



16-20 JULY 2023 ✦ CALGARY, CANADA ✦ HYATT REGENCY CALGARY

ICES 2023

✦ 52ND INTERNATIONAL CONFERENCE ON ENVIRONMENTAL SYSTEMS ✦

ICES 2023 EVENT PROGRAM
ORGANIZED BY ICES STEERING COMMITTEE

SUPPORTED BY

ICES Thermal and Environmental Control Systems (TECS) Committee

ICES International Committee (IIC)

American Institute of Chemical Engineers Environmental Systems Committee (AIChE)

ICES Crew Systems (ICS) Technical Committee

American Institute of Aeronautics and Astronautics Life Science and Systems (AIAA-LS&S) Technical Committee



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TO LIVE, WORK AND PLAY IN SPACE**



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CHAIR'S WELCOME

On behalf of the organizing committee, it is with great pleasure and excitement that I extend a warm welcome to all attendees of the 52nd International Conference on Environmental Systems (ICES) in the beautiful city of Calgary, Canada. We are delighted to have you join us for this international gathering of scientists and engineering professionals dedicated to exploring the fascinating realm of humans living in space.



ICES serves as a platform for collaboration, knowledge exchange, and innovation, fostering meaningful discussions and groundbreaking discoveries within the field. With the conference theme centered around the challenges and advancements in human space exploration, we are certain that the coming days will be filled with enlightening presentations, thought-provoking discussions, and valuable networking opportunities.

Calgary, nestled in the picturesque province of Alberta, offers a stunning backdrop for this significant event. Renowned for its natural beauty, vibrant culture, and warm hospitality, this city provides an ideal setting for fostering new connections and nurturing existing

collaborations. We encourage you to take some time to explore Calgary's diverse attractions, from the majestic Rocky Mountains to its vibrant downtown core, which is rich in art, entertainment, and culinary experiences.

ICES has brought together a distinguished lineup of keynote speakers, esteemed experts, and industry leaders who will share their cutting-edge research and insights with the aim of advancing our understanding of human life in extreme environments. We are confident that the presentations and discussions will provide fresh perspectives, spark inspiration, and pave the way for new avenues of exploration in environmental control and life support systems, human factors, thermal control systems and EVA systems technology.

Moreover, this conference presents a unique opportunity for you to showcase your own research, projects, and breakthroughs. We encourage you to actively participate in the technical and poster sessions, as well as the interactive events and receptions. Share your knowledge, engage in fruitful debates, and contribute to the collective intelligence of this esteemed gathering.

We extend our gratitude to the steering committee, our sponsors, session chairs, conference planner and all those who have contributed to making this conference a reality. Their unwavering support and dedication have been instrumental in ensuring the success of this event.

As we gather to embark on this incredible journey of discovery and collaboration, we encourage you to engage with your fellow attendees, seize every opportunity for dialogue and knowledge exchange, and embrace the diversity of ideas that this conference will undoubtedly foster. Let us work together to shape the future of human space exploration and create a lasting impact on our planet and beyond.

Once again, a warm welcome to the 52nd ICES in Calgary, Canada. We hope that this conference will not only be intellectually enriching but also leave you with fond memories of this vibrant city and lasting connections with your fellow colleagues.

Wishing you a productive, inspiring, and unforgettable experience at ICES.

Shawn R Macleod - ICES 2023 Conference Chair

♦ ORGANIZING COMMITTEE

CONFERENCE CHAIR

Shawn R Macleod
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Stéphane Lapensée
PAST CONFERENCE CHAIR 2020/2021
European Space Agency



EVENT OVERVIEW

SUNDAY 16 JULY	MONDAY 17 JULY	TUESDAY 18 JULY	WEDNESDAY 19 JULY	THURSDAY 20 JULY
	SESSION CHAIR & SPEAKER BREAKFAST 7:00-8:15 HRS IMPERIAL 5/7/9		SESSION CHAIR & SPEAKER BREAKFAST 7:00-8:15 HRS IMPERIAL 5/7/9	
	PLENARY SESSION 8:30 - 10:00 HRS IMPERIAL BALLROOM	TECHNICAL SESSIONS 8:00-10:00 HRS	TECHNICAL SESSIONS 8:30-10:00 HRS	EARLY MORNING COFFEE BREAK GRAND FOYER 2/3/4
	MORNING COFFEE BREAK GRAND FOYER 2/3/4	MORNING COFFEE BREAK GRAND FOYER 2/3/4	MORNING COFFEE BREAK GRAND FOYER 2/3/4	TECHNICAL SESSIONS 9:00-10:30 HRS
	TECHNICAL SESSIONS 10:30-12:00 HRS	TECHNICAL SESSIONS 10:30-12:30 HRS	TECHNICAL SESSIONS 10:30-12:00 HRS	MORNING COFFEE BREAK GRAND FOYER 2/3/4
	LUNCH ON OWN 12:00-14:00 HRS	LUNCH ON OWN 12:30-14:30 HRS	LUNCH ON OWN 12:00-14:00 HRS	TECHNICAL SESSIONS 11:00-13:00 HRS
CONFERENCE REGISTRATION & CHECK-IN 13:00-19:00 HRS GRAND FOYER 1/2	STUDENT POSTER JUDGING IMPERIAL 4/6/8	COMMITTEE MEETINGS TECS - The Studio AIChE - The Gallery AIAA LS&S - Stephen B	COMMITTEE MEETINGS ICS - The Studio IIC - The Gallery	
	TECHNICAL SESSIONS 14:00-16:00 HRS	TECHNICAL SESSIONS 14:30-16:30 HRS	TECHNICAL SESSIONS 14:00-16:00 HRS	
	NETWORKING COFFEE BREAK GRAND FOYER 2/3/4		EARLY CAREER WORKSHOP 16:00-17:30 HRS THOMSONS SOCIAL HUB	
	TECHNICAL SESSIONS 16:30-18:00 HRS	FREE TIME	FREE TIME	
WELCOME RECEPTION 17:30-19:30 HRS ATRIUM + THOMSONS KITCHEN & BAR	STUDENT POSTER RECEPTION 18:00-19:30 HRS IMPERIAL 4/6/8	WILD WEST SHOW GIRLETZ RODEO RANCH BUSES LOAD @ 17:30 HRS FROM HYATT REGENCY CALGARY	PRE-BANQUET RECEPTION 18:15 HRS - GRAND FOYER 2/3/4 ICES 2023 AWARDS BANQUET 19:00 HRS IMPERIAL BALLROOM IMMEDIATELY FOLLOWING BANQUET DESSERT RECEPTION ATRIUM + THOMSONS KITCHEN & BAR	



GENERAL INFORMATION

REGISTRATION AND INFORMATION CENTER HOURS

The ICES Registration and Information Center will be located on the 3rd Floor in the Grand Foyer

HOURS ARE AS FOLLOWS:

SUNDAY, 16 JULY	13:00-19:00 hrs
MONDAY, 17 JULY	06:30-18:00 hrs
TUESDAY, 18 JULY	07:30-16:30 hrs
WEDNESDAY, 19 JULY	07:30-16:00 hrs
THURSDAY, 20 JULY	08:30-13:00 hrs

COMMITTEE MEETINGS

ICES THERMAL AND ENVIRONMENTAL CONTROL SYSTEMS (TECS) COMMITTEE

Tuesday, 18 July 12:30-14:30 hrs The Studio (2nd floor)

AICHE ENVIRONMENTAL SYSTEMS COMMITTEE (AICHE)

Tuesday, 18 July 12:30-14:30 hrs The Gallery (2nd floor)

AIAA LIFE SCIENCES & SYSTEMS TECHNICAL COMMITTEE (AIAA LS&S)

Tuesday, 18 July 12:30-14:30 hrs Stephen B (3rd floor)

ICES CREW SYSTEMS (ICS) TECHNICAL COMMITTEE

Wednesday, 19 July 12:00-14:00 hrs The Gallery (2nd floor)

ICES INTERNATIONAL COMMITTEE (IIC)

Wednesday, 19 July 12:00-14:00 hrs The Studio (2nd floor)

NETWORKING COFFEE BREAKS

They will be located on the 3rd Floor in Grand Foyer 2/3/4

MONDAY 17 JULY	10:00-10:30 hrs 16:00-16:30 hrs
TUESDAY 18 JULY	10:00-10:30 hrs
WEDNESDAY 19 JULY	10:00-10:30 hrs
THURSDAY 20 JULY	08:30-09:00 hrs 10:30-11:00 hrs

DOWNLOAD APP!



SESSION CHAIR REPORTS

All Session Chairs are asked to complete a session chair report to evaluate their session for future planning. The online report can be found on the conference app or on www.ices.space under the Session Chair Materials & Resources page.

AUDIO/VISUAL

Each session room will be preset with the following: one video/data projector, one screen, one microphone & sound system (if necessitated by room size) and one laser pointer/slide advancer.

ICES does not provide computers to connect to projectors – you must provide your own laptop. Please note that ICES does not provide security in the session rooms and recommends that items of value, including computers, not be left unattended. Any additional audiovisual requirements or equipment requested will be at the cost of the presenter. Technicians are on site from Canadian View Corp.



CONFERENCE PROCEEDINGS

The proceedings collection for ICES 2023 has been made available on the Texas Tech University Libraries site as of Sunday, 16 July 2023. Go to www.ices.space to access the Conference Proceedings page or links can also be found on the conference app. If you are interested in obtaining a digital copy of ALL conference proceedings, you can download it to a USB at the ICES Registration Desk.

“NO PAPER, NO PODIUM” & “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.

PUBLICATION POLICY

ICES will not consider for presentation or publication any paper that has been presented or published elsewhere.

RESTRICTIONS

Photography, video, or audio recording of technical sessions is prohibited. ICES 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 don't discuss ITAR export-restricted information with non-U.S. nationals in attendance.

PLEASE NOTE: There will be a photographer on site documenting all events other than technical sessions.



SESSION CHAIR & SPEAKER BREAKFAST

NEW FOR 2023: ICES WILL HOST TWO SESSION CHAIR & SPEAKER BREAKFASTS.

- Speakers who are presenting on Monday or Tuesday (July 17-18) will attend the Monday morning breakfast.
- Speakers who are presenting on Wednesday or Thursday (July 19-20) will attend the Wednesday morning breakfast.

All Speakers and Session Chairs will be served a breakfast buffet in *IMPERIAL Ballroom* while they meet to coordinate presentations.

WHO SHOULD ATTEND THE MONDAY BREAKFAST?

All Session Chairs and Speakers (Presenters) from the following sessions are scheduled to attend from 7:00-8:15 hrs on Monday, July 17 in *IMPERIAL 5/7/9*.

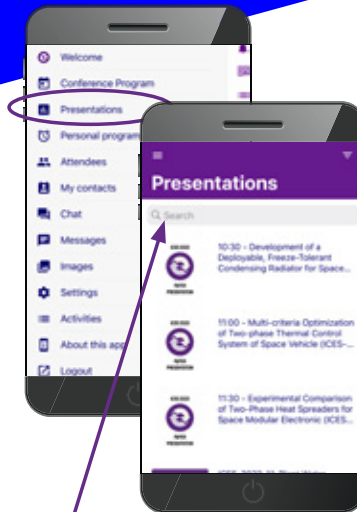
102-A	102-B	102-C		
104-A	104-B			
201-A	201-B	201-C	201-D	
202-A	202-B			
205-A	205-B	205-C		
206				
207-A				
300-A	300-B			
302-A	302-B	302-C	302-D	302-E
303-A	303-B	303-C	303-D	303-E
304-A				
400-A	400-B	400-C		
401				
402-A	402-B	402-C		
404				
408-A	408-B			
500-A	500-B			
502-A	502-B	502-C	502-D	
506-A	506-B	506-C	506-D	
509-A				
513-A	513-B			

WHO SHOULD ATTEND THE WEDNESDAY BREAKFAST?

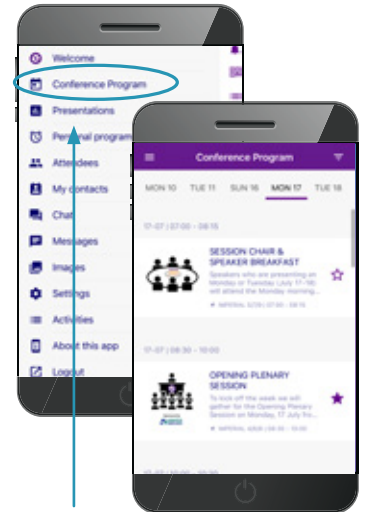
All Session Chairs and Speakers (Presenters) from the following sessions are scheduled to attend from 7:00-8:15 hrs on Wednesday, July 19 in *IMPERIAL 4/6/8*.

101-A	101-B			
103-A	103-B			
104-C				
107				
203-A	203-B			
204-A	204-B	204-C		
207-B	207-C			
301				
302-F	302-G	302-H	302-I	302-J
304-B	304-C	304-D	304-E	304-F
305				
307-A	307-B	307-C		
308-A	308-B	308-C		
403-A	403-B			
405				
406-A	406-B			
407-A	407-B			
501				
503				
504				
509-B	509-C			
510-A	510-B			
511				

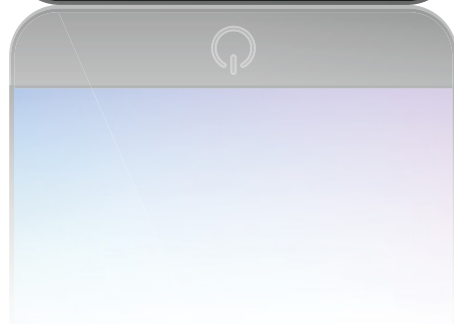
ICES 2023 CONFERENCE APP!



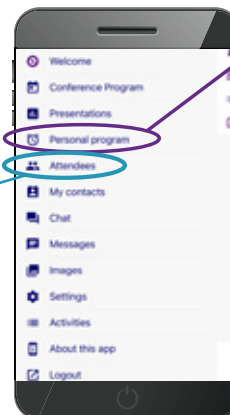
SEARCH FOR AN
AUTHOR OR A PAPER
PRESENTATION



GO HERE TO FIND OUT
WHAT IS HAPPENING
EACH DAY



REACH
OUT TO
FELLOW
ATTENDEES



CREATE YOUR
OWN PERSONAL
PROGRAM



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Google Play

LET'S
GET
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TAL

SCAN TO
DOWNLOAD



NETWORKING & SPECIAL EVENTS

WELCOME RECEPTION SPONSORED BY



Collins Aerospace

Join the entire ICES community for a welcome reception on **Sunday, 16 July from 17:30-19:30 hrs, in the Atrium + Thomsons Kitchen & Bar** on the Lobby Level. Take this opportunity to refresh old contacts and meet new participants the night before the conference begins. Additional tickets for guests may be purchased at the ICES Registration/Info desk.



OPENING PLENARY SESSION SPONSORED BY



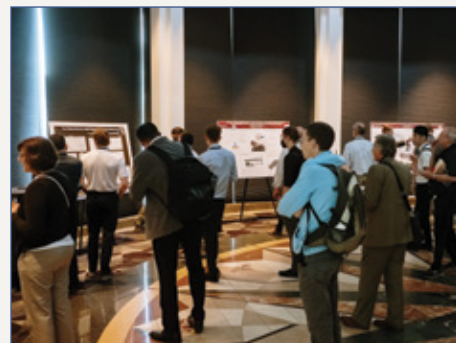
To kick off the week we will gather for the Opening Plenary Session on **Monday, 17 July from 08:30-10:00 hrs in Imperial 4/6/8**. There will be remarks by the ICES 2023 Conference Chair, Shawn R Macleod, and a special presentation by **Jeremy Parsons, Deputy Program Manager for the Exploration Ground Systems Program** (NASA Kennedy Space Center).



STUDENT POSTER RECEPTION SPONSORED BY



All attendees are invited to this "happy hour" reception to view and discuss the work presented by the students participating in this year's poster competition. The reception will be held **Monday, 17 July from 18:00-19:30 hrs in Imperial 4/6/8**.



GIRLETZ RANCH WILD WEST SHOW SPONSORED BY



leidos

The ICES community will enjoy a one-of-a-kind **Wild West Show at the Girletz Ranch on the evening of Tuesday 18 July**. Casual attire and cowboy boots preferred! Additional tickets for guests may be purchased at the ICES Registration/Info desk.

Buses depart @ 17:30 for the Ranch.

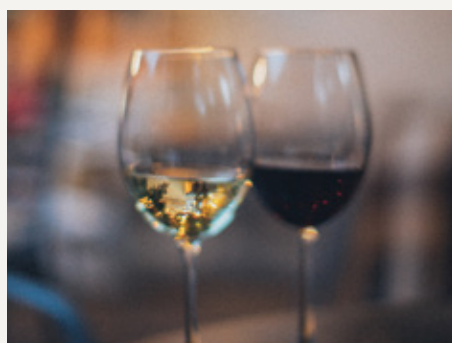




EARLY CAREER WORKSHOP SPONSORED BY



This casual forum is designed to allow for a unique networking opportunity for students and young professionals to connect with veterans in the field to ask about how to best develop their future careers in the domain of environmental systems. This Workshop will take place on **Wednesday, 19 July at 16:00-17:30 hrs in the Thomsons Social Hub** (back of the hotel restaurant). If you have not had an opportunity to RSVP for this event, please stop by the ICES Registration/Information desk on the lower level to let us know you are interested in attending.



ICES AWARDS BANQUET

The ICES 2023 Awards Banquet will be held at the **Hyatt Regency Calgary on Wednesday, 19 July**.

PRE-BANQUET RECEPTION

Join us for a happy hour before the Banquet at **18:15 hrs in the Grand Foyer**.



ICES AWARDS BANQUET SPONSORED BY



The reception will be **followed by dinner in the Imperial Ballroom** which includes an awards program and a keynote presentation by **Dr. Lisa Watson-Morgan, Manager - Human Landing System Program** (NASA Marshall Space Flight Center).

Additional tickets for guests may be purchased at the ICES Registration/Info Desk and each ticket includes both the pre-reception and the dessert reception.



DESSERT RECEPTION SPONSORED BY



Immediately following the awards presentation there will be a **Dessert Reception in the Atrium + Thomsons Kitchen & Bar** on the lobby level.



PROGRAM AT A GLANCE

SUNDAY, 16 JULY 2023

13:00 hrs	CONFERENCE REGISTRATION	GRAND FOYER 1
17:30 hrs	WELCOME RECEPTION sponsored by Collins Aerospace	ATRIUM + THOMSONS KITCHEN & BAR

MONDAY, 17 JULY 2023

7:00 hrs	SESSION CHAIR & SPEAKER BREAKFAST <small>*for Monday + Tuesday Presenters*</small>	IMPERIAL 5/7/9
8:30 hrs	OPENING PLENARY SESSION sponsored by Vertex Aerospace	IMPERIAL BALLROOM
10:00 hrs	Networking Coffee Break	GRAND FOYER 2/3/4
10:30 hrs	TECHNICAL SESSIONS Two-Phase Thermal Control Technology - ICES201-A Thermal and Environmental Control Engineering Analysis and Software - ICES207-A International Space Station ECLS: Systems - ICES404 Extravehicular Activity: Systems - ICES401 Life Science/Life Support Research Technologies - ICES500-A Physio-Chemical Life Support - Water Recovery & Management Systems - Technology and Process Development - ICES303-A	WALKER/BANNERMAN DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 2 IMPERIAL 3
12:00 hrs	Lunch Break - Attendees on Own	
12:00 hrs	STUDENT POSTER JUDGING (Lunch provided to students and judges)	IMPERIAL 4/6/8
14:00 hrs	TECHNICAL SESSIONS Two-Phase Thermal Control Technology - ICES201-B Thermal Control for Planetary and Small Body Surface Missions - ICES102-A Extravehicular Activity: PLSS Systems - ICES402-A Extravehicular Activity: Space Suits - ICES400-A Life Science/Life Support Research Technologies - ICES500-B Physio-Chemical Life Support - Water Recovery & Management Systems - Technology and Process Development - ICES303-B Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-A Advanced Life Support Sensor and Control Technology - ICES205-A Space Architecture - ICES502-A	WALKER/BANNERMAN DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 2 IMPERIAL 3 IMPERIAL 5 IMPERIAL 7 IMPERIAL 9
16:00 hrs	Networking Coffee Break	GRAND FOYER 2/3/4
16:30 hrs	TECHNICAL SESSIONS Two-Phase Thermal Control Technology - ICES201-C Thermal Control for Planetary and Small Body Surface Missions - ICES102-B Extravehicular Activity: PLSS Systems - ICES402-B Extravehicular Activity: Space Suits - ICES400-B Human Exploration Beyond Low Earth Orbit: Missions and Technologies - ICES506-A Physio-Chemical Life Support - Water Recovery & Management Systems - Technology and Process Development - ICES303-C Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-B Advanced Life Support Sensor and Control Technology - ICES205-B Space Architecture - ICES502-B	WALKER/BANNERMAN DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 2 IMPERIAL 3 IMPERIAL 5 IMPERIAL 7 IMPERIAL 9
18:00 hrs	STUDENT POSTER RECEPTION sponsored by Boeing	IMPERIAL BALLROOM

TUESDAY, 18 JULY 2023

8:00 hrs	<p>TECHNICAL SESSIONS</p> <p>201: Two-Phase Thermal Control Technology - ICES201-D</p> <p>206: Crewed Orbiting Infrastructures, Habitats, Space Station and Payload Thermal Control - ICES206</p> <p>Thermal Control for Planetary and Small Body Surface Missions - ICES102-C</p> <p>Extravehicular Activity: PLSS Systems - ICES402-C</p> <p>Extravehicular Activity: Space Suits - ICES400-C</p> <p>Human Exploration Beyond Low Earth Orbit: Missions and Technologies - ICES506-B</p> <p>Physio-Chemical Life Support - Water Recovery & Management Systems - Technology and Process Development - ICES303-D</p> <p>Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-C</p> <p>Advanced Life Support Sensor and Control Technology - ICES205-C</p> <p>Space Architecture - ICES502-C</p>	<p>WALKER/BANNERMAN</p> <p>WALKER/BANNERMAN</p> <p>DOLL/HERALD</p> <p>STEPHEN AB</p> <p>IMPERIAL 1</p> <p>IMPERIAL 2</p> <p>IMPERIAL 3</p> <p>IMPERIAL 5</p> <p>IMPERIAL 7</p> <p>IMPERIAL 9</p>
10:00 hrs	Networking Coffee Break	GRAND FOYER 2/3/4
10:30 hrs	<p>TECHNICAL SESSIONS</p> <p>Satellite, Payload, and Instrument Thermal Control - ICES202-A</p> <p>Advances in Thermal Control Technology - ICES104-A</p> <p>Human Health and Performance Analysis - ICES513-A</p> <p>ISS US EVA-80 Water Helmet Incident Investigation - ICES408-A</p> <p>Human Exploration Beyond Low Earth Orbit: Missions and Technologies - ICES506-C</p> <p>Physio-Chemical Life Support - Water Recovery & Management Systems - Technology and Process Development - ICES303-E</p> <p>Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-D</p> <p>ECLSS Modeling and Test Correlations - ICES300-A</p> <p>Space Architecture - ICES502-D</p>	<p>WALKER/BANNERMAN</p> <p>DOLL/HERALD</p> <p>STEPHEN AB</p> <p>IMPERIAL 1</p> <p>IMPERIAL 2</p> <p>IMPERIAL 3</p> <p>IMPERIAL 5</p> <p>IMPERIAL 7</p> <p>IMPERIAL 9</p>
12:30 hrs	Lunch Break - Attendees on Own	
12:30 hrs	<p>Committee Meeting Luncheons:</p> <p>TECS Thermal and Environmental Control Systems Committee</p> <p>AICHe Environmental Systems Committee</p> <p>AIAA Life Sciences & Systems Technical Committee</p>	<p>The Studio (2nd floor)</p> <p>The Gallery (2nd floor)</p> <p>Stephen B</p>
14:30 hrs	<p>TECHNICAL SESSIONS</p> <p>Satellite, Payload, and Instrument Thermal Control - ICES202-B</p> <p>Advances in Thermal Control Technology - ICES104-B</p> <p>Human Health and Performance Analysis - ICES513-B</p> <p>ISS US EVA-80 Water Helmet Incident Investigation - ICES408-B</p> <p>Human Exploration Beyond Low Earth Orbit: Missions and Technologies - ICES506-D</p> <p>Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development - ICES304-A</p> <p>Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-E</p> <p>ECLSS Modeling and Test Correlations - ICES300-B</p> <p>Fire Safety in Spacecraft and Enclosed Habitats - ICES509-A</p>	<p>WALKER/BANNERMAN</p> <p>DOLL/HERALD</p> <p>STEPHEN AB</p> <p>IMPERIAL 1</p> <p>IMPERIAL 2</p> <p>IMPERIAL 3</p> <p>IMPERIAL 5</p> <p>IMPERIAL 7</p> <p>IMPERIAL 9</p>
17:30 hrs	Wild West Show at Girletz Ranch - sponsored by Leidos (Buses depart at 17:30 from front of hotel)	GIRLETZ RANCH



