICES403: Extravehicular Activity: Operations

163	403	Methodology for the Scientific Physical and Operations Characterization (SPOC) of Terrestrial Fieldwork	Rachel Vitail, Matthew Miller and Leia Stirling
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ICES404: International Space Station ECLS: Systems

35	404	Developing Methods for Biofilm Control in Microgravity for a Water Recovery System	Yo-Ann Velez, Donald Carter, Mononita Nur and Geoffrey Angle
391	404	Upgrades to the International Space Station Urine Processor Assembly	Jill Williamson, Layne Carter, Danielle Morris, Jimmy Hill and Colton Caviglia

ICES405: Human/Robotics System Integration

181	405	Autonomous framework protocols for Space Missions	Vittorio Netti and Tara Bisharat
428	405	Astronaut Smart Glove: A Human-Machine Interface For the Exploration of the Moon, Mars, and Beyond	Pascal Lee, Christopher McKay, Gregory Quinn, Tom Chase, Moina Tamuly, Sondre Tagestad, Haakon Pettersen, Magnus Arveng, Frank Oygard, Brandon Dotson, John Schutt and Jake Jessica Todd, Andrew Liu and Leia Stirling
538	405	Investigation of Augmented Reality in Enabling Telerobotic On-Orbit Inspection of Spacecraft	Jessica Todd, Andrew Liu and Leia Stirling

ICES406: Spacecraft Water/Air Quality: Maintenance and Monitoring

67	406	Photocatalytic Oxidation Using TiO2 and UV for Total Organic Carbon Analysis of Water	Marianne Gonzalez, Valeria Lopez, Richard Kidd, Margie Homer, Aaron Noell, Chad Morrison, Apri Jewell, Samad Firdosy, Murray Darrach, Mike Callahan, Lance Christensen and Fred Chad Morrison, Jonathan To, Aaron Noell and Michael Callahan
398	406	Selection of a Total Organic Carbon Analyzer System for Exploration Missions	Chad Morrison, Jonathan To, Aaron Noell and Michael Callahan
399	406	Miniature TOC Analyzer using Tunable Laser Spectroscopy and Combustion	Frank Winiberg, Lance Christensen, Matthew Kale, Andrew Jones and Chad Morrison

ICES500: Life Science/Life Support Research Technologies

28	500	Plant Water Management in Microgravity	Tyler Hatch, Mark Weislogel, Rihana Mungin and Maria Hernandez
77	500	Development of a photosynthesis measurement chamber under different airspeeds for applications in future space crop-production facilities	Lucie Poulet, Michael Gildersleeve, Lawrence Koss, Gioia D. Massa and Raymond M. Wheeler

ICES501: Life Support Systems Engineering and Analysis

85	501	Life Support System Design for Habitation in Lunar Lava Tubes	Hiroyuki Miyajima
220	501	A New Vision and More Rational Process Will Advance Space Life Support Through Better Projects	Harry Jones
223	501	The System Complexity Metric (SCM) Predicts System Costs and Failure Rates	Harry Jones
473	501	Analysis of Candidate Technologies for a Partial Gravity Water Recovery System	Tsvetelina Baryakova and Kevin Lange