PROGRAM AT A GLANCE

WEDNESDAY, 19 JULY 2023

7:00 hrs	SESSION CHAIR & SPEAKER BREAKFAST <small>*for Wednesday + Thursday Presenters*</small>	IMPERIAL 4/6/8
8:30 hrs	TECHNICAL SESSIONS Spacecraft and Instrument Thermal Systems - ICES101-A Advances in Thermal Control Technology - ICES104-C Thermal Control of Commercial and Exploration Spacecraft - ICES103-A Spacecraft Water/Air Quality: Maintenance and Monitoring - ICES406-A Human/Robotics System Integration - ICES405 Collaboration, Educational Outreach, and Public Engagement - ICES307-A Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development - ICES304-B Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-F Management of Air Quality in Sealed Environments - ICES504 Planetary and Spacecraft Dust Properties and Mitigation Technologies - ICES510-A Fire Safety in Spacecraft and Enclosed Habitats - ICES509-B	WALKER/BANNERMAN DOLL/HERALD DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 2 IMPERIAL 3 IMPERIAL 5 IMPERIAL 5 IMPERIAL 7 IMPERIAL 9
10:00 hrs	Networking Coffee Break	GRAND FOYER 2/3/4
10:30 hrs	TECHNICAL SESSIONS Spacecraft and Instrument Thermal Systems - ICES101-B Thermal Control of Commercial and Exploration Spacecraft - ICES103-B Spacecraft Water/Air Quality: Maintenance and Monitoring - ICES406-B Extravehicular Activity: Emerging Space Suit Technologies - ICES407-A Collaboration, Educational Outreach, and Public Engagement - ICES307-B Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development - ICES304-C Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-G Planetary and Spacecraft Dust Properties and Mitigation Technologies - ICES510-B Fire Safety in Spacecraft and Enclosed Habitats - ICES509-C	WALKER/BANNERMAN DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 2 IMPERIAL 3 IMPERIAL 5 IMPERIAL 7 IMPERIAL 9
12:00 hrs	Lunch Break - Attendees on Own	
12:00 hrs	Committee Meeting Luncheons: IIC ICES International Committee ICS ICES Crew Systems Technical Committee	The Studio (2nd floor) The Gallery (2nd floor)
14:00 hrs	TECHNICAL SESSIONS Thermal Design of Cubesats, Nanosats, and Other Small Satellites - ICES107 Life Support Systems Engineering and Analysis - ICES501 Bioregenerative Life Support - ICES204-A Extravehicular Activity: Emerging Space Suit Technologies - ICES407-B Collaboration, Educational Outreach, and Public Engagement - ICES307-C Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development - ICES304-D Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-H Environmental Control of Commercial and Exploration Spacecraft - ICES305 Advanced Life Support Systems Control - ICES301 Advanced Technologies for In-Situ Resource Utilization - ICES308-A	WALKER/BANNERMAN DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 2 IMPERIAL 3 IMPERIAL 5 IMPERIAL 5 IMPERIAL 7 IMPERIAL 9
16:00 hrs	Early Career Workshop sponsored by Oceaneering	THOMSONS SOCIAL HUB
18:15 hrs	Pre-Banquet Reception	GRAND FOYER 2/3/4
19:00 hrs	ICES 2023 Awards Banquet sponsored by Sierra Space	IMPERIAL BALLROOM
21:00 hrs	Dessert Reception sponsored by Paragon Space Development Corporation	ATRIUM + THOMSONS KITCHEN & BAR

THURSDAY, 20 JULY 2023

8:30 hrs	Early Morning Coffee Break	GRAND FOYER 2/3/4
9:00 hrs	TECHNICAL SESSIONS Thermal Testing - ICES203-A Thermal and Environmental Control Engineering Analysis and Software - ICES207-B Bioregenerative Life Support - ICES204-B Extravehicular Activity: Space Suit and Surface Mobility Operations - ICES403-A Reliability for Space Based Systems - ICES511 Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development - ICES304-E Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-I Radiation Issues for Space Flight - ICES503 Advanced Technologies for In-Situ Resource Utilization - ICES308-B	WALKER/BANNERMAN DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 2 IMPERIAL 3 IMPERIAL 5 IMPERIAL 7 IMPERIAL 9
10:30 hrs	Networking Coffee Break	GRAND FOYER 2/3/4
11:00 hrs	TECHNICAL SESSIONS Thermal Testing - ICES203-B Thermal and Environmental Control Engineering Analysis and Software - ICES207-C Bioregenerative Life Support - ICES204-C Extravehicular Activity: Space Suit and Surface Mobility Operations - ICES403-B Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development - ICES304-F Physio-Chemical Life Support - Air Revitalization Systems - Technology and Process Development - ICES302-J Advanced Technologies for In-Situ Resource Utilization - ICES308-C	WALKER/BANNERMAN DOLL/HERALD STEPHEN AB IMPERIAL 1 IMPERIAL 3 IMPERIAL 5 IMPERIAL 9



OPENING PLENARY SESSION



MONDAY, 17 JULY – 8:30 HRS
IMPERIAL BALLROOM 4/6/8

JEREMY PARSONS —————

Deputy Program Manager for the Exploration
Ground Systems Program

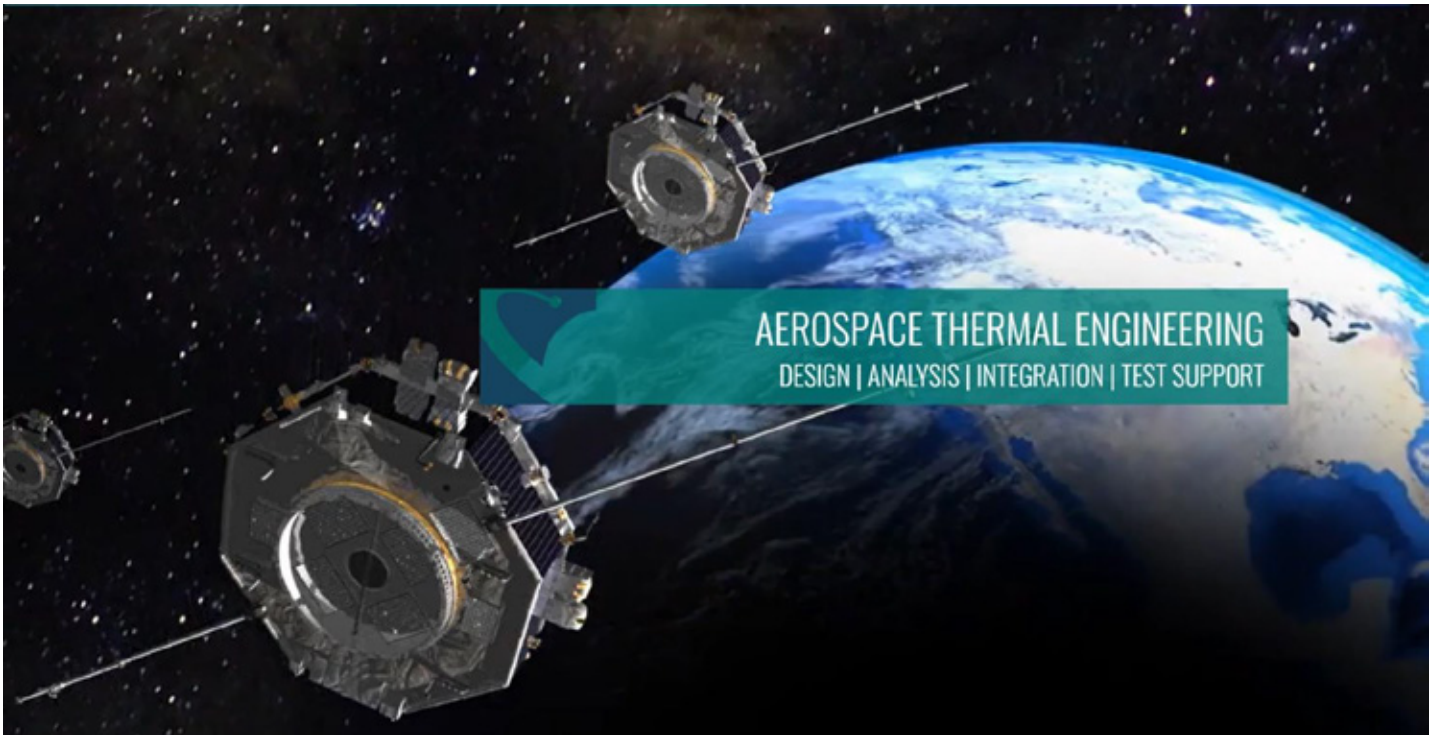
NASA Kennedy Space Center

Jeremy W. Parsons is the deputy manager of NASA's Exploration Ground Systems (EGS) Program at the John F. Kennedy Space Center in Florida. Appointed to this position in July 2019, he, along with the program manager, is responsible for leading the government and contractor team that is preparing the ground systems, infrastructure, facilities and processes required to support NASA's next-generation space launch systems and spacecraft and then processing those same vehicles for launch.

Parsons began his career with NASA in 2002 as a mission operations engineer for the International Space Station and Payload Processing Directorate at Kennedy. There, he was able to serve as the operations engineering lead for several space station missions, as well as payload launch and landing activities. Later, he was able to leverage that experience working for the Constellation Program leading cost and concept of operations assessments for vertical integration planning.

Parsons also spent time at NASA Headquarters supporting cost analysis for the Human Exploration Framework Team (HEFT). HEFT ultimately made many of the recommendations that resulted in the exploration architecture of the Space Launch System (SLS) and Orion vehicles. He was able to use his HEFT experience to serve as the NASA fellow to former U.S. Senator Bill Nelson, the chair of the Senate Science and Space Subcommittee. In this role, he served as the science and space advisor to the senator during a time of major transition at NASA. Upon his return from Washington D.C., Parsons assumed the role of technical manager, and eventually, branch chief of the Operations Integration Office within the Ground Systems Development and Operations Program at Kennedy.

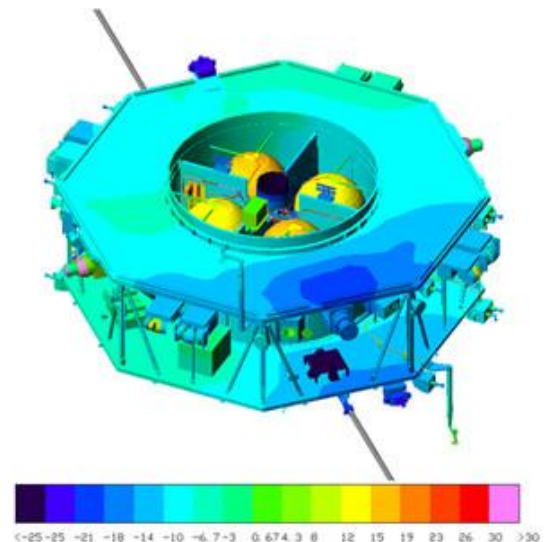
Parsons has served in leadership positions across the EGS program, including deputy division chief of the project management division and senior project manager for launch accessories. In this capacity, he led the final fabrication and testing of the launch umbilicals for SLS and Orion. Later as the chief of the systems engineering and integration, he led the arm of the EGS program that acts as the primary technical integration voice within the program office. In this capacity, he was responsible for all requirements satisfaction, waivers, deviations, processes and coordination across SLS/Orion. He also assumed leadership of the Program Review Board and Joint Integration Control Board (PRB/JICB), which are the senior technical configuration control boards at the program and cross-program level.



Vertex Aerospace, LLC is an engineering services company headquartered in Maryland, specializing in thermal engineering design, analysis and test support for government and industry throughout the United States.

Vertex Aerospace with more than fifty years combined experience in aerospace thermal engineering maintains a broad knowledge and state of the art expertise in:

- Design, analysis, integration, test, and verification of satellite thermal control systems (TCS) that include spacecraft, instruments, avionics boxes and PCBs.
- The latest Thermal Desktop and SINDA/FLUINT software.
- Specifying flight thermal control system (TCS) hardware.
- Introducing design concepts, thermal control options and negotiating interfaces between subsystems.
- Developing TCS requirements, specifications, analysis reports, test plans, test procedures and test reports.
- Supporting thermal vacuum and thermal balance testing.
- Correlating thermal models to thermal balance data and flight data.



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FLOOR PLAN
Second Floor

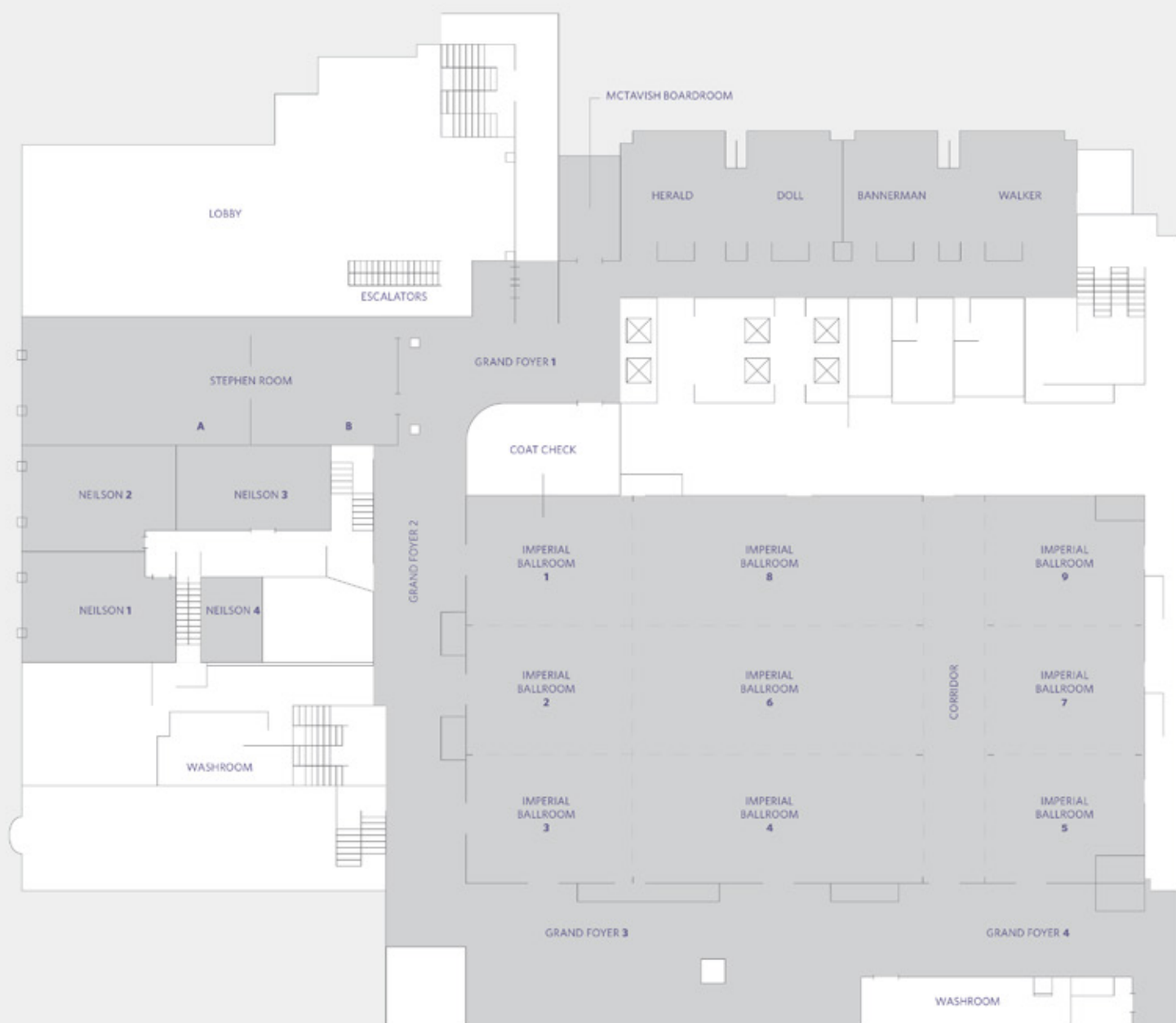


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FLOOR PLAN

Third Floor





MONDAY

17 JULY
LATE MORNING

WALKER/BANNERMAN

ICES201-A: IIC Two-Phase Thermal Control Technology

ORGANIZERS:

FRANK BODENDIECK, OHB SYSTEM AG
STÉPHANE LAPENSÉE, EUROPEAN SPACE AGENCY
GUANGHAN WANG, CANADIAN SPACE AGENCY
FRANCISCO ROMERA, IBERESPACIO S.A.
ALAIN CHAIX, THALES ALENIA SPACE

DOLL/HERALD

ICES207-A: IIC/TECS Thermal and Environmental Control Engineering Analysis and Software

ORGANIZERS:

HENRI BROUQUET, ITP AERO
BRIAN BRIGGS, NASA JET PROPULSION LABORATORY
MATTHEW VAUGHAN, EUROPEAN SPACE AGENCY
HUME PEABODY, NASA GODDARD SPACE FLIGHT CENTER

STEPHEN A/B

ICES404: ICS International Space Station ECLS: Systems

ORGANIZERS:

STEVEN BALISTRERI, THE BOEING COMPANY
JOHN COVER, NASA JOHNSON SPACE

10:30

ICES-2023-5 Development of a Deployable, Freeze- Tolerant Condensing Radiator for Spaceborne Two-Phase Pumped Loops

Thomas Conboy (Creare, LLC), Daniel Kromer (Creare, LLC)
and Eric Sunada (Jet Propulsion Laboratory)

ICES-2023-129 Novel Methods for Modeling Thermochromic Variable Emissivity Surfaces

Derek Hengeveld (Redwire) and Jonathan Allison
(Air Force Research Laboratory, Space Vehicles Directorate)

ICES-2023-437 International Space Station (ISS) Environmental Control and Life Support (ECLS) System Overview of Events 2022

Steven Balistreri (The Boeing Company)
and John Cover (NASA)

11:00

ICES-2023-440 Multi-criteria Optimization of Two-phase Thermal Control System of Space Vehicle

Gennadiy Gorbenko (Center of Technical Physics LLC),
Rustem Turna (Center of Technical Physics LLC) and Artem
Hodunov (National Aerospace University«Kharkov Aviation
Institute»)

ICES-2023-77 Alternate Approach to Multi-Layer Insulation Modeling to Reduce Node Count

Hume Peabody (NASA-GSFC) and Chris Evans (NASA-GSFC)

ICES-2023-97 Status of ISS Water Management and Recovery

Jill Williamson (NASA), Hieu Luong (The Boeing
Company), Kristina Robinson (The Boeing Company)
and Jonathan P. Wilson (NASA)

11:30

ICES-2023-332 Experimental Comparison of Two-Phase Heat Spreaders for Space Modular Electronics

Sai Kiran Hota (Advanced Cooling Technologies, Inc.),
Kuan-Lin Lee (Advanced Cooling Technologies, Inc.), Greg
Hoeschele (Advanced Cooling Technologies, Inc.), Tanner
McFarland (Advanced Cooling Technologies, Inc.), Srujan
Rokkam (Advanced Cooling Technologies, Inc.) and
Richard Bonner (Advanced Cooling Technologies, Inc.)

ICES-2023-151 Improvement in Radiative Exchange Factor Calculations Using New GPU Dedicated Hardware

Daniel Navajas Ortega (IDR/UPM), Javier Piqueras
Carreño (IDR/UPM), Ignacio Torralbo Gimeno (IDR/UPM),
Isabel Pérez-Grande (IDR/UPM) and David González
Bárcena (IDR/UPM)

ICES-2023-435 Recent Major Constituent Analyzer Performance on the International Space Station

Ben Gardner (Collins Aerospace), Stephen Denson
(Collins Aerospace), Mark Huffman (Collins Aerospace)
and Tyler Zimmerman (Collins Aerospace)

IMPERIAL 1

ICES401: ICS/AIAA LS&S Extravehicular Activity: Systems

ORGANIZERS:

KEITH SPLAWN, ILC DOVER
BRIAN ALPERT, NASA JOHNSON SPACE CENTER
ERIC VALIS, ILC DOVER

ICES-2023-268 Compatibility between Exploration EVA System and Exploration Spacecrafts

Christine Kovich (NASA JSC Extravehicular Activity and Human Surface Mobility Program (EHP), (Mail Stop DI)/ The Aerospace Corporation) and Caitlin Meyer (NASA JSC Extravehicular Activity and Human Surface Mobility Program (EHP), (Mail Stop DI)/NASA)

ICES-2023-25 Requirements Engineering Scorecard and the Next-Generation Space Suit

Michael Cabrera (Jacobs Technology), Steve Simske (Colorado State University) and Julia Worrell (NASA)

ICES-2023-236 Using Virtual Reality to Envision Deployment of Spacesuit-Compatible Augmented Reality Displays for Lunar Surface Operations

Jacob Keller (Jacobs/NASA JSC), Lanssie Ma (KBR Wyle/ NASA Ames), Matthew Noyes (NASA JSC), Daren Welsh (KBR Wyle/NASA JSC), Lauren Brady (METECS /NASA JSC), Joseph Vacca (Tietronix/NASA JSC), Forrest Porter (Tietronix/NASA JSC), Skye Ray (Jacobs/NASA JSC, et al.

IMPERIAL 2

ICES500-A: AIAA LS&S/AIChE Life Science/Life Support Research Technologies

ORGANIZERS:

BOB MORROW, SIERRA NEVADA CORPORATION
JOHN WETZEL, SIERRA NEVADA CORPORATION
JEAN HUNTER, CORNELL UNIVERSITY
JOHN HOGAN, NASA AMES RESEARCH CENTER

ICES-2023-124 Legume Crop Testing for Space

Lashelle Spencer (Amentum), Jennifer Gooden (Amentum), Aaron Curry (Amentum), Takiyah Sirmons (Leidos Innovations Corporation), Raymond Wheeler (NASA) and Matthew Romeyn (NASA)

ICES-2023-125 Novel Microgreen Crop Testing for Space

Lashelle Spencer (Amentum), Jennifer Gooden (Amentum), Aaron Curry (Amentum), Takiyah Sirmons (Leidos Innovations Corporation), Raymond Wheeler (NASA) and Matthew Romeyn (NASA)

ICES-2023-163 XROOTS ISS Tech Demo of Aeroponics and Hydroponics Nutrient Delivery in Microgravity

John Wetzel (Sierra Space), Robert Morrow (Sierra Space), Guillermo Tellez (Sierra Space) and Daniel Wyman (Sierra Space)

IMPERIAL 3

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

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
MIKE FLYNN, NASA AMES RESEARCH CENTER
ANDREW JACKSON, TEXAS TECH UNIVERSITY
CESARE LOBASCIO, THALES ALENIA SPACE
PETR ANDREYCHUK, RSC ENERGIA

ICES-2023-237 To Biocide or not to Biocide? Exploring the "No Biocide" Option in Spacecraft Potable Water Systems

Mary Lou Nadeau (Aerodyne Industries LLC), Audry Almengor (JES Tech), Dean Muirhead (Barrios Technology), Mark Ott (NASA Johnson Space Center) and Michael Callahan (NASA Johnson Space Center)

ICES-2023-87 Characterization of Microbes Present in Purge Pump and Separator Assembly Ground Testing

Kristen Saban (NASA George C. Marshall Space Flight Center), Yo-Ann Velez Justiniano (NASA George C. Marshall Space Flight Center), David Long (NASA George C. Marshall Space Flight Center), Peyton Herrnecker (NASA) and Eric R. Beitle (Jacobs ESSCA)

ICES-2023-2 Material Compatibility Study of Coated Metals to Maintain Biocidal Silver in a Spacecraft Potable Water System

Rogelio Garcia Fernandez (NASA JSC - Jacobs Technology Inc.), Stacey Marshall (NASA JSC - Aerodyne Industries) and Niklas Adam (NASA JSC)



MONDAY

17 JULY

EARLY AFTERNOON

WALKER/BANNERMAN

ICES201-B: IIC Two-Phase Thermal Control Technology

ORGANIZERS:

FRANK BODENDIECK, OHB SYSTEM AG
STÉPHANE LAPENSÉE, EUROPEAN SPACE AGENCY
GUANGHAN WANG, CANADIAN SPACE AGENCY
FRANCISCO ROMERA, IBERESPACIO S.A.
ALAIN CHAIX, THALES ALENIA SPACE

ICES-2023-11 Development and Testing of a Two-Phase Mechanically Pumped Loop for Active Antennae

Henk Jan van Gerner, Johannes van Es, Ramon van den Berg (NLR), Anne Tailliez (AIRBUS Defence and Space), Andy Walker (ADS France), Charlton Castro, Cristina Ortega (AVS Added Value Solutions), Mónica Iriarte (AVS - Added Value Solutions, Elgoibar), et al.

ICES-2023-85 Two Phase Capillary Evaporator Characterization for an Ammonia Cooling MPL Dedicated to Highly Dissipative Electronic

Benjamin Lagier (IRT Saint Exupéry Toulouse (AIRBUS Defence and Space)), Frédéric Boudesseul (IRT Saint Exupéry Toulouse (THALES Alenia Space)) and Laure Baert-Authier (IRT Saint Exupéry Toulouse (EPSYL))

ICES-2023-57 Additively Manufactured Heat Pipe Performance and Modeling

Payton Batliner, Alex Pagano, John McHale, Natalie Walsh, Jacob Rome, Xueyong Kevin Qu and Glenn Bean (The Aerospace Corporation)

ICES-2023-19 Fabrication and Evaluation of an Oscillating Heat Pipe with Check Valves by Metal Additive Manufacturing

Makiko Ando, Kousuke Tanaka, Atsushi Okamoto (Japan Aerospace Exploration Agency), Koutaro Matsushige (Nikkeikin Aluminium Core Technology Co, Ltd.), Kentaro Tanaka and Shinya Okuma (Azuma Kinzoku Sangyo Co., Ltd.)

DOLL/HERALD

ICES102-A: TECS Thermal Control for Planetary and Small Body Surface Missions

ORGANIZERS:

JENNIFER MILLER, NASA JET PROPULSION
LABORATORY
GAJ BIRUR, NASA JET PROPULSION LABORATORY

ICES-2023-388 Dragonfly: Thermal Control System Design Overview

Gary Holtzman, Jane He, Robert Coker, Hui Liu, Dahway Lin, Bruce Williams, Elisabeth Abel and Carl Ercol (The Johns Hopkins University Applied Physics Laboratory LLC)

ICES-2023-389 Dragonfly: Lander Thermal System Modeling

Robert Coker, Gary Holtzman, Jane He, Hui Liu, Dahway Lin, Bruce Williams and Elisabeth Abel (The Johns Hopkins University Applied Physics Laboratory LLC)

ICES-2023-390 Dragonfly: Lander Thermal Testing

Dahway Lin, Bruce Williams, Gary Holtzman, Jane He, Robert Coker, Hui Liu and Elisabeth Abel (The Johns Hopkins University Applied Physics Laboratory LLC)

ICES-2023-392 Dragonfly: Lander Computational Fluid Dynamics (CFD) Thermal Analysis on Titan Surface

Hui Liu, Jane He, Gary Holtzman, Bruce Williams, Dahway Lin, Robert Coker and Elisabeth Abel (The Johns Hopkins University Applied Physics Laboratory LLC)

STEPHEN A/B

ICES402-A: ICS Extravehicular Activity: PLSS Systems

ORGANIZERS:

GREGORY QUINN, COLLINS AEROSPACE
BRUCE CONGER, JACOBS
GREG GUYETTE, COLLINS AEROSPACE

ICES-2023-160 The Development of Carbon-Based Sorbent Monoliths – a Review

Marek A. Wojtowicz (Advanced Fuel Research, INC), Joseph E. Cosgrove (Advanced Fuel Research, INC), Michael A. Serio (Advanced Fuel Research, INC), Andrew E. Carlson (Advanced Fuel Research, INC) and Cinda Chullen (NASA)

ICES-2023-320 Nanoporous Silica as a Regenerable Sorbent for Potential Integration into NASA's Trace Contamination Control System

Evgueni Kadossov (XploSafe LLC), Nick Materer, Allen Applett (Oklahoma State University), Shoaib Shaikh, Mallikharjuna Komarneni, Michael Teicheira (XploSafe), Cinda Chullen (NASA), John Hostetler (Axiom Space) et al.

ICES-2023-399 Design and Performance Maturation of Regenerable Trace Contaminant Control for Removal of Ammonia and Other Trace Constituents

Christian Junaedi (Precision Combustion, Inc.), Kyle Hawley (Precision Combustion, Inc.), Codruta Loebeck (Precision Combustion, Inc.) and Sinead Flanagan (Precision Combustion, Inc.)

ICES-2023-324 Test Bed for Evaluation of Sorbents Used in the Exploration Portable Life Support System

Nick Materer (Oklahoma State University), Evgueni Kadossov (XploSafe), Allen Applett (Oklahoma State University), Mallikharjuna Komarneni (XploSafe), Shoaib Shaikh (XploSafe), Michael Teicheira (XploSafe), Cinda Chullen (NASA) and Kelsey Bloom (NASA)

IMPERIAL 1

ICES400-A: ICS Extravehicular Activity: Space Suits

ORGANIZERS:

JINNY FERL, ILC DOVER
KRISTINE DAVIS, NASA JOHNSON SPACE CENTER
KATYA ARQUILLA, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ICES-2023-121 NASA Advanced Space Suit Pressure Garment System Status and Development Priorities 2023

Shane McFarland (NASA), Richard Rhodes (NASA) and
Don Campbell (KBR/NASA-JSC)

ICES-2023-240 Design for Custom Shaped Spacesuit, and Optimizing the Fit of Spacesuit Hard Upper Torsos

Will Green (University of North Dakota), Pablo De Leon
(University of North Dakota), Jesse Rhoades (University
of North Dakota) and Han Kim (Leidos, Inc)

ICES-2023-286 Exploration Extra-Vehicular Mobility Unit (xEMU) Composite Hard Upper Torso (CHUT) Development

Shridhar Yarlagadda, David Roseman, Joseph Cipriani,
Nicholas Shevchenko, John Tierney, John Gillespie
Jr (Center for Composite Materials, University of
Delaware), Mohan Parthasarathy (Altair Engineering),
Richard Rhodes (NASA), Daniel Kim (NASA) et al.

ICES-2023-33 Exploration Helmet Permanent Anti-fog Study

Kristine Davis (NASA) and Greg Trude (Air-Lock Inc)

IMPERIAL 2

ICES500-B: AIAA LS&S/AICHe Life Science/Life Support Research Technologies

ORGANIZERS:

BOB MORROW, SIERRA NEVADA CORPORATION
JOHN WETZEL, SIERRA NEVADA CORPORATION
JEAN HUNTER, CORNELL UNIVERSITY
JOHN HOGAN, NASA AMES RESEARCH CENTER

ICES-2023-147 ECLSS Technology Roadmap at Spaceship FR

Gregory Navarro (CNES), Marie-Christine Desjean (CNES)
and Alexis Paillet (CNES)

ICES-2023-224 Assessing the Recycling Potential of Cupriavidus necator for Space Travel: Production of SCPs and PHAs from Organic Wastes

Pierre Joris (TBI - INSA de Toulouse), Eric Lombard (TBI
- CNRS), Gregory Navarro (CNES), Alexis Paillet (CNES),
Nathalie Gorret (TBI - INRAE) and Stephane Guillouet
(TBI - INSA Toulouse)

ICES-2023-453 SCAMPI Project: Design of an Aquatic Closed Ecological System for Microgravity

Tarek Ben Slimane, Costanza Torchia, Patrick Grubbs,
Jorge Galvan Lobo, Alvaro Ropero, Jorge Alberto
Rodriguez, Joshua Smith, Anatole Berger (The Spring
Institute for Forest on the Moon) et al.

IMPERIAL 3

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

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
MIKE FLYNN, NASA AMES RESEARCH CENTER
ANDREW JACKSON, TEXAS TECH UNIVERSITY
CESARE LOBASCIO, THALES ALENIA SPACE
PETR ANDREYCHUK, RSC ENERGIA

ICES-2023-41 Silver Electrolysis for Disinfection of Spacecraft Potable Water: 2023 Update

Phillip Hicks (Jacobs Technology), Niklas Adam (NASA)
and Rogelio Garcia Fernandez (Jacobs Technology)

ICES-2023-251 Silver Foam: A Novel Approach for Long-Term Passive Dosing of Biocide in Spacecraft Potable Water Systems - Update 2023

Tesia Irwin (The Bionetics Corporation), Angie Diaz,
Jennifer Gooden, Mary Hummerick, Wenyan Li
(Amentum), Nilab Azim (NASA Kennedy Space Center),
Deborah Essumang (NASA Kennedy Space Center) and
Michael Callahan (NASA Johnson Space Center)

ICES-2023-68 Mitigation of Silver Ion Loss from Solution by Polymer Coating of Metal Surfaces, Part V, and Related Developments

John Vance (NASA AMES RESEARCH CENTER / KBR)
and Lance Delzeit (NASA)

ICES-2023-71 Capacitively-Coupled Contactless Conductivity Detection (C4D) for In-Line Ionic Silver Monitoring

John Vance (NASA AMES RESEARCH CENTER / KBR),
John Abdou (KBR) and Lance Delzeit (NASA)



MONDAY

17 JULY

EARLY AFTERNOON

	IMPERIAL 5	IMPERIAL 7	IMPERIAL 9
	ICES302-A: AIChE/ICS/IIC Physio-chemical Life Support - Air Revitalization Systems - Technology and Process Development	ICES205-A: IIC/AIChE Advanced Life Support Sensor and Control Technology	ICES502-A: AIAA LS&S Space Architecture
	ORGANIZERS: MORGAN ABNEY, NASA ENGINEERING AND SAFETY CENTER GRACE BELANCHIK, NASA AMES RESEARCH CENTER JIM KNOX, DYNETICS TECHNICAL SOLUTIONS PATRICK OGER, AIRBUS	ORGANIZERS: ABHIJIT V. SHEVADE, NASA JET PROPULSION LABORATORY DARRELL L. JAN, NASA AMES RESEARCH CENTER TIMO STUFFLER, OHB SYSTEM AG	ORGANIZERS: MAHSA ESFANDABADI, UNIVERSITY OF HOUSTON ANNE-MARLENE RÜEDE, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE ADAM OSWALD, BLUE ORIGIN GEORGI PETROV, SKIDMORE OWINGS & MERRILL SANDRA HAEUPLIK-MEUSBURGER, TU WIEN SPACE-CRAFT ARCHITEKTUR
14:00	ICES-2023-116 Status of the Four Bed Carbon Dioxide Scrubber ISS Technology Demonstration 2022-2023	ICES-2023-92 ANITA-2 – the Advanced Multicomponent Air Analyser for ISS – First Year of Operation, Hardware Behaviour, Expected Lifetime and Reliability as well as Future Updates for ANITA-3	ICES-2023-270 Atlas of Habitats Beyond Earth. Architectural Solutions for Space Applications
	James Knox (Knox Analytical Solutions Inc.), Gregory Cmarik (Jacobs Space Exploration Group, NASA/MSFC/ES62) and John Garr (NASA Johnson Space Center)	Lukas Pfeiffer (OHB), Michael Gisi (OHB System AG), Eckart Göhler (OHB), Roland Seurig (OHB System AG), Armin Stettner (OHB System AG), Atle Honne (SINTEF), Kristin Kaspersen (SINTEF), Jens Thielemann (SINTEF) et al.	Giacomo D'Amico (Mediterranea University of Reggio Calabria) and Marina Tornatora (Mediterranea University of Reggio Calabria)
14:30	ICES-2023-414 Test and Evaluation of the Next Generation Blower for FBCO2 Scrubber	ICES-2023-95 ANITA2 – the Advanced Multicomponent Air Analyser for ISS – Gas Measurement Results From the ISS Air in 2022	ICES-2023-128 A Methodology for the Systematic Review of Space Architecture Concepts
	Kaitlin Oliver Butler (NASA Marshall Space Flight Center), Jim Knox (Jacobs Technology, Inc.), Rasish Khatri (Calnetix Technologies), Octavio Solis (Calnetix Technologies) and John Garr (Johnson Space Center)	Atle Honne (SINTEF), Kristin Kaspersen (SINTEF), Kari Anne Hestnes Bakke (SINTEF), Anders Erik Liverud (SINTEF), Jens T. Thielemann (SINTEF), Brian Elvesæter (SINTEF), Michael Gisi (OHB System AG), Lukas Pfeiffer (OHB System AG) et al.	Annika Rollock (Aurelia Institute), Danielle DeLatte (Aurelia Institute) and Ariel Ekblaw (Aurelia Institute)
15:00	ICES-2023-423 The FY2022 Development Status of CO2 Removal System for ISS Demonstration	ICES-2023-465 Calibration and Performance of the Spacecraft Atmosphere Monitor, an Air Constituent Monitor for Human Spaceflight	ICES-2023-185 Architectural Commonalities of Critical Facilities (On and Off-Earth)
	Chiaki Yamazaki, Kentaro Hirai, Shotaro Futamura, Satoshi Matsumoto, Hideki Saruwatari (Japan Aerospace Exploration Agency), Ayako Yamamoto, Hidetoshi Nakagami, Mutsumu Nagase (Chiyoda Corporation) et al.	Murray Darrach, Byunghoon Bae, Dejian Fu, Vachik Garkanian, Margie Homer, Richard Kidd, Cecile Jung-Kubiak, Hannes Kraus (Jet Propulsion Laboratory (JPL)) et al.	Tamalee Basu (IIEST, Shibpur)
15:30	ICES-2023-119 Four Bed Carbon Dioxide Scrubber Engineering Development Unit Cabin Air Inlet Testing		ICES-2023-231 Design of Space Music Hall as a Module of Low Earth Orbit Space Station
	James Knox (Knox Analytical Solutions Inc), Gregory Cmarik (Jacobs Space Exploration Group, NASA/MSFC/ES62) and Arisa Waddle (Jacobs Space Exploration Group, NASA/MSFC/ES62)		Kazuki Toma (University of Tokyo), Shuto Takashita (University of Tokyo) and Shinichi Nakasuka (University of Tokyo)

NOTES ✨

[illegible]



MONDAY

17 JULY LATE AFTERNOON

WALKER/BANNERMAN

ICES201-C: IIC Two-Phase Thermal Control Technology

ORGANIZERS:

FRANK BODENDIECK, OHB SYSTEM AG
STÉPHANE LAPENSÉE, EUROPEAN SPACE AGENCY
GUANGHAN WANG, CANADIAN SPACE AGENCY
FRANCISCO ROMERA, IBERESPACIO S.A.
ALAIN CHAIX, THALES ALENIA SPACE

ICES-2023-158 3D Printed Wicks for Loop Heat Pipes

Rohit Gupta (Advanced Cooling Technologies, Inc.),
Chien-Hua Chen (Advanced Cooling Technologies,
Inc.) and William G. Anderson (Advanced Cooling
Technologies, INC)

ICES-2023-430 Ammonia Loop Heat Pipe with Thin Evaporator Fabricated by Additive Manufacturing

Hosei Nagano (Nagoya Univ), Satoshi Kajiyama (Nagoya
Univ), Kazuhiro Nakazawa (Nagoya Univ), Takeshi
Tsuru (Kyoto Univ) and Yuki Akizuki (Japan Aerospace
Exploration Agency)

ICES-2023-79 Prototype of Loop Heat Pipe with Electrohydrodynamic Conduction Pump for Active Shutdown Function

Masahito Nishikawara (Toyouhashi university of technol-
ogy), Takeshi Miyakita (Japan Aerospace Exploration
Agency), Genki Seshimo, Hiroshi Yokoyama and Hideki
Yanada (Toyouhashi university of technology)

DOLL/HERALD

ICES102-B: TECS Thermal Control for Planetary and Small Body Surface Missions

ORGANIZERS:

JENNIFER MILLER, NASA JET PROPULSION
LABORATORY
GAJ BIRUR, NASA JET PROPULSION LABORATORY

ICES-2023-109 Thermal Design and Control of the Main Electronic Box in Titan Environment for the DraMS Instrument

Daniel Bae (NASA GSFC), David Steinfeld (NASA GSFC),
Franklin Robinson (NASA GSFC) and Samuel Nichols
(ATA Aerospace)

ICES-2023-337 Demonstration of Ice-Extraction and Ice- Collection System for Lunar Ice Miners

Kuan-Lin Lee, Sai Kiran Hota, Quang Truong, Mojtaba
Edalatpour, Srujan Rokkam (Advanced Cooling
Technologies, Inc.) and Kris Zacny (Honeybee Robotics)

ICES-2023-472 DAVINCI EDU Descent Sphere Thermal Insulation Test Results and Model Correlation

Rommel Zara (Vertex Aerospace/GSFC) and Evan
Alexander (Vertex Aerospace/GSFC)

STEPHEN A/B

ICES402-B: ICS Extravehicular Activity: PLSS Systems

ORGANIZERS:

GREGORY QUINN, COLLINS AEROSPACE
BRUCE CONGER, JACOBS
GREG GUYETTE, COLLINS AEROSPACE

ICES-2023-27 Space Suit Portable Life Support System Oxygen Regulator History, Development, & Testing Results

Ryan Ogilvie (NASA Johnson Space Center), Colin
Campbell (NASA Johnson Space Center), Ioannis
Hatziprokopiou (Mission Systems Division, Eaton),
Robert Walz (Mission Systems Division, Eaton) and
James Rogers (Mission Systems Division, Eaton)

ICES-2023-64 xPLSS Structural Backplate Design, Manufacture, and Test Overview

Sarah Hargrove (NASA) and Sean Miller (NASA)

ICES-2023-53 Development of a Multi-Gas Microsensor Array for the Exploration Portable Life Support System

James Makel (Makel Engineering Inc.), Richard
Kokoletso (Makel Engineering Inc.), Darby Makel
(Makel Engineering Inc.), Ryan Ogilvie (NASA
Johnson Space Center) and Sepehr Bastami (NASA
Langley Research Center)

IMPERIAL 1

ICES400-B: ICS Extravehicular Activity: Space Suits

ORGANIZERS:
JINNY FERL, ILC DOVER
KRISTINE DAVIS, NASA JOHNSON SPACE CENTER
KATYA ARQUILLA, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ICES-2023-466 Development of ARGOS Offloading Assessments and Methodology for Lunar EVA Simulations

Sarah Jarvis (NASA/Aegis Aerospace), Richard Rhodes (NASA), Linh Vu (NASA/Aegis Aerospace), Garima Gupta (NASA/Aegis Aerospace), Elizabeth Benson (NASA/KBR), Han Kim (NASA/Leidos) and Sudhakar Rajulu (NASA)

ICES-2023-257 Testing Fit, Mobility, and Comfort of the Exploration Pressure Garment Subsystem (xPGS)

Richard Rhodes (NASA), Christine Flaspohler (Jacobs Technology) and Shane McFarland (NASA)

ICES-2023-58 Exploration Extravehicular Mobility Unit (xEMU) Pressure Garment System (PGS) Cycle Testing Overview and Results

Christine Flaspohler (NASA) and Richard Rhodes (NASA)

IMPERIAL 2

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

ORGANIZERS:
DAN BARTA, NASA JOHNSON SPACE CENTER
JAMES CHARTRES, MILLENNIUM ENGINEERING & INTEGRATION (MEI)
DAWN R. WHITAKER, PURDUE UNIVERSITY

ICES-2023-368 Utilizing Gaps and Performance Measures to Inform NASA Environmental Control and Life Support Systems and Crew Health and Performance Technology Decisions

James Broyan (NASA-HQ), Andrew Abercromby (NASA) and Alexander Burg (Bryce Space and Technology)

ICES-2023-312 NASA Environmental Control and Life Support Technology Development for Exploration: 2022-2023 Status

Walter Schneider (NASA), Arthur Brown (NASA), Chris Allen (NASA), Melissa McKinley (NASA), Imelda Stambaugh (NASA), Alesha Ridley (NASA), Daniel Barta (NASA) and Daniel Gazda (NASA)

ICES-2023-259 International Space Station as a Testbed for Exploration Environmental Control and Life Support Systems – 2023 Status

Alesha Ridley (NASA), Christopher Brown (NASA), John Garr (NASA), Lynda Gavin (NASA), David Hornyak (NASA), Katherine Toon (NASA), Paul Caradec (Leidos Innovations Corporation) and Allen Williams (Leidos Innovations Corporation)

IMPERIAL 3

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

ORGANIZERS:
JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
MIKE FLYNN, NASA AMES RESEARCH CENTER
ANDREW JACKSON, TEXAS TECH UNIVERSITY
CESARE LOBASCIO, THALES ALENIA SPACE
PETR ANDREYCHUK, RSC ENERGIA

ICES-2023-175 Hybrid Life Support System Full Scale Testing: Integrated Bioreactor-Desalination Long Term Testing

Ghaem Hooshyari (Texas Tech University), Arpita Bose (Texas Tech University), Jessica La-Grenade (Texas Tech University), Siddhi Kad (Texas Tech University), Michael Callahan (NASA) and William Jackson (Texas Tech University)

ICES-2023-96 CDC Bioreactor Configuration Method for Volume Level Control with Controlled Inlet and Outlet Flow

Connor Murphy (Jacobs Space Exploration Group), Eric Beitle (Jacobs Space Exploration Group) and Yo-Ann Velez Justiniano (NASA George C. Marshall Space Flight Center)

ICES-2023-90 Analysis of CDC Bioreactor Internal Thermal Measurements and Sample Coupon Temperatures

Eric Beitle (Jacobs Space Exploration Group), Connor Murphy (Jacobs Space Exploration Group), Yo-Ann Velez Justiniano (NASA George C. Marshall Spaceflight Center) and Darla Goeres (Center for Biofilm Engineering, Montana State University)



MONDAY

17 JULY LATE AFTERNOON

IMPERIAL 5

ICES302-B: AICHe/ICS/IIC Physio-chemical Life Support - Air Revitalization Systems - Technology and Process Development

ORGANIZERS:

MORGAN ABNEY, NASA ENGINEERING AND SAFETY
CENTER
GRACE BELANCHIK, NASA AMES RESEARCH CENTER
JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
PATRICK OGER, AIRBUS

16:30

ICES-2023-308 Demonstration of an Electrochemically- Driven Multi-Cell Stack Using Shorted Anion Exchange Membranes for Spacecraft Cabin Air Revitalization

Marco Colin Martinez (University of Delaware),
Stephanie Matz (University of Delaware), Brian Setzler
(University of Delaware) and Yushan Yan (University of
Delaware)

17:00

ICES-2023-376 Spacecraft Carbon Dioxide Deposition Full-Scale System: Design, Analysis, Build and Test

Pranav Jagtap (NASA Ames Research Center), Grace
Belancik (NASA Ames Research Center), Michael Schuh
(NASA Ames Research Center), Tiago Costa (NASA), Kelby
Gan (NASA Ames Research Center) and Jason Samson
(NASA Ames Research Center)

17:30

ICES-2023-70 A Cryogenic CO2 Scrubber with an Integrated Switchable Heat Pipe

Weibo Chen (JPL), Luis Fonseca Flores (JPL) and Scott
Roberts (JPL)

IMPERIAL 7

ICES205-B: IIC/AICHe Advanced Life Support Sensor and Control Technology

ORGANIZERS:

ABHIJIT V. SHEVADE, NASA JET PROPULSION
LABORATORY
DARRELL L. JAN, NASA AMES RESEARCH CENTER
TIMO STUFFLER, OHB SYSTEM AG

ICES-2023-470 SWIM: Progress Report on the Organics Detection from Water

Dragan Nikolic (Jet Propulsion Laboratory), Stojan
Madzunkov (JPL) and Jurij Simcic (Jet Propulsion
Laboratory)

ICES-2023-83 Spacecraft Water Analysis with Nanopore (SWAN)

Zehui Xia (Goeppert LLC), Brian DiPaolo (Goeppert LLC)
and David Niedzwicki (Goeppert LLC)

ICES-2023-256 Portable Tunable Laser Spectrometer (PTLS) for Human Exploration: Update on Lasers and Mesh Networking

Lance Christensen, Kamjou Mansour (Jet Propulsion
Laboratory, California Institute of Technology),
Alexander Hart, Benedito Fonseca (Northern Illinois
University), Yuebin Ning (Norcada Inc.), Simon
Wingar (National Research Council Canada), Nakeeran
Ponnampalam, Tran Tran (Norcada Inc.) et al.