ICES502: Space Architecture

11	502	Lunar Daytime: Behavioral Experiments in a Space Analog Living and Working Environment	Marc M. Cohen, Donald C. Barker, Suzana De Oliveira Bianco, Sheryl Bishop, Ronald Gentile, Sandra Haeuplik-Meusburger, Pablo de Leon and James Wise
13	502	Antaeus: Concept for a Sample Receiving Lab/Planetary Quarantine Facility at the Gateway	Marc M. Cohen, Donald Barker, N. Robert Bennett, Suzana De Oliveira Bianco, Shen Ge, Rocco Mancinelli and Kris A. Zacny
150	502	Kansei Engineering Methodology to Define the Interior Design of Habitats in Extreme Environments	Paolo Caratelli and Maria Alessandra Misuri
300	502	The Bionomic Design and Mixed Reality as Passive Countermeasures in Terrestrial Analogs and Extraterrestrial Habitats	Sheryl Bishop, Sandra Haeuplik-Meusburger, Olga Bannova, Jorge Camba and Marc Jurblum
385	502	Solar Array Configurations for the Moon Village	Eric Halbach, Daniel Inocente, Max Haney, Neil Katz and Georgi I. Petrov
550	502	3D-Printing Lunar and Martian Habitats and the Potential Applications for Additive Construction	Monserrate Roman, Melodie Yashar, Michael Fiske, Shadi Nazarian, Amanda Adams, Platt Boyd, Michael Bentley and Jason Ballard
ICES504: Management of Air Quality in Sealed Environments			
156	504	Impact of different ventilation strategies on aircraft cabin air quality and passengers' comfort and well-being – the ComAir study	Britta Herbig, Victor Norrefeldt, Pawel Wargocki, Florian Mayer, Ria Ströhlein, Lei Fang and Ivana Ivandic
ICES506: Human Exploration Beyond Low Earth Orbit: Missions and Technologies			
138	506	Human Adaptation: Rationale for the Sub-Atmospheric Spacecraft Environment	Hussein El-Lessy, Kevin Braman, Robert Perkins, Matthew Ziglar, Anthony Cook and Mitchell Bland
200	506	NASA Environmental Control and Life Support Technology Development and Maturation for Exploration: 2019 to 2020 Overview	Walter Schneider, Jay Perry, James Broyan, Ariel Macatangay, Melissa McKinley, Caitlin Meyer, Andrew Owens, Nikzad Toomarian and Robyn Gatens
299	506	International Space Station as a Testbed for Exploration Environmental Control and Life Support Systems - 2020 Status	Laura Shaw, John Garr, Lynda Gavin, Christopher Matty, Alesha Ridley, Michael Salopek and Katherine Toon
364	506	Planetary Protection Requirements for Crewed Missions - An update to the COSPAR Workshop Series	J Andy Spry, Bette Siegel, Margaret Race, Gerhard Kminek, Lisa Pratt and Athena Coustenis
419	506	Establishing Assessment Criteria for Intelligent Infusion of "Smart Systems" into a Space Habitat	David Klaus, Sophie Zaccarine, Patrick Pischulti and Annika Rollock
432	506	Integrating Orion and Initial Lunar Gateway Environmental Control and Life Support Systems	Joel Kirkland, Heather Mera, Timothy Cichan and Ryan Wall
485	506	Contingency operations on the Deep Space Gateway: Approaches, and Considerations to Orbiting Platforms for Deep Space Exploration	David Zuniga, Rachel Sturtz, Miriam Sargusingh, Stephanie Casper and Chad Tressler
ICES509: Fire Safety in Spacecraft and Enclosed Habitats			
125	509	A Smoke Detector to Prevent False Alarms in Lunar Missions by Smoke-Dust Discrimination	Thorsten Schultze, Lea Sichma and Marit Meyer
173	509	Spacecraft Fire Safety Technology Development Plan For Exploration Missions	David Urban, Gary Ruff and Daniel Dietrich
340	509	Spacecraft Smoke Detector Characterization with Reference and Smoke Aerosols	Xiaoliang Wang, Judith Chow, John Watson, Marit Meyer, Gary Ruff, John Easton, Gordon Berger and Paul Mudgett
341	509	Effect of Humidity on Surface Interactions of Gaseous HCl and Aluminum for Spacecraft Fire Safety Applications	Justin Niehaus, Suleyman Gokoglu, Sandip Mazumder, Gordon Berger and John Easton
407	509	Effects of Confinement on Flame Spread in Microgravity	Yanjun Li, Ya-Ting Liao, Paul Ferkul, Michael Johnston and Charles Bunnell
433	509	Hazardous Effects of Li-Ion Battery Based Fires	Rosa Padilla, Ilse Alcantara, Marit Meyer, Alfredo Juarez, Daniel Dietrich, David Urban, Gary Ruff and Christopher R. Nagel
ICES510: Planetary and Spacecraft Dust Properties and Mitigation Technologies			
65	510	Airborne Particulate Monitor: A Real-time Reference Quality Aerosol Instrument Payload for ISS Air Pollution Quantification	Marit Meyer
147	510	Spacesuit Dust Mitigation-Study in Vacuum Settings Using Carbon Nanotube Fibers with Electric Fields	Kavya Manyapu, Leora Peltz, Pablo De Leon and Dr Carlos Calle
ICES511: Reliability for Space Based Systems			
221	511	Verified Cost-Effective High Reliability for New Deep Space Systems	Harry Jones
222	511	Minimum Risk Deep Space Habitat and Life Support	Harry Jones
488	511	Failure Mode and Effects Analysis for Environmental Control and Life Support System Self-Awareness	Samuel Eshima and James Nabity
ICES513: Computational Modeling for Human Health and Performance Analysis			
87	513	Age-Specific Organ and Tissue Mass Estimates and Their Distribution in Adult Women	Jan Weber
315	513	Countermeasure Suits for Spaceflight	Rachel Bellisle and Dava Newman
541	513	Estimating Compressive Spinal Loads Due to Planetary Space Suits	Katelyn Burkhart, Dennis Anderson and Leia Stirling