IMPERIAL 9

ICES502-B: AIAA LS&S Space Architecture

ORGANIZERS:

MAHSA ESFANDABADI, UNIVERSITY OF HOUSTON
ANNE-MARLENE RÜEDE, ECOLE POLYTECHNIQUE
FEDERALE DE LAUSANNE
ADAM OSWALD, BLUE ORIGIN
GEORGI PETROV, SKIDMORE OWINGS & MERRILL
SANDRA HAEUPLIK-MEUSBURGER, TU WIEN | SPACE-
CRAFT ARCHITEKTUR

ICES-2023-182 Anthropocentric Habitation of Mars Through Parametric Design

Chi Lan Huynh, Erin Quigley, Logan Miller and
Christopher Hisle (Sasakawa International Center for
Space Architecture)

ICES-2023-253 Drop the Base: Biological, ISRU-Based Aleatory Construction System for Martian Habitats

Monika Brandić Lipińska, Martyn Dade-Robertson
(Hub for Biotechnology in the Built Environment,
Newcastle University), Meng Zhang (Hub for
Biotechnology in the Built Environment, Northumbria
University) and Lynn J. Rothschild (NASA Ames
Research Center)

ICES-2023-294 Multi-layered 3D Printed Mars Habitat Proposal, Analysis of Habitability Requirements and Autonomous Building Technologies from the NEST Team's Design at the NASA Centennial Challenge

Jose-Miguel Armijo-Vielma (Georgia Institute of
Technology), José Hernández Vargas (KTH Royal
Institute of Technology) and Priyanka Naidu (New
York City Architecture Biennial)

Engineering a sustainable future



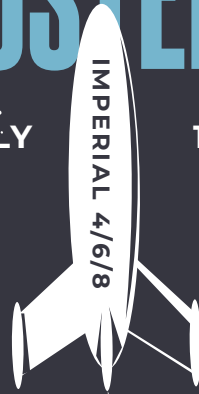
We are working on innovative solutions for a sustainable future of flight.
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STUDENT POSTER RECEPTION

MONDAY, 17 JULY

18:00-19:30 HRS



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HUMAN LANDING SYSTEM ENVIRONMENTAL CONTROL AND LIFE SUPPORT SYSTEM RESEARCH AND DESIGN

Chad Pflieger, Cody Bahan, Nathan Foote, Kathleen Laughton, James Nabity, Aanshi Panchal, Stuart Tozer and Samuel Trux (University of Colorado - Boulder)

RETURN ON INVESTMENT OF EMERGENT TECHNOLOGY FOR DEEP SPACE HABITATS: A HOME CASE STUDY

Annika Rollock and David Klaus (University of Colorado, Boulder)

ANALYSIS OF OFF-GASES FROM PACKED BED ANAMMOX REACTORS FOR SPACE HABITATION

Brennan Riley and Andrew Jackson (Texas Tech University)

ENSURING SATISFACTORY ECLSS DATA GENERATION TO TEST MACHINE LEARNING ALGORITHMS FOR ANOMALY DETECTION AND DIAGNOSTICS

Samuel Eshima and James Nabity (University of Colorado Boulder)

CHARACTERIZING THE TRADE SPACE FOR INCORPORATING EMERGING TECHNOLOGIES INTO DEEP-SPACE 'SMART' HABITATS: NEEDS AND OPPORTUNITIES

Sophia Zaccarine and David Klaus (University of Colorado at Boulder)

NONTHERMAL PLASMA WATER TREATMENT FOR THE PREVENTION AND MITIGATION OF BIOFILM IN HYDROPONIC PLANT-GROWING SYSTEMS.

Chelsea Tischler and John Foster (University of Michigan, Ann Arbor)

ECO-DESIGN OF AN INHABITED SPACE BASE ON THE MOON'S SURFACE

Augustin Gallois, Stéphanie Lizy-Destrez, Jean-Charles Chaudemar (Institut Supérieur de l'Aéronautique et de l'Espace (ISAE-SUPAERO)), Estelle Moraux (Institut de Planétologie et d'Astrophysique de Grenoble (IPAG - CNRS)), Gregory Navarro, Alexis Paillet and Julien Rey (Centre National d'Études Spatiales (CNES))

ANTHROPOCENTRIC HABITATION OF MARS THROUGH PARAMETRIC DESIGN

Chi Lan Huynh, **Chris Hisle**, Erin Quigley and **Logan Miller**
(Sasakawa International Center for Space Architecture)

PHYSICS BASED MACHINE LEARNING ALGORITHM TO VALIDATE INVERSION TECHNIQUE TO DETERMINE PARTICLE CHARACTERISTICS USING A MULTIWAVELENGTH MULTIANGLE PARTICULATE MATTER SENSOR

Shruti Choudhary, Pratim Biswas (University of Miami), Tandeep Chadha, Jiaxi Fang (Applied Particle Technology), Marit Meyer (Northrop Grumman Corporation), Paul Mudgett (National Aeronautics and Space Administration Johnson Space Center) and Claire Fortenberry (National Aeronautics and Space Administration Genn Research Center)

THERMAL RADIATION CONTROL IN SPACE USING HOLLOW MICROSPHERE-BASED COATINGS

Hoyeon Park (UC Irvine)

MANUFACTURING AN EVA SPACESUIT USING THE DIGITAL THREAD: AUTOMATIC PATTERN GENERATION FROM A DIGITAL BODY

Abigail Maltese and Bonnie J. Dunbar (Texas A&M Aerospace Engineering)

ASSESSING METABOLIC COST ACROSS SPEEDS, INCLINES, AND GRAVITY LEVELS WITH THE VERTICAL OFFLOADING POWER DEVICE

Logan Kluis, Callie Wynn and Ana Diaz-Artiles (Texas A&M University)

QUALITATIVE EVALUATION OF THE GRAVITY LOADING COUNTERMEASURE SKINSUIT DURING EXERCISE AND FUNCTIONAL ACTIVITY IN LOW-EARTH ORBIT

Rachel Bellisle (Harvard-MIT Health Sciences and Technology; Draper Scholar Program at The Charles Stark Draper Laboratory, Inc.), Katya Arquilla, Lonnie Petersen, Dava Newman (Department of Aeronautics and Astronautics, Massachusetts Institute of Technology) and Andrea Webb (The Charles Stark Draper Laboratory, Inc.)

BIOMASS QUANTIFICATION METHODS FOR THE STUDY OF MICROBIAL FOULING IN THE INTERNATIONAL SPACE STATION WATER PROCESSOR ASSEMBLY

Micah Hickethier, Elizabeth Sandvik (Center for Biofilm Engineering) and Phil Stewart (Department of Chemical and Biological Engineering Montana State University)

COPOLYMER NANOFIBER EXPERIMENTATION FOR BIOFILM CONTAMINATION PREVENTION IN THE WATER PROCESSOR ASSEMBLY ON THE INTERNATIONAL SPACE STATION

Emma Johnson, Arnav Gonella (Georgia Institute of Technology), Bailey Hodakievic, Samiksha Chandran, Jacob Weinstein and Leidy Rosario Duran (University of Houston)

PILOT TESTING OF THE EFFECTS OF SIMULATED PARTIAL GRAVITY ON ANKLE PROPRIOCEPTION

Nicole McGaa, Rachel Bellisle, Dava Newman (MIT), Gordon Wadding and Ashleigh Marchant (University of Canberra)

HOLEY SILICON-BASED THERMOPILES FOR HIGH-SENSITIVITY BROADBAND THERMAL DETECTION

Jiahui Cao and Jaeho Lee (University of California, Irvine)

TOWARDS A SIMULATION METHODOLOGY FOR EARTH-INDEPENDENT ANOMALY RESPONSE IN DEEP SPACE HABITATS

Patrick Pischulti and David Klaus (University of Colorado Boulder)





TUESDAY

18 JULY
EARLY MORNING

WALKER/BANNERMAN

**ICES201-D: IIC
ICES206: IIC/TECS**

201: Two-Phase Thermal Control Technology
206: Crewed Orbiting Infrastructures, Habitats,
Space Station and Payload Thermal Control

201 ORGANIZERS:
FRANK BODENDIECK,
OHV SYSTEM AG
STÉPHANE LAPENSÉE,
EUROPEAN SPACE AGENCY
GUANGHAN WANG,
CANADIAN SPACE AGENCY
FRANCISCO ROMERA,
IBERESPACIO S.A.
ALAIN CHAIX, THALES
ALENIA SPACE

206 ORGANIZERS:
PATRICK OGER, AIRBUS
MATTEO LAMANTEA, THALES
ALENIA SPACE
DIEGO MUGURUSA,
COLLINS AEROSPACE
DALE WINTON, HONEYWELL
INTERNATIONAL

8:00

ICES-2023-213 (ICES201)
Development and Characterization of
Additive Manufacturing Flat Loop Heat
Pipe Evaporator

Javier Corrochano (Arquimea Space), Francisco Romera
(Arquimea Space), Carlos Galleguillos (FADA-CATEC),
Antonio Perinán (FADA-CATEC), Fernando Lasagni (FADA-
CATEC), Marco Gottero (Thales Alenia Space Italia) and
Stéphane Lapensée (ESA-ESTEC)

8:30

ICES-2023-159 (ICES201)
Operating Characteristics of Cryogenic Loop
Heat Pipes at Different Filling Pressures

Takeshi Yokouchi (Institute of Fluid Science, Tohoku
University), Xinyu Chang (Institute of Fluid Science), Kimihide
Odagiri (Japan Aerospace Exploration Agency), Hiroyuki
Ogawa (Japan Aerospace Exploration Agency), Hosei Nagano
(Department of Mechanical System Engineering, Nagoya
University) and Hiroki Nagai (Institute of Fluid Science)

9:00

ICES-2023-198 (ICES201)
Sublimation Cooling Technology for
CubeSat Thermal Control

Janine Moses (University of California, Davis) and
Stephen Robinson (University of California, Davis)

9:30

ICES-2023-131 (ICES206)
Novel Vapor Chambers for Heating and Cooling of
Advanced Sorption Systems

Haley Myer (Advanced Cooling Technologies) and
Michael C. Ellis (Advanced Cooling Technologies, INC)

DOLL/HERALD

ICES102-C: TECS
Thermal Control for Planetary and Small
Body Surface Missions

ORGANIZERS:
JENNIFER MILLER, NASA JET PROPULSION
LABORATORY
GAJ BIRUR, NASA JET PROPULSION LABORATORY

ICES-2023-238
MMX Rover: Thermal Control Design and
Validation of a Rover on Phobos Martian Moon

Maxime André (CNES)

STEPHEN A/B

ICES402-C: ICS
Extravehicular Activity: PLSS Systems

ORGANIZERS:
GREGORY QUINN, COLLINS AEROSPACE
BRUCE CONGER, JACOBS
GREG GUYETTE, COLLINS AEROSPACE

ICES-2023-35
Ventilation Heat Exchanger/Flow Meter for
xPLSS

Michael Izenson (Creare Inc.), Adam Niblick (Creare LLC),
Sheldon Stokes (Creare LLC) and Tessa Rundle (NASA)

ICES-2023-26
Space Suit Portable Life Support System
Thermal Control Valve Ball Design

Ryan Ogilvie (NASA Johnson Space Center), Sean
Miller (NASA Johnson Space Center) and Tessa Rundle
(NASA Johnson Space Center)

ICES-2023-267
SERFE PLSS Component Lessons Learned from ISS

Alicia Contreras-Baker (NASA/Jacobs), David
Westheimer (NASA) and Chane Sladek (NASA/Jacobs)

IMPERIAL 1

ICES400-C: ICS Extravehicular Activity: Space Suits

ORGANIZERS:

JINNY FERL, ILC DOVER
KRISTINE DAVIS, NASA JOHNSON SPACE CENTER
KATYA ARQUILLA, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ICES-2023-34 Initial Testing of the Exploration Extravehicular Mobility Unit (xEMU) in Lunar Environment Simulation at the Neutral Buoyancy Lab (NBL) in 2022

Kristine Davis (NASA), Zachary Tejral (NASA), Tommy Keomany (NASA) and Linh Vu (MEI Technologies)

ICES-2023-37 Establishing Standardized Test Methods for Evaluating Space Suit Gloves

Robert Jones (NASA), Richard Rhodes (NASA), Morgan Abney (NASA NESCA), Timothy Brady (NASA NESCA), Shane McFarland (NASA), Joseph Settles (NASA), Chanel Stephens (NASA), Andrew Hoyle (NASA) et al.

00:8

02:8

00:6

02:6

IMPERIAL 2

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

ORGANIZERS:

DAN BARTA, NASA JOHNSON SPACE CENTER
JAMES CHARTRES, MILLENNIUM ENGINEERING & INTEGRATION (MEI)
DAWN R. WHITAKER, PURDUE UNIVERSITY

ICES-2023-265 Environmental Control and Life Support (ECLS) System Options for Mars Transit and Mars Surface Missions

Zach Bryant (Jacobs Space Exploration Group), Andrew Choate (Jacobs Space Exploration Group) and David Howard (NASA Marshall Space Flight Center)

ICES-2023-321 NextSTEP Appendix A Modular ECLSS Effort Lessons Learned

James Clawson (NASA HQ (Stellar Solutions, Inc)), Daniel Barta (NASA), Walter Schneider (NASA), Marlon Cox (NASA) and David Howard (NASA)

ICES-2023-451 Lunar SmartHab Mission Operations and Crew Day-In-The-Life

Kenneth Pritchard (Purdue University), Luca Vaccino (Purdue University), Xiaoyu Liu (Purdue University), Dawn Whitaker (Purdue University), Shirley Dyke (Purdue University) and Brian Joyal (Veridiam, Inc.)

ICES-2023-255 NASA Crew Health & Performance Capability Development for Exploration: 2022 to 2023 Overview

Andrew Abercromby (NASA), Grace Douglas (NASA JSC), Kent Kalogera (NASA), Karina Marshall-Goebel (NASA), Jeffrey Somers (NASA), Rahul Suresh (NASA), Moriah Thompson (NASA), Scott Wood (NASA) et al.

IMPERIAL 3

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

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
MIKE FLYNN, NASA AMES RESEARCH CENTER
ANDREW JACKSON, TEXAS TECH UNIVERSITY
CESARE LOBASCIO, THALES ALENIA SPACE
PETR ANDREYCHUK, RSC ENERGIA

ICES-2023-100 Development and Testing of a New Partial Gravity Urine Processor Design and Urine Pretreatment

Jill Williamson (NASA), Colton Caviglia (NASA), Yo-Ann Velez Justiniano (NASA), Chelsea McCool (ESSCA) and Chelsi Cassilly (ESSCA)

ICES-2023-292 Brine Processor Assembly: A Year of Successful Operation on the International Space Station

Stephanie Boyce, Connor Joyce, Patrick Pasadilla, Philipp Tewes (Paragon Space Development Corporation), Jonathan P. Wilson (NASA MSFC), Jill Williamson (NASA MSFC) and Katherine Toon (NASA JSC).

ICES-2023-45 From Waste to Water - An Integrated System to Recover Potable Water from Urine and Condensate

Ingrid Helgeland (Aquaporin A/S), Maja Bender Tommerup (Danish Aerospace Company), Jason A. Ogden (Danish Aerospace Company) and Jörg Vogel (Aquaporin A/S)

ICES-2023-94 Status of ISS Biofilm Management Testing for the Water Processor Assembly

Yo-Ann Velez Justiniano (NASA George C. Marshall Space Flight Center), Iulian Cioanta (Sanuwave), Eric R. Beitle (Jacobs Space Exploration Group), Connor P. Murphy (Jacobs Space Exploration Group), Cary McGhin (Sanuwave) and John Jackson (Sanuwave)



TUESDAY

18 JULY
EARLY MORNING

IMPERIAL 5

ICES302-C: AIChE/ICS/IIC
 Physio-chemical Life Support - Air
 Revitalization Systems - Technology and
 Process Development

ORGANIZERS:

MORGAN ABNEY, NASA ENGINEERING AND SAFETY
CENTER
GRACE BELANCHIK, NASA AMES RESEARCH CENTER
JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
PATRICK OGER, AIRBUS

IMPERIAL 7

ICES205-C: IIC/AIChE
 Advanced Life Support Sensor and
 Control Technology

ORGANIZERS:

ABHIJIT V. SHEVADE, NASA JET PROPULSION
LABORATORY
DARRELL L. JAN, NASA AMES RESEARCH CENTER
TIMO STUFFLER, OHB SYSTEM AG

IMPERIAL 9

ICES502-C: AIAA LS&S
 Space Architecture

ORGANIZERS:

MAHSA ESFANDABADI, UNIVERSITY OF HOUSTON
ANNE-MARLENE RÜEDE, ECOLE POLYTECHNIQUE
FEDERALE DE LAUSANNE
ADAM OSWALD, BLUE ORIGIN
GEORGI PETROV, SKIDMORE OWINGS & MERRILL
SANDRA HAEUPLIK-MEUSBURGER, TU WIEN | SPACE-
CRAFT ARCHITEKTUR

8:00

ICES-2023-103

Carbon Dioxide Removal by Ionic Liquid
System (CDRILS): Ground Prototype Testing
and Trace Contaminant Removal Integration

Rebecca Kamire, Stephen F. Yates, Phoebe Henson,
Matthew J. Kayatin, Jack Ford, Emir Rahislic, Mark
Triezenberg, Meghan Pipitone (Honeywell Aerospace)
et al.

ICES-2023-302

Orion LAMS Laser Absorption Spectrometer
for Human Spaceflight - Artemis 3 Flight
Unit Build and Test Results

Jason Pohly (Romach Technologies), Lance Christensen
(Jet Propulsion Laboratory, California Institute of
Technology), Kamjou Mansour (Jet Propulsion Laboratory,
California Institute of Technology), David Roe (Dynetics),
John Vaughan (Dynetics) and Cody Erb (Dynetics)

ICES-2023-149

Definition of a Reusable Lunar Habitat to
Extend Exploration Range

Gregory Navarro (CNES), Alexis Paillet (CNES), Sebastien
Barde (CNES) and Marie-Christine Desjean (CNES)

8:30

ICES-2023-143

CO2 Capture with Supported Ionic Liquid
Membranes for ECLSS and ISRU: Progress,
Performance, and Potential

Bharath Tata (University of Colorado), Cody Bahan
(University of Colorado) and James Nabity (University of
Colorado Boulder)

ICES-2023-373

Evaluation of a New Commercial Catalyst
for CO Oxidation for Environmental Control
and Life Support Applications

Sudheera Yaparathne, Madison McCarthy, Louis Nicoloro,
Neil Fisher (Department of Civil and Environmental
Engineering, University of Maine), John Graf (Johnson
Space Center), Lawrence Barrett, Oageng George (Jacobs
JETS Contract) and Onur Apul (Department of Civil and
Environmental Engineering, University of Maine)

ICES-2023-172

Swarm Habitat: Lava Tube Base Design with
Non-Orthogonal Modular Coordination of
The Truncated Octahedral Modules

Takashi Mizuguchi (Keio University) and Yashushi
Ikeda (The University of Tokyo)

9:00

ICES-2023-137

Update of the Ground-Based Liquid Amine
Horizontal Contactor Test System

Tiago Costa (NASA), Lisa Chu (NASA), Lawrence Barrett
(NASA), Grace Belancik (NASA) and Jason Samson (NASA)

ICES-2023-301

Feasibility Testing of a Thermal Dispersion
Flowmeter with External Signal
Conditioning for Health Monitoring of
Liquid and Gas flows

Diego Mugurusa (Collins Aerospace), Nicholas Van Derzee
(Collins Aerospace) and James Davis (Collins Aerospace)

ICES-2023-319

Practical Lunar Surface Site Selection
Criteria to Optimize Habitat Environmental
Control

William O'Hara (Blue Origin LLC) and Jennifer Matty
(Blue Origin LLC)

9:30

ICES-2023-358

Evaluation of Alternative Liquid Sorbents
and Additives for Spacecraft CO2 Capture

Grace Belancik (NASA Ames Research Center), Lisa
Chu (Barrios Technology), Tiago Costa (KBR Wyle) and
Mathangi Soundararajan (KBR Wyle)

ICES-2023-454

Developing an Integrated Logistics
Infrastructure for Lunar Surface Habitats

David Akin (University of Maryland)

NOTES ✨

[illegible]



TUESDAY

18 JULY
LATE MORNING

WALKER/BANNERMAN

ICES202-A: IIC
Satellite, Payload, and Instrument
Thermal Control

ORGANIZERS:

JOHANNES VAN ES, NLR
ROMAIN PEYROU-LAUGA, EUROPEAN SPACE AGENCY
DAVID VALENTINI, THALES ALENIA SPACE
HIROYUKI OGAWA, JAPAN INSTITUTE OF SPACE AND
ASTRONAUTICAL SCIENCE
ALBERTO CORBELLI, SITAEL

DOLL/HERALD

ICES104-A: TECS/IIC
Advances in Thermal Control
Technology

ORGANIZERS:

JEFF FARMER, NASA MARSHALL SPACE FLIGHT CENTER
YANN CERVANTES, CNES
PHILIPP B. HAGER, EUROPEAN SPACE AGENCY
ANGEL ALVAREZ-HERNANDEZ, NASA JOHNSON SPACE CENTER
CHRIS MASSINA, NASA JOHNSON SPACE CENTER
WILLIAM JOHNSON, NASA MARSHALL SPACE FLIGHT CENTER
JEAN-PAUL DUDON, THALES ALENIA SPACE

STEPHEN A/B

ICES513-A: AIAA LS&S
Human Health and Performance Analysis

ORGANIZERS:

CLAAS OLTHOFF, AIRBUS
ANA DIAZ ARTILES, TEXAS A&M UNIVERSITY

10:30

ICES-2023-122
Thermal Design of the Hyperspectral
Instrument of the CHIME Mission

Victor Cleren (ESA) and Niels Schibilla (OHB)

ICES-2023-23
Thermal Modeling of a Novel Air-
Cooled Temperature Swing Adsorption
Compressor (AC-TSAC)

Hannah Alpert (NASA Ames Research Center), Keith
Peterson (NASA Ames Research Center), Tra-My Justine
Richardson (NASA Ames Research Center), Quinton
Dzurny (Georgia Institute of Technology) and G. P.
Peterson (Georgia Institute of Technology)

ICES-2023-98
An Investigation into the Effect of Liquid
Accumulation on Thermo-Physiologic State using
an Advanced Moisture Model Coupled with a
High Resolution Human Thermal Model

Timofey Golubev (ThermoAnalytics, Inc.), Mark
Hepokoski (ThermoAnalytics, Inc.), Kevin Ward (W.
L. Gore and Associates), Joel Coffel (W. L. Gore and
Associates) and Hee Jong Song (NASA Johnson Space
Center)

11:00

ICES-2023-139
TuMag Optical Unit Thermal Control for a
Stratospheric Balloon-borne Mission

Alejandro Gonzalo, Manuel Reina, Antonio Sánchez,
Ana Fernández-Medina, María Cebollero, Hugo Laguna,
David Escribano and Alberto Álvarez-Herrero (Instituto
Nacional de Técnica Aeroespacial (INTA))

ICES-2023-398
Design, Modeling, and Initial
Characterization of a Subscale Variable
Conductance Radiator for CO₂ Deposition
System in Deep Space Transit

Alexander Sarvadi (University of North Texas), Huseyin
Bostanci (University of North Texas), Cable Kurwitz
(Texas A&M University) and Grace Belancik (NASA Ames
Research Center)

ICES-2023-315
Review of Human Thermoregulation
Models, Validation Methods, and Selected
Responses to Gravity Dose Analogs

Maddie Haas (Texas A&M University) and Bonnie
Dunbar (Texas A&M University)

11:30

ICES-2023-4
JUICE (JUpiter ICy moon Explorer) Thermal
Model Correlation and Final Flight Thermal
Predictions

Romain Peyrou-Lauga (ESA) and Gabriel Roca (Airbus
Defence and Space)

ICES-2023-335
Development of Flight Demonstration Hot
Reservoir Variable Conductance Heat Pipes
for Microgravity Testing and Future Lunar
Landers and Surface Systems

Kuan-Lin Lee, Calin Tarau, Ramy Abdelmaksoud, William
G. Anderson (Advanced Cooling Technologies INC),
Chirag Kharangate (Case Western Reserve University) and
Yasuhiro Kamotani (Case Western Reserve University)

ICES-2023-141
Towards Personalized Digital Twin as
Clinical Decision Support Tool for Astronaut
Medication : a Review of Literature

Laure Boyer (MEDES/CNES), Samuel Baroudi (ExactCure),
Sylvain Benito (ExactCure), Matthieu Basset (ExactCure),
Alexis Paillet (CNES), Anne Pavy-Le Traon (MEDES),
Audrey Berthier (MEDES) and Frederic Dayan (ExactCure)

12:00

ICES-2023-72
On-orbit Thermal Performance of the JWST
Mid-Infrared Instrument

Bryan Shaughnessy (RAL Space), Tim Grundy (RAL
Space), Samuel Tustain (RAL Space), Mireya Etzaluze
(RAL Space), Bret Naylor (JPL) and Mark Weilert (JPL)

ICES-2023-370
Two-Phase Thermal Switch for Lunar
Lander and Rover Thermal Management

Nathan Van Velson, Jeffrey Diebold, David-Paul
Schulze, Calin Tarau and William Anderson (Advanced
Cooling Technologies, Inc.)

ICES-2023-221
Digital Twin for Astronaut Orthopedic Care:
A Feasibility Study

Laure Boyer (MEDES/CNES), Léo Fradet (Philomec),
Rohan-Jean Bianco (Philomec), Alexis Paillet (CNES)
and Audrey Berthier (MEDES)

IMPERIAL 1

ICES408-A: ICS ISS US EVA-80 Water Helmet Incident Investigation

ORGANIZERS:

KRISTINE DAVIS, NASA JOHNSON SPACE CENTER
NOAH ANDERSEN, NASA JOHNSON SPACE CENTER

ICES-2023-346 Comparative Analysis for EMU Fleet Latent Loading Characterization in Support of US EVA 80 Failure

Noah Andersen (HX5, LLC (JETS2))

ICES-2023-347 Extravehicular Mobility Unit System-Level Model (SINDA EMU) Usage for Operational Mitigations in Support of US EVA 80

Noah Andersen (HX5, LLC (JETS2)) and Bruno Miranda
(HX5, LLC (JETS2))

ICES-2023-355 Integrated Computational Fluid Dynamics and Thermal Desktop Thermal Modeling for Assessment of the EMU in Support of ISS EVA 80

Blain Lancaster (NASA JSC/JETS), Abigail Baukus
(NASA JSC/KBR), Kambiz Andish (NASA JSC/JETS) and
Anthony Hanford (NASA JSC/JETS)

ICES-2023-62 EMU Ventilation Loop Simulation and Assessment of Contamination of the EMU Sublimator Hydrophilic Coating

Alex Wickham (Reaction Systems, Inc.), Colin Campbell
(NASA Johnson Space Center), Michael Humbert (Collins
Aerospace) and David Wickham (Reaction Systems, Inc.)

IMPERIAL 2

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

ORGANIZERS:

DAN BARTA, NASA JOHNSON SPACE CENTER
JAMES CHARTRES, MILLENNIUM ENGINEERING &
INTEGRATION (MEI)
DAWN R. WHITAKER, PURDUE UNIVERSITY

ICES-2023-361 Final Report of the COSPAR Meeting Series on Knowledge Gaps in Planetary Protection for Crewed Missions to Mars

J Andy Spry (SETI Institute), Bette Siegel (National
Aeronautics and Space Administration), Elaine Seasley
(NASA) and J Nick Benardini (National Aeronautics and
Space Administration)

ICES-2023-300 Mission-Scale MOXIE Development Driven Prospects for ISRU and Atmosphere Revitalization

Joseph Hartvigsen (OxEon Energy, LLC), Michele Hollist
(OxEon Energy), Jessica Elwell (OxEon Energy, LLC), S.
Elangovan (OxEon Energy) and Gerald Voecks (JPL)

ICES-2023-349 The Roles of Plants in a Commercial Space Habitat

Robert Morrow (Sierra Space), John Wetzel (Sierra
Space), Samuel Moffatt (Sierra Space), Matthew Bair
(Sierra Space) and Laura Kelsey (Sierra Space)

ICES-2023-170 Dynamic Simulation Study on the Effect of Airtightness on the Sensitivity of Air Composition Monitoring in SPACE FOODSPHERE

Hiroyuki Miyajima (International University of Health and
Welfare), Yoshitoki Tanaka (JGC Corporation), Hidekazu
Tsuda (JGC Corporation) and Soichi Mori (JGC Corporation)

IMPERIAL 3

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

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
MIKE FLYNN, NASA AMES RESEARCH CENTER
ANDREW JACKSON, TEXAS TECH UNIVERSITY
CESARE LOBASCIO, THALES ALENIA SPACE
PETR ANDREYCHUK, RSC ENERGIA

ICES-2023-288 Dormancy Protocol of Electro Oxidation Membrane Evaporator for Urine Processing and Water Recovery

Tatsuya Arai (Oceaneering Space Systems) and John
Fricker (Oceaneering Space Systems)

ICES-2023-360 Alternative Treatment of Crew Wastewater Using a Hybrid Membrane Technology

Talon Bullard (USF), Daniella Saetta (NASA/USF),
Alexandra Smith (USF), Katrina Haarmann (USF),
Flaubert Akepeu (USF), Ana Ferret (USF), Celia DeVito
(USF), Benjamin Hoque (USF) et al.

ICES-2023-252 Mitigation of Biofouling in Plant Watering Systems Using AgXX, a Novel Surface Treatment

Tesia Irwin (The Bionetics Corporation), Wenyan
Li (Amentum), Angie Diaz (Amentum) and Mary
Hummerick (Amentum)



TUESDAY

18 JULY
LATE MORNING

IMPERIAL 5

ICES302-D: AICHe/ICS/IIC
Physio-chemical Life Support - Air
Revitalization Systems - Technology and
Process Development

ORGANIZERS:

MORGAN ABNEY, NASA ENGINEERING AND SAFETY
CENTER
GRACE BELANCHIK, NASA AMES RESEARCH CENTER
JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
PATRICK OGER, AIRBUS

ICES-2023-311
Status of the Advanced Oxygen Generation
Assembly

Kevin Takada (NASA), David Hornyak (NASA), John
Garr (NASA), Steven Van Keuren (S&K Global Solutions,
Inc.), Christine Faulkner (Jacobs Technology, Inc.) and
Abdelrahman Elsherbini (Collins Aerospace)

ICES-2023-101
Ground Testing of an Oxygen Concentrator
in a Simulated International Space Station
(ISS) Cabin Environment

Laura Soto (NASA), Katerina Lewis (NASA) and Jeffrey
Sweterlitsch Ph.D. (NASA).

ICES-2023-408
Ceramic Oxygen Generator: A Method
for Extracting High Pressure, High Purity
Oxygen from Spacecraft Cabin Air

John Graf (NASA Johnson Space Center), Dale Taylor
(American Oxygen) and Jon Tylka (NASA White Sands
Test Facility)

ICES-2023-88
Methane Pyrolysis Enables Closed-loop
Oxygen Recovery - Brassboard Evaluation

Amanda Childers (Honeywell Aerospace), Stephen
Yates (Honeywell Aerospace) and Mark Triezenberg
(Honeywell Aerospace)

IMPERIAL 7

ICES300-A: AICHe
ECLSS Modeling and Test Correlations

ORGANIZERS:

CHANG HYUN SON, THE BOEING COMPANY
CYNTHIA REULAND, AERODYNE
NIKOLAY IVANOV, PETER THE GREAT SAINT
PETERSBURG POLYTECHNIC UNIVERSITY, RUSSIA
KEVIN BRAMAN, THE BOEING COMPANY
SUSAN SNYDER, THE BOEING COMPANY
ANTHONY COOK, THE BOEING COMPANY

ICES-2023-246
Numerical Study of Carbon Dioxide
Transport Problem for the Open and Lower
Airflow Space in the ISS Module

Chang Son (The Boeing Company), Nikolay Ivanov (New
Technologies and Services), Evgueni Smirnov (New
Technologies and Services) and Denis Telnov (Peter the
Great St. Petersburg Polytechnic University)

ICES-2023-56
Comprehensive 3D Multiphysics Model on
Electrochemical Recovery of O₂ from metabolic
CO₂ at the International Space Station (ISS)

Jesus Dominguez (Jacobs JSEG/IG), Cara Black, Brittany
Brown (NASA Marshall Space Center), Wilaiwan
Chanmanee (University of Texas at Arlington), Brian
Dennis (UT Arlington), Kaitlin Oliver-Butler (NASA
Marshall Space Center), Kagen Crawford (NASA Marshall
Space Center), Shannon McCall (Jacobs JSEG) et al.

ICES-2023-74
V-HAB Atmosphere Modeling and
Simulation for a Crewed Polar Sortie

Amrita Singh (University of Colorado Boulder), Trayana
Athannassova (University of Colorado Boulder), James
Nabity (University of Colorado Boulder) and Claas
Olthoff (Airbus)

ICES-2023-249
Numerical Validation of ISS Columbus
Crew Alternative Sleeping Area Ventilation
with an Improved Configuration

Chang Son (The Boeing Company), Susan Snyder
(The Boeing Company), Amy Caldwell (The Boeing
Company), Nikolay Ivanov (New Technologies and
Services), Evgueni Smirnov (New Technologies
and Services) and Denis Telnov (Peter the Great St.
Petersburg Polytechnic University)

IMPERIAL 9

ICES502-D: AIAA LS&S
Space Architecture

ORGANIZERS:

MAHSA ESFANDABADI, UNIVERSITY OF HOUSTON
ANNE-MARLENE RÜEDE, ECOLE POLYTECHNIQUE
FEDERALE DE LAUSANNE
ADAM OSWALD, BLUE ORIGIN
GEORGI PETROV, SKIDMORE OWINGS & MERRILL
SANDRA HAEUPLIK-MEUSBURGER, TU WIEN | SPACE-
CRAFT ARCHITEKTUR

ICES-2023-449
Simulation-Based Assessment of
Hazardous States in a Deep Space Habitat

Luca Vaccino (Purdue University), Kenneth Pritchard
(Purdue University), Mohsen Azimi (Purdue University),
Shirley Dyke (Purdue University) and Alana Lund
(University of Waterloo)

ICES-2023-458
Successful Testing of Advanced Space
Habitat

James Kirwan (ILC Dover), John Lin (ILC Dover), Beth
Schaepe (Sierra Space), Gerard Valle (Sierra Space),
Matthew Morgan (ILC Dover) and Shawn Buckley
(Sierra Space)

ICES-2023-187
XR Testing Framework for Human-System
Interaction Design Validation

Vittorio Netti (Sasakawa International Center for
Space Architecture), Albert Rajkumar (Sasakawa
International Center for Space Architecture) and Olga
Bannova (Sasakawa International Center for Space
Architecture)

ICES-2023-189
Proposal for a Testing Standard for
Planetary Construction Technologies with
ISRU

Vittorio Netti (Sasakawa International Center for
Space Architecture) and Tara Bisharat (Sasakawa
International Center for Space Architecture)



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TUESDAY

18 JULY
EARLY AFTERNOON

WALKER/BANNERMAN

ICES202-B: IIC Satellite, Payload, and Instrument Thermal Control

ORGANIZERS:
JOHANNES VAN ES, NLR
ROMAIN PEYROU-LAUGA, EUROPEAN SPACE AGENCY
DAVID VALENTINI, THALES ALENIA SPACE
HIROYUKI OGAWA, JAPAN INSTITUTE OF SPACE AND
ASTRONAUTICAL SCIENCE
ALBERTO CORBELL, SITAEL

ICES-2023-14 Benefits of the In-Orbit Thermal Correlation of the Solar Orbiter Spacecraft

Scott Morgan (Airbus Defence and Space UK)

ICES-2023-429 Embedded Pulsating Heat Pipe for Improved Heat Spreading in CFRP Equipment Panels for Satellites

Johannes van Es, Edwin Bloem, Roel Benthem, Adry
Van Vliet, Ronald Klomp (Royal Netherlands Aerospace
Centre NLR) and Gunnar Sieber (European Space Agency
(ESA))

ICES-2023-348 Development of a Variable Conductance Cold Plate for Spatial and Temporal Isothermality Across Power Scales

Elizabeth Seber (Advanced Cooling Technologies) and
Michael Ellis (Advanced Cooling Technologies, Inc.)

DOLL/HERALD

ICES104-B: TECS/IIC Advances in Thermal Control Technology

ORGANIZERS:
JEFF FARMER, NASA MARSHALL SPACE FLIGHT CENTER
YANN CERVANTES, CNES
PHILIPP B. HAGER, EUROPEAN SPACE AGENCY
ANGEL ALVAREZ-HERNANDEZ, NASA JOHNSON SPACE CENTER
CHRIS MASSINA, NASA JOHNSON SPACE CENTER
WILLIAM JOHNSON, NASA MARSHALL SPACE FLIGHT CENTER
JEAN-PAUL DUDON, THALES ALENIA SPACE

ICES-2023-241 Planetary and Lunar Environment Thermal Toolbox Elements (PALETTE) Project Final Results

David Bugby (Jet Propulsion Laboratory, California
Institute of Technology), Jose Rivera (Jet Propulsion
Laboratory, California Institute of Technology) and
QuynhGiao Nguyen (NASA Glenn Research Center)

ICES-2023-244 Thermal Technology Advancements for Extended-Duration Lunar Operation

David Bugby (Jet Propulsion Laboratory, California
Institute of Technology) and Jose Rivera (Jet Propulsion
Laboratory, California Institute of Technology)

ICES-2023-350 Thermal Vacuum and Vibration Testing of the Differential Thermal Expansion Thermal Switch

Stephanie Mauro (NASA MSFC), Jeffery Farmer (NASA
MSFC), David Bugby (JPL) and Jose Rivera (JPL)

ICES-2023-123 Highly Thermally Conductive Hybrid Carbon Fiber Polymer Composite for Radiator Application

Jin Ho Kang, Keith Gordon (NASA Langley Research
Center), Darwyn Ward (NASA Interns, Fellows, and
Scholars (NIFS) Program Intern, NASA Langley Research
Center), Grace Belancik (NASA Ames Research Center),
Pranav Jagtap (KBR Wyle Services, LLC / NASA Ames
Research Center) and Godfrey Sauti (NASA Langley
Research Center)

STEPHEN A/B

ICES513-B: AIAA LS&S Human Health and Performance Analysis

ORGANIZERS:
CLAAS OLTHOFF, AIRBUS
ANA DIAZ ARTELES, TEXAS A&M UNIVERSITY

ICES-2023-157 Design, Development, and Testing of Peristaltic Suit: Active-Dynamic Compression and Physiological Sensing Intra-vehicular Activity Spacesuit for Cardiovascular Deconditioning

Irmandy Wicaksono (MIT), Ali Shtarbanov (MIT), Esha
Ranade (MIT), Rebecca Slater (MIT), Dava Newman (MIT)
and Joseph Paradiso (MIT)

ICES-2023-165 Improving Harness-based Partial Gravity Simulators by Implementing Engineering Systems Modeling

Alvin Harvey (Massachusetts Institute of Technology),
Nicole McGaa (Massachusetts Institute of Technology)
and Dava Newman (Massachusetts Institute of
Technology)

ICES-2023-168 The Mk-7 Gravity Loading Countermeasure Skinsuit: Evaluation of Insole Pressure and Load Distribution

Ciarra Ortiz (Georgia Institute of Technology), Rachel
Bellisle (Massachusetts Institute of Technology), Alvin
Harvey (Massachusetts Institute of Technology), Katya
Arquilla (Massachusetts Institute of Technology) and
Dava Newman (Massachusetts Institute of Technology)

IMPERIAL 1

ICES408-B: ICS ISS US EVA-80 Water Helmet Incident Investigation

ORGANIZERS:
KRISTINE DAVIS, NASA JOHNSON SPACE CENTER
NOAH ANDERSEN, NASA JOHNSON SPACE CENTER

ICES-2023-356 EMU CO2 Washout Comparative Assessments for the HAB/HAP-E in Support of EVA 80

Moses Navarro (NASA), Abigail Baukus (KBR Wyle Services) and Monica Mah (NASA)

ICES-2023-431 Assessment of HAB Particulate Tracing in EMU Helmet in Support of EVA 80

Abigail Baukus (NASA) and Colin Campbell (NASA)

ICES-2023-432 EMU Helmet Free Water Transport Assessment for the HAB in Support of EVA 80

Abigail Baukus (NASA) and Colin Campbell (NASA)

ICES-2023-402 Excess Water in Astronaut Helmet During EVA on ISS: Mitigations with Flight Demonstrations

Mark Weislogel (IRPI LLC), John Graf (NASA), Logan Torres (IRPI LLC), Oleg Krishcko (IRPI LLC), Paul Dum (NASA), Colin Campbell (NASA) and Tessa Rundle (NASA)

IMPERIAL 2

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

ORGANIZERS:
DAN BARTA, NASA JOHNSON SPACE CENTER
JAMES CHARTRES, MILLENNIUM ENGINEERING &
INTEGRATION (MEI)
DAWN R. WHITAKER, PURDUE UNIVERSITY

ICES-2023-242 Supporting Exploration Missions by Enabling Exploration Mission System Software

Matthew Miller (Jacobs/NASA JSC), James Montalvo (KBR Wyle/NASA JSC), Ben Feist (Jacobs/NASA JSC), David Charney (Jacobs/NASA JSC), David Ryneerson (Jacobs/NASA JSC), Jackie Vu (Jacobs/NASA JSC), Katie Heinemann (KBR Wyle/NASA JSC), Trey Davis (KBR Wyle/NASA JSC) et al.

ICES-2023-362 Data Collection in Svalbard, Norway to Test the use of Virtual Reality for Lunar and Planetary Surface Exploration

Cody Paige, Don Derek Haddad, Ferrous Ward, Jessica Todd (Massachusetts Institute of Technology, Gordon R. Osinski (University of Western Ontario), Ariel Ekblaw and Dava Newman (Massachusetts Institute of Technology)

ICES-2023-334 Multi-Sensor 3D Data Visualization in Virtual Reality for Planetary Science and Mission Operations

Ferrous Ward (MIT), Cody Paige (MIT), Jess Todd (MIT), Don Derek Haddad (MIT), Jennifer Heldmann (NASA Ames), Darlene Lim (NASA Ames), Dava Newman (MIT) and Ariel Ekblaw (MIT)

ICES-2023-233 Passive Deployment Mechanisms for Minimal Composition of Lunar/Martian Base Camp Implanted into Lava Tube

Jun Sato, Saneyuki Kawabata, Tomohiro Yokozeki (The University of Tokyo), Kazuya Saito (Kyushu University), Masato Sakurai, Yasuhiro Awata and Nao Hoshinouchi (Japan Aerospace Exploration Agency)

IMPERIAL 3

ICES304-A: AIChE/IIC Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development

ORGANIZERS:
JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
STEVE SEPKA, NASA
MATTEO LAMANTEA, THALES ALENIA SPACE
ANNIE MEIER, NASA KENNEDY SPACE CENTER
RAY PITTS, NASA KENNEDY SPACE CENTER

ICES-2023-40 Advancements in Logistics Reduction for Exploration Missions

Melissa McKinley (NASA-JSC), Melissa Borrego (NASA), Patrick Fink (NASA-JSC), Anne Meier (NASA-KSC), Michael Ewert (NASA-JSC), Curtis Hill (ESSCA), Steven Sepka (NASA-ARC), Tra-My Justine Richardson (NASA-ARC) and Evelyn Orndoff (NASA-JSC)

ICES-2023-207 The Trash Compaction Processing System (TCPS) Technology Demonstrations Science Objectives and Requirement Definitions

Tra-My Justine Richardson (National Aeronautics and Space Administration), Steve Sepka (NASA), Kevin Martin (NASA), Michael Ewert (Johnson Space Center), Melissa McKinley (NASA-JSC), Jeffrey Lee (NASA), Gregory Pace (KBR Wyle), Douglas White (Stellar Solutions, Inc) et al.

ICES-2023-296 Design of a Trash Compaction & Processing System (TCPS) for Waste Management and Logistics Reduction in Long Duration Spaceflight

Joseph Klopotic (Sierra Space), Daniel Wyman (Sierra Space), Zachary Petrie (Sierra Space) and John Wetzel (Sierra Space)

ICES-2023-7 Source Contaminant Control System Design, Operation, and Testing for the Trash Compaction and Processing System

Janine Young (NASA), Gregory Pace (KBRWyle), Serena Trieu (NASA), Kevin Martin (NASA), Tra-My Justine Richardson (NASA), Steve Sepka (NASA) and Jurek Parodi (NASA)



TUESDAY

18 JULY
EARLY AFTERNOON

IMPERIAL 5

ICES302-E: AICHe/ICS/IIC
 Physio-chemical Life Support - Air
 Revitalization Systems - Technology and
 Process Development

ORGANIZERS:

MORGAN ABNEY, NASA ENGINEERING AND SAFETY
CENTER
GRACE BELANCHIK, NASA AMES RESEARCH CENTER
JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
PATRICK OGER, AIRBUS

14:30

ICES-2023-260

Increased Oxygen Recovery Using Plasma
Pyrolysis Technology and Electrochemical
Hydrogen Separation

Kagen Crawford (NASA Marshall Space Flight Center),
Cara Black (NASA Marshall Space Flight Center) and
Travis Quillen (Jacob Space Exploration Group)

15:00

ICES-2023-127

Automated Carbon Formation Reactor
Facilitates Closed-Loop Oxygen Recovery to
Enable Long-Duration Manned Missions

Mary Powell, Chris Holt, Paul Matter, Travis Hery, Toby
Baumgartner, Jacob Goldman, Carolyn Weiser, Charlie
Wiswesser (pH Matter LLC) et al.

15:30

ICES-2023-403

Ionic Liquids for a Regenerable Carbon
Formation Reactor: Reactor Design Study
and Ionic Liquid Parameterization

Kaitlin Oliver-Butler (NASA Marshall Space Flight
Center) and Mitchell Woolever (University of Colorado,
Boulder)

16:00

ICES-2023-351

Cold Trap Carbon Capture Filter for
Carbon Fines Management - In-laboratory
Performance and Efficiency Results

Juan Agui (NASA) and Gordon Berger (USRA)

IMPERIAL 7

ICES300-B: AICHe
 ECLSS Modeling and Test Correlations

ORGANIZERS:

CHANG HYUN SON, THE BOEING COMPANY
CYNTHIA REULAND, AERODYNE
NIKOLAY IVANOV, PETER THE GREAT SAINT PETERSBURG
POLYTECHNIC UNIVERSITY, RUSSIA
KEVIN BRAMAN, THE BOEING COMPANY
SUSAN SNYDER, THE BOEING COMPANY
ANTHONY COOK, THE BOEING COMPANY

ICES-2023-445

First Principles Modeling of the Thermal
Amine Scrubber Flight Experiment's
Chemical Performance

Lawrence Barrett (Jacobs Engineering)

ICES-2023-211

Ecosystem Modeling and Validation using
Empirical Data from NASA CELSS and
Biosphere 2

Grant Hawkins (Over the Sun, LLC), Ezio Melotti (Over the
Sun, LLC), Kai Staats (Over the Sun, LLC), Attila Meszaros
(Over the Sun, LLC) and Gene Giacomelli (University of
Arizona)

IMPERIAL 9

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

ORGANIZERS:

GRUNDE JOMAAS, ZAG
GARY A. RUFF, NASA GLENN RESEARCH CENTER
DAVID URBAN, NASA GLENN RESEARCH CENTER
STEPHEN PERALTA, NASA WHITE SANDS TEST FACILITY
MICHAEL JOHNSTON, NASA GLENN RESEARCH CENTER
ULISES ROJAS ALVA, ZAG

ICES-2023-133

Limiting Oxygen Concentrations of Burning PMMA
Cylinders under External Radiant Heating and
Subatmospheric Pressure

Christina Liveretou, Charles Scudiere, Jose Rivera,
Carlos Fernandez-Pello, Michael Gollner (University
of California, Berkeley), Sandra Olson and Paul Ferkul
(USRA; NASA John H. Glenn Research Center)

ICES-2023-171

Sooting Behavior in Concurrent and
Upward Burning of Cylindrical PMMA-
samples

Christian Eigenbrod (University of Bremen, ZARM),
Florian Meyer (University of Bremen, ZARM), Hans-
Christoph Ries (University of Bremen, ZARM) and Jan
Heissmeier (University of Bremen, ZARM)

ICES-2023-191

Upward Flame Spread over a Thin Fabric in
Normoxic Atmospheres

Maria Thomsen (Universidad Adolfo Ibañez), Luca
Carmignani (University of California Agriculture and
Natural Resources), Priya Garg, Carlos Fernandez-
Pello, Michael Gollner (University of California,
Berkeley), David Urban (NASA) and Gary Ruff (NASA)

ICES-2023-194

Evaluation of Buoyant Flow Velocity
Induced by Centrifugal and Coriolis
Acceleration During Downward Flame
Spread Over Thin Wire in a Centrifuge

Yusuke Konno (Hokkaido University), Shoryu Ishikawa
(Hokkaido University), Nozomu Hashimoto (Hokkaido
University) and Osamu Fujita (Hokkaido University)

NOTES ✨

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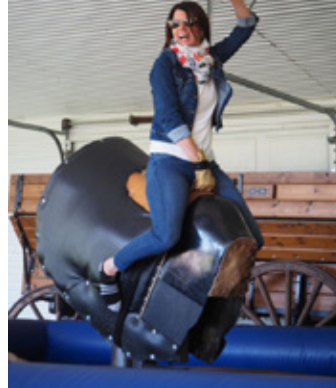
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WEDNESDAY

19 JULY
EARLY MORNING

WALKER/BANNERMAN

ICES101-A: TECS
Spacecraft and Instrument Thermal Systems

ORGANIZERS:

JOSE RODRIGUEZ, NASA JET PROPULSION LABORATORY
HUME PEABODY, NASA GODDARD SPACE FLIGHT CENTER
WES OUSLEY, LENTECH, INC.
DOUG BOLTON, NASA JET PROPULSION LABORATORY

DOLL/HERALD

ICES104-C: TECS/IIC
ICES103-A: TECS/IIC
104: Advances in Thermal Control Technology
103: Thermal Control of Commercial and Exploration Spacecraft

104 ORGANIZERS:

JEFF FARMER
YANN CERVANTES
PHILIPP B. HAGER
ANGEL ALVAREZ-HERNANDEZ
CHRIS MASSINA
WILLIAM JOHNSON
JEAN-PAUL DUDON

103 ORGANIZERS:

TOM LEIMKUEHLER
JOSE ROMAN
SEAN TUTTLE
ANDREA FERRERO

STEPHEN A/B

ICES406-A: ICS/AICHe
Spacecraft Water/Air Quality: Maintenance and Monitoring

ORGANIZERS:

DAVID ZUNIGA, AXIOM SPACE
DARREL JAN, NASA AMES RESEARCH CENTER

8:30

ICES-2023-44
Thermal Design of the Deep Space Optical Communication (DSOC) Payload for the Psyche Mission

Arthur Na-Nakornpanom (Jet Propulsion Laboratory) and Rogelio Rosas (Jet Propulsion Laboratory)

ICES-2023-448 (ICES104)
Design of an Actively Shuttered Dust-Resilient Radiator for Lunar Applications

Andrew S. Gibson (ESR Technology), Angel Iglesias (Almatech SA), Dominic Bailes-Brown (ESR Technology Limited), Martin Humphries (Spacemech Limited), Simeon Barber (Space Science Solutions Limited) and Philipp Hager (European Space Agency)

ICES-2023-276
Iodine Depletion Analysis of Polyvinylidene Fluoride Bladders for the Potable Water System on Axiom Station

Saige Drecksler (Axiom Space), Héctor Colón-Colón (Axiom Space), Joseph Gutheinz (Axiom Space), Jamison Tyson (Axiom Space), Megan Yang (Axiom Space) and Frank Thomas (Axiom Space)

9:00

ICES-2023-269
Thermal Control Design for Deep Space Optical Communication (DSOC) Docking Mechanism High-Output Paraffin Actuator

Rogelio Rosas, Kristen MacNeal, Marcus Wilkerson, Gregory Agnes, Joel Johnson, Arthur Na-Nakornpanom and Brenda Hernandez (Jet Propulsion Laboratory, California Institute of Technology)

ICES-2023-60 (ICES103)
Actively Controlled Louver for Human Spacecraft Radiator Ultraviolet (UV), Dust, and Freeze Protection

Darnell Cowan (NASA)

ICES-2023-279
Iodine Depletion Analysis of Polyether Urethane Bladders for the Potable Water System on Axiom Station

Héctor Colón-Colón (Axiom Space), Saige Drecksler (Axiom Space), Joseph Gutheinz (Axiom Space), Jamison Tyson (Axiom Space), Megan Yang (Axiom Space) and Frank Thomas (Axiom Space)

9:30

ICES-2023-120 (ICES103)
Theoretical Approach to Quantify Effects of Lunar Dust Deposition on Radiator Performance for Moon Exploration Missions

Philipp B. Hager (European Space Agency), Adrian P. Tighe (European Space Agency), Fabrice W.S. Cipriani (European Space Agency) and Francesca McDonald (European Space Agency)

ICES-2023-230
Evaluation of Long-Term Microbial Regrowth in Slosh Water Tanks from the International Space Station

Luke Roberson (NASA), Jason Fischer (Amentum), Daniella Saetta (University of South Florida), Carolina Franco (Amentum), Christina Khodadad (Amentum), Mary Hummerick (Amentum), Cory Sperrin (Amentum), Daniel Yeh (University of South Florida) et al.

IMPERIAL 1

ICES405: ICS Human/Robotics System Integration

ORGANIZERS:
AMY ROSS, NASA JOHNSON SPACE CENTER
DR. DAVID AKIN, UNIVERSITY OF MARYLAND

ICES-2023-156 Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat

Xiaoyu Liu (Purdue University), Amir Behjat (Purdue University), Shirley Dyke (Purdue University), Dawn Whitaker (Purdue University), Julio Ramirez (Purdue University) and Ilias Bilionis (Purdue University)

ICES-2023-78 A Simulated Air Revitalization Task to Investigate Remote Operator Human-Autonomy Teaming With Communication Latency

Jacob Kintz (University of Colorado - Boulder), Young-Young Shen (MDA Ltd.), Savannah Buchner (University of Colorado - Boulder), Allison Anderson (University of Colorado - Boulder) and Torin Clark (University of Colorado - Boulder)

ICES-2023-464 Development and Testing of Crew Interfaces for an Advanced Unpressurized Exploration Rover

Charles Hanner, Nicolas Bolatto, Daniil Gribok, Spencer Quizon, Rowan Quintero, Ian Welfeld and David Akin (University of Maryland)

IMPERIAL 2

ICES307-A: AICHe Collaboration, Educational Outreach, and Public Engagement

ORGANIZERS:
LUCIE POULET, NASA POSTDOCTORAL PROGRAM,
KENNEDY SPACE CENTER
DEAN MUIRHEAD, BARRIOS TECHNOLOGY
JOCHEN KEPPLER, SELEON GMBH
MARY LOU NADEAU, AERODYNE INDUSTRIES

ICES-2023-342 Pathway to Successful Inclusion of Tribal Colleges and Universities (TCUs) in the Johnson Space Center (JSC) Small Business Innovation Research (SBIR) / SBIR Technology Transfer (STTR) Program

Doug Goodman (Jacobs), Kathryn Packard (NASA) and James Whittington (JETS/JSC)

ICES-2023-442 iSTEM to Know NASA Outreach Program at Purdue University Fort Wayne

Dawn Whitaker (Purdue University) and Marteze Hammonds (Purdue University Fort Wayne)

ICES-2023-452 Space Hands-on Training at the University of Stuttgart: from Microalgae to Docking Maneuvers

Gisela Detrell (Institute of Space Systems - University of Stuttgart)

IMPERIAL 3

ICES304-B: AICHe/IIC Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development

ORGANIZERS:
JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
STEVE SEPKA, NASA
MATTEO LAMANTEA, THALES ALENIA SPACE
ANNIE MEIER, NASA KENNEDY SPACE CENTER
RAY PITTS, NASA KENNEDY SPACE CENTER

ICES-2023-38 NASA Exploration Toilet On-orbit Results and Impact on Future Missions

Melissa McKinley (NASA-JSC), Melissa Borrego (NASA), Cory Kaufman (Collins Aerospace), Jill Williamson (NASA-MSFC) and Kelly DeRees (NASA-JSC)

ICES-2023-420 Feasibility of an Optical Sensor to Monitor Toilet Pretreat Quality

Cory Kaufman (Collins Aerospace), Robert Youngquist (QPhysics Inc), Tracy Gibson (NASA), Mark Nurge (NASA) and Upendra Singh (NASA)

ICES-2023-43 Evolution of the Next Exploration Toilet through Human-in-the-Loop (HITL) Testing

Melissa Borrego, Mary Walker (National Aeronautics and Space Administration (NASA)), Yvette Carmona (KBR Wyle Services, LLC (JES Tech)), Alexandra Eifert (KBR Wyle Services, LLC (AEGIS Aerospace)) and Alisa Marshall (KBR Wyle Services, LLC (Leidos))



WEDNESDAY

19 JULY EARLY MORNING

IMPERIAL 5

ICES302-F: AICHe/ICS/IIC
ICES504: AIAA LS&S
 302: Physio-chemical Life Support - Air Revitalization Systems - Technology and Process Development
 504: Management of Air Quality in Sealed Environments

302 ORGANIZERS:

MORGAN ABNEY, NASA
ESC

GRACE BELANCHIK,
NASA ARC

JIM KNOX, DYNETICS
TECHNICAL SOLUTIONS

PATRICK OGER, AIRBUS

504 ORGANIZERS:

TINA GOODALL, UK

MINISTRY OF DEFENCE

WILLIAM WALLACE, KBR

IMPERIAL 7

ICES510-A: AIAA LS&S
 Planetary and Spacecraft Dust Properties and Mitigation Technologies

ORGANIZERS:

MARIE-CHRISTINE DESJEAN, CNES

JUAN H. AGUI, NASA GLENN RESEARCH CENTER

MARIT MEYER, NASA GLENN RESEARCH CENTER

IMPERIAL 9

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

ORGANIZERS:

GRUNDE JOMAAS, ZAG

GARY A. RUFF, NASA GLENN RESEARCH CENTER

DAVID URBAN, NASA GLENN RESEARCH CENTER

STEPHEN PERALTA, NASA WHITE SANDS TEST FACILITY

MICHAEL JOHNSTON, NASA GLENN RESEARCH CENTER

ULISES ROJAS ALVA, ZAG

8:30

ICES-2023-1 (ICES302)
 Performance of Flight Compatible Microlith® Catalytic Oxidizer for Exploration Trace Contaminant Control

Saurabh Vilekar (Precision Combustion, Inc.), Curtis Morgan (Precision Combustion, Inc.), Matthew Kayatin (NASA) and Jay Perry (National Aeronautics and Space Administration)

ICES-2023-285
 Low Temperature, Durable Siloxane/Epoxy Nanocomposite Coating for Drastic Reduction in Lunar Particulate Adhesion

Lauryn Baranowski (TDA Research, Inc.), Denis Kisounko (TDA Research, Inc.), Matt Peppel (TDA Research, Inc.), Amrita Singh (University of Colorado Boulder) and James Nabity (University of Colorado Boulder)

ICES-2023-18
 Chemical Challenge Tests on ISS Fire Cartridges

Cristina Muko (KBR), Steven Beck (KBR), Edgar Hudson (JES Tech), Lawrence Barrett (Jacobs), Adam Korona (Jacobs), Emily Rabel (NASA), William Wallace (KBR), Spencer Williams (NASA) and Daniel Gazda (NASA)

9:00

ICES-2023-80 (ICES302)
 Is Direct Methane Removal in Human Space Flight Required?

Bettylynn Ulrich (Northrop Grumman)

ICES-2023-272
 Evaluation of Lunar Dust Dispersion with Computational Fluid Dynamics Discrete Phase Modeling

Abigail Baukus (KBR) and Rachel Sturtz (Jacobs)

ICES-2023-21
 A Study of the Kinetics of the CO Oxidation Catalyst in a Human Spaceflight Fire Cartridges as a Method to Understand and Predict Performance

Adam Korona (Jacobs Engineering), Lawrence Barrett (Jacobs Engineering), Emily Rabel (NASA), Cristina Muko (KBR), Steven Beck (KBR) and Edgar Hudson (KBR)

9:30

ICES-2023-229 (ICES504)
 Advanced Adsorbents for Ammonia Control in Enclosed Environments

Charles Cummings (QinetiQ) and Edward Harris (QinetiQ)

ICES-2023-322
 Updated Analysis of Particulate Data from the Airborne Particulate Monitor ISS Payload

Claire Fortenberry (Universities Space Research Association/NASA Glenn Research Center) and Marit Meyer (Northrop Grumman)

ICES-2023-24
 Characterizing Fit Factor of a One Size Fits-Most Emergency Mask using Subjects with Smaller Neck Circumferences

Adam Korona (Jacobs), Emily Rabel (NASA (JSC)), Justine Wiles (NASA (JSC)), Matt Meyer (Jacobs), Alicia Ruiz (Jacobs) and Jeff Hahn (Jacobs)

NOTES ✨



WEDNESDAY

19 JULY LATE MORNING

WALKER/BANNERMAN

ICES101-B: TECS Spacecraft and Instrument Thermal Systems

ORGANIZERS:

JOSE RODRIGUEZ, NASA JET PROPULSION
LABORATORY
HUME PEABODY, NASA GODDARD SPACE FLIGHT CENTER
WES OUSLEY, LENTECH, INC.
DOUG BOLTON, NASA JET PROPULSION LABORATORY

10:30

ICES-2023-264

NASA's PACE Ocean Color Instrument
Thermal Design Evolution: from Goddard's
Instrument Design Lab Through Flight
Development

Kan Yang (NASA Goddard Space Flight Center), Deepak
Patel (NASA Goddard Space Flight Center) and Wes
Ousley (Vertex Aerospace)

11:00

ICES-2023-461

Check Valve Anomaly Investigation for the
Mars 2020 Spacecraft

Jennifer Miller (NASA JPL), Pradeep Bhandari (JPL),
Keith Novak (Jet Propulsion Laboratory), Razmig
Kandilian (NASA JPL), Kaustabh Singh (Jet Propulsion
Laboratory), Paul Karlmann (NASA JPL), Mohamed
Abid (NASA JPL) and Jacqueline Lyra (Jet Propulsion
Laboratory)

11:30

ICES-2023-447

Design of Working Fluid Venting System
for Mechanical Pumped Fluid Loop Heat
Rejection System for Mars Missions

Pradeep Bhandari (Jet Propulsion Laboratory)

DOLL/HERALD

ICES103-B: TECS/IIC Thermal Control of Commercial and Exploration Spacecraft

ORGANIZERS:

TOM LEIMKUEHLER, NASA JOHNSON SPACE CENTER
JOSE ROMAN, NASA MARSHALL SPACE FLIGHT CENTER
SEAN TUTTLE, NOVA SYSTEMS / SIGMA SPACE SYSTEMS
ANDREA FERRERO, THALES ALENIA SPACE

ICES-2023-42

Analyses of Blue Origin Blue Moon Lunar
Landing Descent Engine Plume Effects

William Hoey, Maxwell Martin, John Alred, Carlos
Soares (Jet Propulsion Laboratory, California Institute
of Technology) and Mohammed Ababneh (Blue Origin,
LLC)

ICES-2023-338

Hybrid Thermal Control System for
Extreme Thermal Environments

William Johnson (NASA Marshall Space Flight Center),
Kayla Daniel (NASA Marshall Space Flight Center),
Kenton Roberts (NASA Marshall Space Flight Center),
Greg Schunk (NASA Marshall Space Flight Center) and
Jeffery Farmer (NASA Marshall Space Flight Center)

ICES-2023-142

Development of Parabolic Flight Experiment to
Measure the Volume of Gas Bubbles Detaching
from Substrates in a Liquid as a Function of
Buoyancy, Gravitational Force and Substrate
Surface Energy

Jadon Kaercher (Texas A&M University), Justin
Roskamp (Texas A&M University), Samantha DeNicola
(Texas A&M University) and Bonnie Dunbar (Texas
A&M University)

STEPHEN A/B

ICES406-B: ICS/AICHe Spacecraft Water/Air Quality: Maintenance and Monitoring

ORGANIZERS:

DAVID ZUNIGA, AXIOM SPACE
DARREL JAN, NASA AMES RESEARCH CENTER

ICES-2023-333

Culture-Independent Fungal Profiling
for the International Space Station
using Nanopore Sequencing: Method
Development

Hang Nguyen (JSC NASA (JES Tech)), Sarah Stahl-
Rommel (JSC NASA (JES Tech)), Marie G. Sharp (JSC
NASA (KBR)), Christian L. Castro (JSC NASA (JES Tech))
and Sarah Castro-Wallace (JSC NASA).

ICES-2023-386

Limiting Biocidal Silver Loss in Stainless
Steel Water Tanks Using Ceramic Thin Film
Coatings

Ali Ansari, Weylyn Lee (Cactus Materials, Inc.), Afsana
Munni, Kiarash Ranjbari, Francois Perreault (Arizona
State University), Rafiqul Islam (Cactus Materials,
Inc.), Mariana Hernandez Molina, Marcela Strane
(Arizona State University) et al.

ICES-2023-110

Progress on the Organic and Inorganic
Modules of the Spacecraft Water Impurity
Monitor, a Next Generation Complete
Water Analysis System for Crewed Vehicles

Stuart Pensinger, Michael Callahan (NASA Johnson
Space Center), Evan Neidholdt (KBR), Aaron Noell,
Nathan Oborny, Byunghoon Bae, Valeria Lopez, Bruce
Hancock (Jet Propulsion Laboratory) et al.

10:30

11:00

11:30

IMPERIAL 1

ICES407-A: ICS

Extravehicular Activity: Emerging Space Suit Technologies

ORGANIZERS:

BRAD HOLSCHUH, UNIVERSITY OF MINNESOTA
SHANE JACOBS, DAVID CLARK COMPANY
INCORPORATED

ICES-2023-32

Thinking Outside the Apollo Toolbox:
Designing SAMPLERS - Spacesuit Attached
Multi-Purpose Lunar EVA Retrieval System

Samuel Stenzel (Wayzata High School)

ICES-2023-239

Design Process Intended to Protect xEMU
Components from Lunar Dust

Thomas Stapleton (Innovative Aerospace LLC), Cinda
Chullen (NASA), Kelsey Bloom (Jacobs Technology),
Otis Walton (Grainflow Dynamics, Inc.), Beichuan Yan
(University of Colorado, Boulder) and Saikat Chakraborty
Thakur (Auburn University, Auburn)

ICES-2023-271

Conceptual Design for the Advancement of
Mechanical Counterpressure Spacesuits

Michelle Kostin (Imperial College London)

IMPERIAL 2

ICES307-B AICHe

Collaboration, Educational Outreach, and
Public Engagement

ORGANIZERS:

LUCIE POULET, NASA POSTDOCTORAL PROGRAM,
KENNEDY SPACE CENTER
DEAN MUIRHEAD, BARRIOS TECHNOLOGY
JOCHEN KEPPLER, SELEON GMBH
MARY LOU NADEAU, AERODYNE INDUSTRIES

ICES-2023-459

A Constellation of Dreamers:
Advancing Space Exploration through
Democratization

Daniella Ngarambe, Patrick Grubbs, Anatole Trepos,
Florent Bourlette (The Spring Institute for Forests on
the Moon), Tarek Ben Slimane (Ecole Polytechnique)
and Louise Fleischer (The Spring Institute for Forests on
the Moon)

ICES-2023-266

Inspiring Future Generations to Pursue
Careers in Space

Michael Wales (Blue Origin), Laurinda Bellinger (Blue
Origin), Kristen Yip (Blue Origin), Riza Mae Mold (Blue
Origin), Barret Schlegelmilch (Blue Origin), Violet Days
(Blue Origin), Amalaye Oyake (Blue Origin) and Charles
Njoka (Blue Origin)

ICES-2023-154

Unfolding the Universe with the James
Webb Space Telescope: Combining
Art, Science, and Technology for Public
Outreach

Elaine Stewart (NASA), Ashley Zelinskie (Ashley
Zelinskie Studio LLC) and Maggie Masetti (ADNET
SYSTEMS Inc)

IMPERIAL 3

ICES304-C: AICHe/IIC

Physio-Chemical Life Support - Waste
Management Systems - Technology and
Process Development

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
STEVE SEPKA, NASA
MATTEO LAMANTEA, THALES ALENIA SPACE
ANNIE MEIER, NASA KENNEDY SPACE CENTER
RAY PITTS, NASA KENNEDY SPACE CENTER

ICES-2023-385

Baseline Assumptions and Ersatz Waste
Streams for Partial Gravity Habitats with
Mobile Female and Male Crew

Dean Muirhead (Barrios Technology), Stacey Marshall
(Aerodyne Industries, Jacobs JETS Contract), Leopoldo
Romero (Jacobs Technology), Niklas Adam (NASA) and
Michael Callahan (NASA)

ICES-2023-418

Ejectors as a Contingency for Waste and
Odor Collection in Microgravity

Cory Kaufman (Collins Aerospace), Matthew Pearson
(Raytheon Technologies Research Center) and Yasmin
Khakpour (Raytheon Technologies Research Center)

ICES-2023-8

The Collapsible Contingency Urinal (CCU)
for Spacecraft

Mark Weislogel (IRPI LLC), Ryan Jenson (IRPI
LLC), Oleg Krishcko (IRPI LLC), Logan Torres (IRPI
LLC), Adam Naidis (NASA Johnson Space Center),
John Graf (NASA) and Donald Pettit (NASA
Johnson Space Center)



WEDNESDAY

19 JULY LATE MORNING

IMPERIAL 5

ICES302-G: AICHe/ICS/IIC
Physio-chemical Life Support - Air Revitalization Systems - Technology and Process Development

ORGANIZERS:

MORGAN ABNEY, NASA ENGINEERING AND SAFETY CENTER
GRACE BELANCHIK, NASA AMES RESEARCH CENTER
JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
PATRICK OGER, AIRBUS

ICES-2023-210
Multifunctional Sorbent (MultiSORB) Devices for Carbon Dioxide Removal

Tra-My Justine Richardson, Keith Peterson (NASA), Tane Boghazian (Analytical Mechanics Associates Inc.), Hannah Alpert (NASA), Sander Visser, Gurpreet Klar (Analytical Mechanics Associates, Inc.), Alexander Schmitt, Gabriella Sandoval (Guardian of Honors)

ICES-2023-417
Carbon Dioxide Adsorption Process of 3D Zeolite-13X Structures: A Numerical Study

Noah Agata, Priom Agrawal (North Carolina State University), Joseph Cesarano, Michael Niehaus (Robocasting Enterprises LLC), Tra-My Justine Richardson (Ames Research Center) and Sajjad Bigham (North Carolina State University) et al.

IMPERIAL 7

ICES510-B: AIAA LS&S
Planetary and Spacecraft Dust Properties and Mitigation Technologies

ORGANIZERS:

MARIE-CHRISTINE DESJEAN, CNES
JUAN H. AGUI, NASA GLENN RESEARCH CENTER
MARIT MEYER, NASA GLENN RESEARCH CENTER

ICES-2023-469
Cyclone Sub-Micron Particulate Separator

Matthew Haggerty (Mainstream Engineering Corporation), Matthew Emmons (Mainstream Engineering Corporation), Andrew Wagner (Mainstream Engineering Corporation) and Michael Cutbirth (Mainstream Engineering Corporation)

ICES-2023-277
Development of Challenge Aerosols for Testing Filters in Spacecraft Air Revitalization Systems

Robert Green (NASA), Gordon Berger (USRA), Benjamin Sumlin (USRA), R. Vijayakumar (USRA) and Juan Agui (NASA)

ICES-2023-200
Flight Environment HEPA Filter Testing for Lunar Dust Removal Capability

Andrew Walcker (Paragon Space Development Corp), Juan Agui (NASA), Zach Turner (Northrop Grumman), Robert Green (NASA) and Gordon Berger (NASA)

IMPERIAL 9

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

ORGANIZERS:

GRUNDE JOMAAS, ZAG
GARY A. RUFF, NASA GLENN RESEARCH CENTER
DAVID URBAN, NASA GLENN RESEARCH CENTER
STEPHEN PERALTA, NASA WHITE SANDS TEST FACILITY
MICHAEL JOHNSTON, NASA GLENN RESEARCH CENTER
ULISES ROJAS ALVA, ZAG

ICES-2023-204
Vehicle Modeling during the Burning of Cotton Samples in the Saffire IV and V Experiments

Justin Niehaus (NASA) and John Brooker (NASA GRC)

ICES-2023-329
Modeling Characterization of Smoke Particle Transport and Fate in Lunar Gravity

Claire Fortenberry (Universities Space Research Association/NASA Glenn Research Center), David Urban (NASA Glenn Research Center) and Gary Ruff (NASA Glenn Research Center)

ICES-2023-434
Trade Study Considerations for Fire Detection, Suppression and Remediation Systems for Commercial Space Missions

Marit Meyer (Northrop Grumman) and Bettylynn Ulrich (Northrop Grumman)

10:30

11:00

11:30

NOTES ✨

[illegible]



WEDNESDAY

19 JULY
EARLY AFTERNOON

WALKER/BANNERMAN

ICES107: TECS/IIC
Thermal Design of Cubesats, Nanosats,
and Other Small Satellites

ORGANIZERS:

STEPHANIE MAURO, NASA MARSHALL SPACE FLIGHT
CENTER
ROBERT COKER, JOHNS HOPKINS UNIVERSITY APPLIED
PHYSICS LABORATORY
BRIAN BRIGGS, NASA JET PROPULSION LABORATORY
HOSEI NAGANO, NAGOYA UNIVERSITY

14:00

ICES-2023-130
Testing and Evaluation of Spacecraft
Thermal Isolators for SmallSats

Isaac Foster (Air Force Research Laboratory), Trevor Bird
(Blue Halo), Derek Hengeveld (Redwire) and Steven
Lockyer (Redwire)

14:30

ICES-2023-227
Thermal Control System Design and
On-Orbit Validation for the 6U CubeSat
SPHERE-1 EYE

Kazuki Takashima, Shingo Nishimoto, Yuki Kusano,
Kazuki Toma, Toshihiro Shibukawa, Shinichi Yokobori,
Akihiro Ishikawa, Shuhei Matsushita (The University of
Tokyo) et al.

15:00

ICES-2023-217
Evaluation of Thermal System Based
on Flight Result of Nano Moon Lander
OMOTENASHI

Junji Kikuchi, Tomihiro Kinjoh, Yuki Akizuki (Japan
Aerospace Exploration Agency (JAXA)), Toshihiro Osada
(Shinwa Space Inc.) and Tatsuaki Hashimoto (Japan
Aerospace Exploration Agency (JAXA))

15:30

DOLL/HERALD

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

ORGANIZERS:

ANDREW OWENS, NASA LANGLEY RESEARCH CENTER
JAMES NABITY, UNIVERSITY OF COLORADO
CHEL STROMGREN, BINERA, INC.

ICES-2023-89
Human Landing System ECLSS Research
and Design

Cody Bahan, Nathan Foote, Kathleen Loughton, Adam
Oswald, Aanshi Panchal, Chad Pflieger, Samuel Trux,
Stuart Tozer (University of Colorado, Boulder) et al.

ICES-2023-250
Optimal PV and Battery Sizing for a Space
Microgrid Near the Lunar South Pole
Considering ISRU, Habitat and Water
Subsystem Power Demand

Diptish Saha (Aalborg University), Najmeh
Bazmohammadi (Aalborg University), Juan C. Vasquez
(Aalborg University) and Josep M. Guerrero (Center for
Research on Microgrids (CROM), Energy Department,
Aalborg University)

ICES-2023-169
Break-Even Point Analysis of In Situ
Resource Utilization for Mars Settlement
by SpaceX Starship

Hiroyuki Miyajima (International University of Health
and Welfare)

STEPHEN A/B

ICES204-A: IIC/AIAA LS&S
Bioregenerative Life Support

ORGANIZERS:

CESARE LOBASCIO, THALES ALENIA SPACE
MASATO SAKURAI, JAXA
MIRIAM SARGUSINGH, NASA JOHNSON SPACE CENTER
PAUL ZABEL, DLR
MONONITA NUR, NASA

ICES-2023-318
Workload Measurements in the EDEN ISS
Greenhouse during the 2021 Antarctic
Overwintering Mission

Conrad Zeidler (German Aerospace Center) and Jess
Bunchek (German Aerospace Center)

ICES-2023-140
PFPU - Microgravity Precursor Food
Production Unit development status

Giorgio Boscheri, Giovanni Marchitelli (Thales Alenia
Space Italia), Thomas Fili (Thales Alenia Space),
Christel Paille (European Space Agency), Irene
Karoliussen, Achim Gerstenberg, Øyvind Mejdell
Jakobsen and Kai Arne Kristiansen (NTNU Samforsk)

ICES-2023-234
Plasma Activated Water: A Technology
for Acid Generation and Space Crop
Production

Ryan Gott (Oak Ridge Associated Universities),
Kenneth Engeling (NASA), Joel Olson, Bruce Link
(Southeastern Universities Research Association),
Misle Tessema (NASA), Jason Fischer, Carolina
Franco (Amentum) and Christina Johnson (Oak Ridge
Associated Universities)

ICES-2023-450
Ionic Liquid-based CO₂ Control of Plant
Growth Chamber Atmospheres

Felix Nitschke (Technical University of Munich) and
James Nabity (University of Colorado Boulder)

IMPERIAL 1

ICES407-B: ICS Extravehicular Activity: Emerging Space Suit Technologies

ORGANIZERS:

BRAD HOLSCHUH, UNIVERSITY OF MINNESOTA
SHANE JACOBS, DAVID CLARK COMPANY
INCORPORATED

ICES-2023-336 Design of an Augmented Reality User Interface for Lunar Extravehicular Activity Operations

Michael Fornito, Nicholas Lopac, Graydon Russell,
Joseph Demartini, Riley Flanagan, Lea Miller and
Miranda Young (Embry-Riddle Aeronautical University)

ICES-2023-371 Heat Balance Model to Inform Requirements for Martian Spacesuit Architectures

Gabriella Schauss (University of Colorado Boulder)
and Allison Anderson (University of Colorado Boulder
Bioastronautics)

ICES-2023-396 Implementing a Biorobotic Spacesuit Glove Solution to Optimize Crew Performance for Planetary Surface Operations

Danielle Carroll (University of Colorado Boulder),
Spencer Dansereau (University of Colorado Boulder),
Taylor Tvrdy (University of Colorado Boulder), Allison
Anderson (University of Colorado Boulder) and
Stephen Robinson (University of California Davis)

ICES-2023-426 A Localized Compute Platform to Support EVA Software Applications

Michael Vandi (Celestial Systems), Larysa Paliashchuk
(Celestial Systems) and Ashish Upadhyay (Celestial
Systems)

IMPERIAL 2

ICES307-C AICHe Collaboration, Educational Outreach, and Public Engagement

ORGANIZERS:

LUCIE POULET, NASA POSTDOCTORAL PROGRAM,
KENNEDY SPACE CENTER
DEAN MUIRHEAD, BARRIOS TECHNOLOGY
JOCHEN KEPPLER, SELEON GMBH
MARY LOU NADEAU, AERODYNE INDUSTRIES

ICES-2023-16 U.S. Spacesuit Knowledge Capture – Expanding Our Future

Cinda Chullen (NASA), Vladenka Oliva (Jacobs), Gordon
Andrews (Jacobs) and Diana Rodgers (S&K Global
Solutions)

ICES-2023-307 Integrating Hands-on Learning Modules into a Course on Life Support Systems

James Nabity (University of Colorado Boulder)

ICES-2023-209 Integrating Real-Time Environmental Data into an Educational Web Interface

Meridith Greythorne, Gregory Ross, Ian Castellanos,
Grant Hawkins, Ezio Melotti, Ryan Meneses, Kai
Staats (Over the Sun, LLC) and Gretchen Hollingsworth
(Barrow Arts & Sciences Academy)

IMPERIAL 3

ICES304-D: AICHe/IIC Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
STEVE SEPKA, NASA
MATTEO LAMANTEA, THALES ALENIA SPACE
ANNIE MEIER, NASA KENNEDY SPACE CENTER
RAY PITTS, NASA KENNEDY SPACE CENTER

ICES-2023-199 Spaceflight Exercise and Textile Laundering Machine for Improved Human Health

Andrew Arends (University of California, Davis) and
Stephen Robinson (University of California, Davis)

ICES-2023-328 Ultrasonic Clothes Washer/Dryer Combination for Moon, Mars, and ISS Applications

Ayyoub Momen, Jonathan Bigelow, Connor
Shelander, Justin Ellis, Dennis Chertkovsky
(Ultrasonic Technology Solutions), Michael Ewert (JSC
NASA) and Melissa McKinley (NASA)

ICES-2023-73 Solid Waste Ultrasonic Drying Performance under Zero Gravity Condition and the Impact on Material Bioactivity

Ayyoub Momen (Ultrasonic Technology Solutions),
Connor Shelander (Ultrasonic Technology Solutions),
Jonathan Bigelow (Ultrasonic Technology Solutions)
and Tra-My Justine Richardson (NASA)

ICES-2023-263 Using Effluent from a Hybrid Anaerobic Membrane Bioreactor Treating Fecal Waste for Hydroponic Fertigation of Pak Choi

Alexandra Smith, Talon Bullard (University of South
Florida), Daniella Saetta (University of South Florida/
NASA), Jason Fischer (NASA/ LASSO), Katrina
Haarmann, Flaubert Nascimento Akepeu (University
of South Florida), Luke Roberson (NASA) and Daniel
Yeh (University of South Florida)



WEDNESDAY

19 JULY EARLY AFTERNOON

IMPERIAL 5

ICES302-H: AIChE/ICS/IIC
ICES305: AIChE/ICS/TECS/AIAA LS&S
 302: Physio-chemical Life Support - Air Revitalization Systems - Technology and Process Development
 305: Environmental Control of Commercial and Exploration Spacecraft

302 ORGANIZERS: MORGAN ABNEY, NASA ESC
 GRACE BELANCHIK, NASA ARC
 JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
 PATRICK OGER, AIRBUS

305 ORGANIZERS: JORDAN HOLQUIST, PARAGON SDC
 TONY RECTOR, BLUE ORIGIN
 CHANG HYUN SON, BOEING
 DAVID WILLIAMS, NASA JSC
 MAEVE ACHESON, SPACE X
 MICHAEL WALES, BLUE ORIGIN

14:00

ICES-2023-104 (ICES302)
 Integrated Testing of the Air-Cooled Temperature Swing Adsorption Compression System (AC-TSAC) and 4-Bed Molecular Sieve (4BMS)

Jonathan Wells (KBR / NASA Ames), Kelby Gan (KBR / NASA Ames), Arisa Waddle (ESSCA) and Grace Belancik (NASA Ames)

14:30

ICES-2023-196 (ICES302)
 Development of CO₂ Reduction-Water Electrolysis Tandem Device as a Full-Scale Model

Asuka Shima (Japan Aerospace Exploration Agency), Masato Sakurai (Japan Aerospace Exploration Agency), Yoshitsugu Sone (Japan Aerospace Exploration Agency), Hironori Nakajima (Kyushu Univ), Mitsuhiro Inoue (Univ. of Toyama) and Takayuki Abe (Univ. of Toyama)

15:00

ICES-2023-248 (ICES305)
 The LIFETM Habitat (Large Integrated Flexible Environment) Air Revitalization System Development

Sam Moffatt (Sierra Space), Mark Mentink (Sierra Space), Michael Martinez (Sierra Space), Jacob Fischer (Sierra Space), Matt Hurr (Sierra Space), Adam Marten (Sierra Space) and Abolfazl Shakouri (Sierra Space)

15:30

ICES-2023-383 (ICES302)
 Microbial Mayhem: Microbial Growth Potential in CO₂ Removal Systems Designed for Long-Duration Spaceflight

Nico Whitlock (KBR Wyle, NASA Ames Research Center) and Grace Belancik (NASA Ames Research Center)

IMPERIAL 7

ICES301: AIChE
 Advanced Life Support Systems Control

ORGANIZERS:
 CHANG HYUN SON, THE BOEING COMPANY
 CYNTHIA REULAND, AERODYNE
 NIKOLAY IVANOV, PETER THE GREAT SAINT
 PETERSBURG POLYTECHNIC UNIVERSITY, RUSSIA
 CLIFF MARTIN, THE BOEING COMPANY
 AMY CALDWELL, THE BOEING COMPANY

ICES-2023-51
 Development of an efficient alternative to recovery O₂ from metabolic CO₂ via electrolysis operated at ambient temperature and driven by a highly selective catalysis

Jesus Dominguez (Jacobs JSEG IG), Cara Black, Brittany Brown (NASA Marshall Space Flight Center), Wilaiwan Chanmanee, Brian Dennis (University of Texas at Arlington), Lorlyn Reidy, Shannon McCall (Jacobs JSEG), Kaitlin Oliver-Butler (NASA Marshall Space Flight Center) et al.

ICES-2023-290
 PESTO: An Agile Computational Solution for ECLSS Simulation and Control for the Gateway Air Revitalization System

Jonathan Anthony (Paragon Space Development Corporation) and Gregory Doidge (Paragon Space Development Corporation)

ICES-2023-222
 Long Term Material Circulation Control and Handling Repair Order in ALSS by Hierarchical Approach

Masakatsu Nakane (Nihon University) and Hiroyuki Miyajima (International University of Health and Welfare)

ICES-2023-184
 Numerical Analysis of Lunar Dust in Support of the Habitat and Logistics Outpost

Owen G. Brown (Northrop Grumman), James C. Eblin (Northrop Grumman), Luis M. Bermudez (Northrop Grumman) and Zach Turner (Northrop Grumman).

IMPERIAL 9

ICES308-A: AIChE
 Advanced Technologies for In-Situ Resource Utilization

ORGANIZERS:
 CHRISTIAN JUNAEDI, PRECISION COMBUSTION, INC.
 JORDAN HOLQUIST, PARAGON SPACE DEVELOPMENT CORPORATION
 JERRY SANDERS, NASA JOHNSON SPACE CENTER

ICES-2023-475
 An Experimental Study on Low Pressure Frost Formation for Lunar Polar Water Capture

Beau Compton (NASA Glenn Research Center), Timothy Krause (Universities Space Research Association) and Leah Struchen Deans (NASA Glenn Research Center)

ICES-2023-136
 Demonstration and Model Validation of Freeze Distillation as a Purification Step for Lunar Water Processing

Connor Joyce, Jordan Holquist, Alex Ruble, Robert Rivera and Timothy Moeller (Paragon Space Development Corporation)

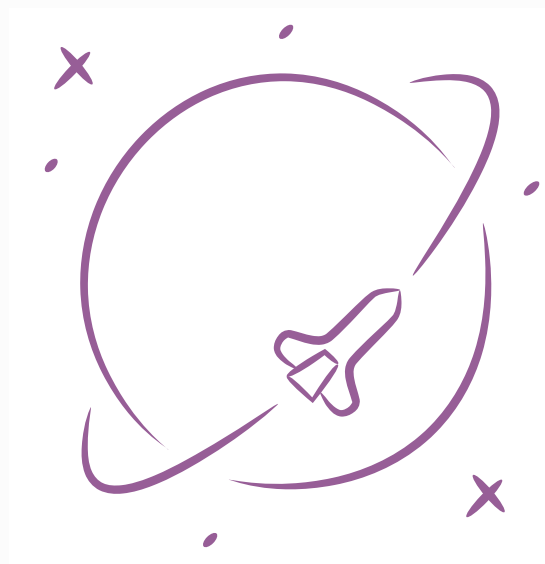
ICES-2023-108
 Demonstration of Paragon's ISRU Propellant Production Subsystem Electrolyzer and Electrolysis Assembly

Jordan Holquist, Connor Joyce, Robert G Rivera, Philipp Tewes (Paragon Space Development Corporation), Timothy Myles (Giner, Inc.), David Markham (Giner, Inc.), Thomas Ebaugh (Giner, Inc.), Meagan Rich (Giner, Inc.) and Jason Willey (Plug Power)

NOTES ✨

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EARLY CAREER WORKSHOP



SPONSORED BY 

WEDNESDAY, 19 JULY - 16:00 HRS

THOMSONS SOCIAL HUB

(BACK OF RESTAURANT)

This casual forum is a networking opportunity for students and young professionals to connect with veterans in the field to learn about how to best develop their future careers in the domain of environmental systems.

If you would like to attend and did not already RSVP during registration, please stop by the ICES Registration & Information desk to let us know.

Get sage advice and learn about the career journeys of industry professionals including ...

ART AVILA

NASA Jet Propulsion Laboratory

BRYAN SHAUGHNESSY

*Science and Technology Facility
Council UK*

CINDY REULAND

NASA

DARNELL COWAN

NASA Johnson Space Center

GRACE BELANCIK

NASA Ames Research Center

GREGORY NAVARRO

CNES

HUME PEABODY

NASA Goddard Space Flight Center

JEN MILLER

NASA Jet Propulsion Laboratory

JORDAN HOLQUIST

*Paragon Space Development
Corporation*

MARTIN ALTENBURG

Airbus

MATTHEW VAUGHAN

European Space Agency

MORGAN ABNEY

NASA Engineering & Safety Center

ROMAIN PEYROU

European Space Agency

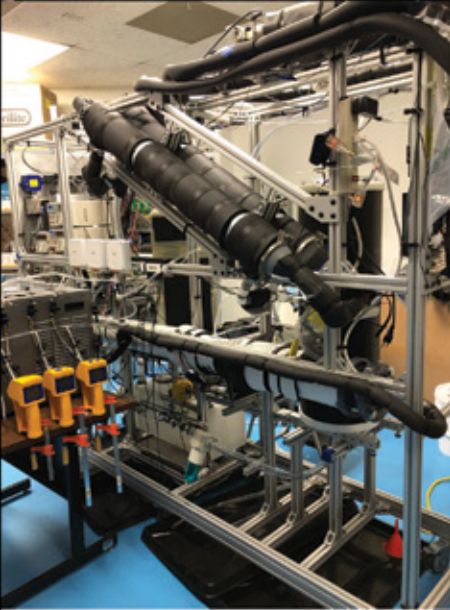
SAURABH VILEKAR

Precision Combustion, Inc.

YANN CERVANTES

CNES







BANQUET KEYNOTE SPEAKER



WEDNESDAY, 19 JULY – 19:00 HRS
IMPERIAL BALLROOM

DR. LISA WATSON-MORGAN ✦

Manager, Human Landing System Program
(NASA Marshall Space Flight Center)

With more than 30 years of contributions and accomplishments in the country's civilian space program, Dr. Lisa Morgan-Watson has proven her leadership expertise and subject matter strengths throughout her career at NASA's Marshall Space Flight Center in Huntsville.

A Huntsville native, Watson-Morgan graduated in 1991 from The University of Alabama with a bachelor's degree in industrial engineering. She received her master's degree in systems engineering in 1994 and her doctorate in engineering management in 2008 from the University of Alabama in Huntsville.

Watson-Morgan began her career with NASA working as a data systems engineer at Marshall while she was still a student at UA. She held this position until 1999 when she became the mission support requirements and development team lead.

After taking a year to solely work on her doctorate, Watson-Morgan worked as ground systems operations branch chief while she completed her degree. She then began to move up through several positions in Science and Missions Systems from 2008-2011 including deputy chief engineer, assistant manager and acting chief engineer.

In 2011, Watson-Morgan became chief engineer of Flight Programs and Partnerships. She was named acting associate director for Technical, Engineering Directorate in 2013 and was appointed to the Senior Executive Service. After working in that position, Watson-Morgan was manager in the Office of Chief Engineer until 2015 and manager of the Spacecraft and Vehicle Systems Department, Engineering until 2018.

During the next two years, she worked as associate director for operations in engineering and then as deputy director of engineering. As deputy director, Watson-Morgan oversaw more than 2,300 employees who worked to develop, test and deliver spaceflight hardware and software.

She was chosen as program manager of the Human Landing System program in July 2019. In this position, Watson-Morgan oversees the planning and creation of integrated lunar landing systems that will transport the first woman and next man to the moon in the next five years. With help from industry, Watson-Morgan's team will support NASA's Artemis Program, which will enable long-term visits to the moon by 2026 and facilitate the next steps to reaching Mars.

Awards she has earned during her time with NASA, three of the most notable are the 2001 Exceptional Service Medal, 2010 Exceptional Achievement Medal and 2018 Meritorious Presidential Rank Award. Dr. Watson-Morgan is a University of Alabama Technical Fellow and was inducted into the state of Alabama Engineering Hall of Fame.

REVOLUTIONIZING THE SPACE BUSINESS

Sierra Space is an established supplier of high-reliability satellites and spacecraft hardware, with multiple areas of expertise, including space solar power generation, precision pointing and motion control, spacecraft docking and berthing, payload separation systems and multi-satellite dispensers, propulsion engines and systems, and spacecraft environmental and thermal control, and life support systems.

For decades, our products have played a key role in space science and exploration, with a long legacy of contribution to government, commercial, and civil customers on a diverse set of missions. Thousands of products, supporting hundreds of missions, with 100% operational success.

This is why our customers choose Sierra Space.



SCAN HERE FOR APPLICATIONS HARDWARE CATALOG



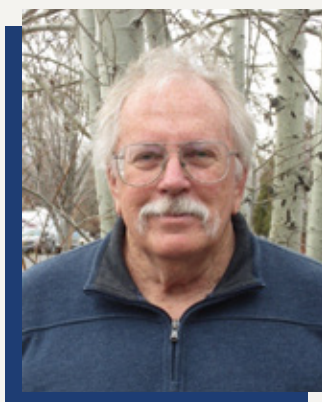
AWARDS PRESENTATIONS

AIAA JEFFRIES AEROSPACE MEDICINE AND LIFE SCIENCES RESEARCH AWARD

Recognizing the importance to aeronautics of scientific endeavors in the field of medicine, the Jeffries Aerospace Medicine and Life Sciences Research Award was established in 1940 as the John Jeffries Award to honor the memory of the American physician, John Jeffries, whose scientific investigations were published in a "Narrative of Two Aerial Voyages" in 1796.

ICES AWARDS BANQUET

WEDNESDAY, 19 JULY – 18:30 HRS | IMPERIAL BALLROOM



2023 RECIPIENT

BRUCE W. WEBBON

NASA Ames Research Center (ret)

Award Citation:

"For innovative engineering, leadership and mentorship in life support, human physiology, thermal control, and extravehicular activity technology development, to advance NASA's human exploration goals."

Dr. Bruce W. Webbon devoted his aerospace career to the pursuit of routine, safe human exploration of the solar system, to the development of aerospace technologies and of people to achieve that goal, and to transferring NASA technologies for the benefit of humanity. He has worked in private industry, in academia, and in government, always with a focus on EVA, ECLS or space technology; and with the objective of maximizing output and professional development of staff. Equally comfortable at the lab bench, or multiplying his output as a manager who guides the work of others, he has stewarded the development of a wide number of technologies spanning the disciplines of EVA, ECLS, space physiology, and earthbound medicine. He has mentored the next generation and shared his knowledge through teaching, publications, advisory committees and review panels, and has consistently and selflessly strived to advance and promote the achievements of his employees, colleagues, mentees and students over his own.

Dr. Webbon worked at Vought Aerospace, SRI International, NASA Ames, UC Santa Cruz, and Oregon Institute of Technology, remaining focused on protective systems, human physiology in harsh or altered environments, and technology development. At SRI he led a team in bioinstrumentation with both civil space and military applications. At NASA Ames he led the methodical evaluation of the AX-5 space suit, and he led the development of a small-size neutral buoyancy facility, for rapid testing of suits, enabling underwater evaluation independent of the larger and more heavily scheduled test facilities at that time. In addition to the suit testing, two key graduate student projects under his supervision utilized that neutral buoyancy facility. One investigated the energy associated with walking in Lunar and Martian gravities. The other investigated the metabolic energy expended under varied center of gravity positions of the PLSS.

Bruce also evaluated radiators, fusible heat sinks, evaporators, sublimators, and heat pipes for use in life support systems, and a dual-walled, gold-coated hard suit concept for thermal control. He brought together the manufacturers of military armored vehicles and hazmat suits, with the designer of the suit port concept and fresh engineers to fabricate and demonstrate to the community a workable suit port prototype.

Bruce continually promoted medical applications of NASA technology and worked with a number of physicians to bring cooling garments to patients in varied therapeutic settings.

INTERNATIONAL CONFERENCE ON ENVIRONMENTAL SYSTEMS (ICES) AWARD FOR TECHNICAL EXCELLENCE

The International Conference on Environmental Systems (ICES) Award for Technical Excellence recognizes individual technical contributions to Space Environmental Control and Life Support (ECLSS), Thermal Control Systems (TCS), Extravehicular Activity (EVA), Crew Systems, and Habitation. The individual selected is being recognized for accomplishments that advance the state of the art in the environmental control industry, contributions to ICES-related parts of space projects, and/or efforts supporting the organization and conduct of the ICES conference. Candidates for the ICES Award are nominated by peers through the ICES sponsoring committees and selected by the ICES Steering Committee.

2023 RECIPIENT TO BE ANNOUNCED DURING THE BANQUET.

PAST RECIPIENTS:

2022 Amy Ross	2010 Burkard Behrens
2021 Chang H. Son & Jentung Ku	2009 Barry Finger
2019 David Klaus	2008 Bill Atwell
2018 Andrew Jackson	2007 Michael Rouen
2017 Greg Gentry	2006 John W. Fisher
2016 Wolfgang Supper	2005 Keiji Nitta
2015 Jeffery T. Farmer	2004 Richard L. Olson
2014 Harry W. Jones	2003 Alan Drysdale
2013 Edward Hodgson	2002 John B. Hall Jr.
2012 Phil Spampinato	2001 Richard Reysa
2011 Joe Chambliss	

ICES STUDENT POSTER AWARDS

The Student Poster Competition conducted earlier in the week consisted of 18 posters presented by students from 12 different universities and were judged by professionals in the ICES community on technical content, poster quality, and presentation of the material.





THURSDAY

20 JULY EARLY MORNING

	WALKER/BANNERMAN	DOLL/HERALD	STEPHEN A/B
	ICES203-A: IIC Thermal Testing	ICES207-B: IIC/TECS Thermal and Environmental Control Engineering Analysis and Software	ICES204-B: IIC/AIAA LS&S Bioregenerative Life Support
	ORGANIZERS: GERD JAHN, AIRBUS LUKE TAMKIN, AIRBUS HIROYASU MIZUNO, JAXA ANDREA FERRERO, THALES ALENIA SPACE	ORGANIZERS: HENRI BROUQUET, ITP AERO BRIAN BRIGGS, NASA JET PROPULSION LABORATORY MATTHEW VAUGHAN, EUROPEAN SPACE AGENCY HUME PEABODY, NASA GODDARD SPACE FLIGHT CENTER	ORGANIZERS: CESARE LOBASCIO, THALES ALENIA SPACE MASATO SAKURAI, JAXA MIRIAM SARGUSINGH, NASA JOHNSON SPACE CENTER PAUL ZABEL, DLR MONONITA NUR, NASA
9:00	ICES-2023-48 Assessing Technical Risk of Tailoring Space Vehicle Thermal Vacuum Testing	ICES-2023-111 Small Satellite Validation of a Simulation Approach for Assessing Dynamic Temperatures in Orbit	ICES-2023-421 1st International Space Ecology Workshop - Research Needs & Roadmap to the Future
	John Welch (The Aerospace Corporation)	Corey Packard (ThermoAnalytics, Inc.), Timofey Golubev (ThermoAnalytics, Inc.), Daniel Woodford (ThermoAnalytics, Inc.), Madison Rosiek (ThermoAnalytics, Inc.) and Zachary Edel (ThermoAnalytics, Inc.)	Christine Escobar (Space Lab Technologies), Patrick Grubbs (Spring Institute for Forests on the Moon), Frieda Taub (University of Washington), Jane Shevtsov (Propagule Space Ecology Institute), Sherri Damlo and Stephen Lantin (University of Florida)
9:30	ICES-2023-317 Lunar Environment Monitoring Station TRL-6 Thermal Vacuum Test and Results	ICES-2023-152 Space Rider Re-entry Module Thermal Transient Uncertainty Analysis: Methodology and Results	ICES-2023-220 Microbial Electrochemical Technologies for Regenerative Life Support Systems
	Ethan Burbridge (Vertex Aerospace, LLC), Mehdi Benna (University of Maryland, Baltimore County) and Mitchell Hamann (AMU Engineering)	Gianni Pippia (Thales Alenia Space Italia), Maria Chiara Berva (Thales Alenia Space Italia), Massimo Bertone (Thales Alenia Space Italia), Corrado Guglielmo (Thales Alenia Space Italia), Andrea Ferrero (Thales Alenia Space Italia), Giovanni Chirulli (ESA) and Egidio Collavo (ESA)	Amanda Kay Luther (Redwire Space NV), Jean-Romain Bautista Angeli (University of Ghent), Dries Demey (Redwire Space NV), Korneel Rabaey (Hydrohm) and Jolien De Paepe (Hydrohm)
10:00	ICES-2023-6 Development and Application of a Novel Calorimetry Technique for the Study of Lithium-Ion Cell Thermal Runaway	ICES-2023-305 Modeling of Gateway Environment Control and Life Support Systems as a Means to Investigate the Subsystem and Integrated Architecture Performance	ICES-2023-281 Survey of Microbial Community in Bioreactors Used for Bioregenerative Water Purification
	Steven Rickman (NASA)	Lawrence Barrett (Jacobs), Rachel Sturtz (Jacobs) and Madelyn Hutchinson (Jacobs)	Daniella Saetta (University of South Florida), Jason Fischer (Kennedy Space Center), Talon Bullard, Alexandra Smith (University of South Florida), Cory Spenn, Anirudha Dixit, Christina Khodadad (Kennedy Space Center), Daniel Yeh (University of South Florida) et al.

00:6

9:30

10:00

IMPERIAL 1

ICES403-A: ICS Extravehicular Activity: Space Suit and Surface Mobility Operations

ORGANIZERS:

CINDA CHULLEN, NASA JOHNSON SPACE CENTER
CHRISTIE SAUERS, NASA JOHNSON SPACE CENTER

ICES-2023-59 Testing the Exploration Conops(Excon) Mockup Suit in Lunar Analog Environments in 2022

Zachary Tejral (NASA), Zachary Fester (NASA), Christine Flaspohler (NASA), Tommy Keomany (NASA), Kristine Davis (NASA), Trevor Graff (Jacobs Engineering) and David Coan (The Aerospace Corporation)

ICES-2023-278 New Equipment and Techniques for Steep and Vertical Terrain Access in Planetary EVA Operations

Nate Ball (Atlas Devices), Daniel Walker (Atlas Devices) and Gino Kahaunaale (Atlas Devices)

ICES-2023-298 Trades, Architecture, and Design of the Joint Augmented Reality Visual Informatics System (Joint AR) Product

Paromita Mitra (NASA), Matthew Miller (Jacobs/NASA JSC), Briana Krygier (NASA), Sarosh Nandwani (NASA), Matthew Noyes (NASA), Vishnuvardhan Selvakumar (Purdue University), Amanda Smith (KBR Wyle/NASA JSC) and Tyler Garrett (NASA)

IMPERIAL 2

ICES511: AIAA LS&S Reliability for Space Based Systems

ORGANIZERS:

TODD H. TREICHEL, SIERRA SPACE
GREGORY L. DAVIS, NASA JET PROPULSION
LABORATORY

ICES-2023-138 Coatings for Space-Based Systems: Impacts of Plasma Processes

Richard Clergereaux (CNRS - Laplace), Veronica Orlandi (CNRS - Laplace), Myrtil Kahn (CNRS - LCC), Gregory Navarro (CNES - Spaceship) and Alexis Paillet (CNES - Spaceship)

ICES-2023-183 Development of a Damageable ECLSS and Interior-Environment Virtual Testbed Model to Simulate Future Resilient Deep Space Habitats

Seungho Rhee (Purdue University), Zoe Noble (Purdue University), Jaewon Park (Purdue University), Amanda Lial (Purdue University), Laura Collazo Carballude (Purdue University) and Davide Ziviani (Purdue University)

ICES-2023-433 Design and Optimization of a Test Setup for Low Thermal Conductance Measurements

Natalie Walsh (The Aerospace Corporation), Christopher Ye (The Aerospace Corporation), Christopher Bertagne (The Aerospace Corporation), Yoshimi Takeuchi (The Aerospace Corporation) and John McHale (The Aerospace Corporation)

IMPERIAL 3

ICES304-E: AICHe/IIC Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
STEVE SEPKA, NASA
MATTEO LAMANTEA, THALES ALENIA SPACE
ANNIE MEIER, NASA KENNEDY SPACE CENTER
RAY PITTS, NASA KENNEDY SPACE CENTER

ICES-2023-47 Benefits of Trash-to-Gas versus Jettison of Waste via Trash-Lock for Mars Transit

Thomas Chen (NASA Johnson Space Center), Michael Ewert (NASA Johnson Space Center) and Joel Olson (Southeastern Universities Research Association, NASA Kennedy Space Center)

ICES-2023-63 Analysis of the Solid Products from the OSCAR and the AOWG Trash Processing Systems

Anne Meier (NASA), Mahmoud Matar Abed (University of Minnesota), Stacy Carrera (Pioneer Astronautics), Joel Olson (Southeastern Universities Research Association) and David Rinderknecht (NASA)

ICES-2023-283 Plasma Abatement of Volatile Organic Compounds

Joel Olson (Southeastern Universities Research Association), Ryan Gott (NASA Kennedy Space Center), Shayla Wilhelm (Southeastern Universities Research Association), Kenneth Engeling (NASA Kennedy Space Center), Caiden Campbell (NASA OSTEM Intern) and Ray Pitts (NASA Kennedy Space Center)



THURSDAY

20 JULY EARLY MORNING

IMPERIAL 5

ICES302-I: AIChE/ICS/IIC
302: Physio-chemical Life Support - Air Revitalization Systems - Technology and Process Development

ORGANIZERS:

MORGAN ABNEY, NASA ENGINEERING AND SAFETY CENTER
GRACE BELANCHIK, NASA AMES RESEARCH CENTER
JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
PATRICK OGER, AIRBUS

IMPERIAL 7

ICES503: AIAA LS&S
Radiation Issues for Space Flight

ORGANIZERS:

RON TURNER, ANSER
SHIRIN RAHMANIAN, NASA LANGLEY RESEARCH CENTER

IMPERIAL 9

ICES308-B: AIChE
Advanced Technologies for In-Situ Resource Utilization

ORGANIZERS:

CHRISTIAN JUNAEDI, PRECISION COMBUSTION, INC.
JORDAN HOLQUIST, PARAGON SPACE DEVELOPMENT CORPORATION
JERRY SANDERS, NASA JOHNSON SPACE CENTER

9:00

ICES-2023-206

Preliminary Study of Moisture Absorption and Desorption in CO₂ Removal System

Masato Sakurai (JAXA), Asuka Shima (JAXA), Kentaro Hirai (JAXA), Chiaki Yamazaki (JAXA), Shotaro Futamura (JAXA), Satoshi Matsumoto (JAXA) and Hideki Saruwatari (JAXA)

ICES-2023-474

Artemis-I - Development and Testing of Radiation Mitigation Strategies for Crewed Missions

Janet Barzilla (Leidos, Civil Group Integrated Missions Operations), Ramona Gaza (Leidos, Civil Group Integrated Missions Operations) and Nicholas Stoffle (Leidos, Civil Group Integrated Missions Operations)

ICES-2023-17

Pressure Retarded Osmosis for Water Supply for Alkaline High Pressure Electrolysis

Sebastian Markgraf (Airbus Defence and Space GmbH), Fabian Fremdling (Airbus Defence and Space GmbH), Walter Jehle (Airbus Defence and Space GmbH) and Martino Giobbio (Faculty of Aerospace Engineering, Delft University of Technology, Delft, the Netherlands)

9:30

ICES-2023-219

Development of Novel Structured Adsorbent to Increase Trapping Efficiency of Water and Carbon Dioxide

Pascal Barbier (Air Liquide Advanced Technologies), Cedric Dupont (Air Liquide Advanced Technologies), Alexis Paillet (CNES) and Gregory Navarro (CNES)

ICES-2023-365

Nuclear Data Needs for GCR Shielding Models

Lawrence Heilbronn (University of Tennessee)

ICES-2023-297

Scale Up and Coupling of the MOXIE Solid Oxide Electrolyzer for Mission-Scale Lunar and Martian Applications

Michele Hollist (OxEon Energy), Joseph Hartvigsen (OxEon Energy), Jessica Elwell (OxEon Energy), S. Elangovan (OxEon Energy), Tyler Hafen (OxEon Energy) and Jenna Pike (OxEon Energy)

10:00

ICES-2023-400

Preliminary Investigation of Vortex Phase Separator-Based Spacecraft Cabin Air Dehumidification Subsystem for CO₂ Removal

Chirag Byanjankar (University of North Texas), Alexander Sarvadi (University of North Texas), Huseyin Bostanci (University of North Texas), Cable Kurwitz (Texas A&M University) and Grace Belancik (NASA Ames Research Center)

ICES-2023-20

Spacecraft Scale Magnetospheric Protection from Galactic Cosmic Radiation

John Slough (MSNW LLC)

ICES-2023-3

Regenerative Solid Oxide Stack for Energy Storage

Saurabh Vilekar (Precision Combustion, Inc.), Christian Junaedi (Precision Combustion, Inc.), Kyle Hawley (Precision Combustion, Inc.), Eric Allocco (Precision Combustion, Inc.) and Jessica Rehaag (Precision Combustion, Inc.)

NOTES ✨

[illegible]



THURSDAY

20 JULY
LATE MORNING

WALKER/BANNERMAN

ICES203-B: IIC Thermal Testing

ORGANIZERS:

GERD JAHN, AIRBUS
LUKE TAMKIN, AIRBUS
HIROYASU MIZUNO, JAXA
ANDREA FERRERO, THALES ALENIA SPACE

DOLL/HERALD

ICES207-C: IIC/TECS Thermal and Environmental Control Engineering Analysis and Software

ORGANIZERS:

HENRI BROUQUET, ITP AERO
BRIAN BRIGGS, NASA JET PROPULSION LABORATORY
MATTHEW VAUGHAN, EUROPEAN SPACE AGENCY
HUME PEABODY, NASA GODDARD SPACE FLIGHT CENTER

STEPHEN A/B

ICES204-C: IIC/AIAA LS&S Bioregenerative Life Support

ORGANIZERS:

CESARE LOBASCIO, THALES ALENIA SPACE
MASATO SAKURAI, JAXA
MIRIAM SARGUSINGH, NASA JOHNSON SPACE CENTER
PAUL ZABEL, DLR
MONONITA NUR, NASA

11:00

ICES-2023-126 METImage Visible and Infrared Detectors End to End Co-Alignment Verification at Cryogenic Subsystem Level

Raphaël Naire, Anja Bergs, Theresa Bonenberger, Robert
Schweikle, Heiko Joos, Bernhard Dorner and Klaus
Werner Kruse (Airbus Defence and Space GmbH)

ICES-2023-218 Reduction and Correlation of Lumped Parameter Method for Thermal Models in Steady-State Conditions

Ignacio Torralbo Gimeno (IDR/UPM), German Fernandez-
Rico (Max Planck Institute for Solar System Research),
Javier Piqueras-Carreño (Universidad Politécnica
de Madrid) and Isabel Perez-Grande (Universidad
Politécnica de Madrid)

ICES-2023-274 Integration and Validation of Mushroom and Algae into an Agent-based Model of a Physico-chemical and Bioregenerative ECLSS

Sean Gellenbeck (University of Arizona), Joel L. Cuello
(Department of Agriculture and Biosystems Engineering,
University of Arizona, Tucson, Arizona, USA), Barry Pryor
(University of Arizona), Kai Staats (Over the Sun, LLC) and
Chuck Gerba (University of Arizona)

11:30

ICES-2023-243 Cryogenic Thermal Test Setup for ARIEL FGS Instrument

Piotr Osica (Spacive Sp. z o.o.), Karolina Wielgos (Spacive
Sp. z o.o.), Agata Bialek, (Space Research Centre of the
Polish Academy of Sciences (CBK PAN)), Markus Czupalla
(FH Aachen - University of Applied Sciences) and Cezary
Gąsowski (Spacive Sp. z o.o.)

ICES-2023-372 BBTherm: A High-Fidelity Analysis Tool for Estimating the In-Vacuum Thermal Conductance Across Ball Bearings

Christopher Bertagne (The Aerospace Corporation),
Christopher Ye (The Aerospace Corporation), Natalie
Walsh (The Aerospace Corporation), John McHale (The
Aerospace Corporation) and Yoshimi Takeuchi (The
Aerospace Corporation)

ICES-2023-258 Integration of a Photobioreactor into the MaMBA Facility as Part of a Human- centered Life Support System

Paul Große Maestrup, Ksenia Appelganc, Saurabh
Band, Florian Stechmann, Vera Hagemann, Anna
Förster, Cyprien Verseux and Christiane Heinicke
(University of Bremen)

12:00

ICES-2023-153 The Thermal Balance/Thermal Cycling Test of Euclid

Marco Gottero, Andrea Ferrero, Roberto Bogiatto (Thales
Alenia Space Italia), Daniele Stramaccioni, Alex Short
(European Space Agency), Giorgio Costa, Renato Martino
and Simone Ferrero (Thales Alenia Space Italia)

ICES-2023-162 A System-Level Spacecraft Thermal Model Reduction Method Applicable to Transient Analysis

Toshihiro Shibukawa (ArkEdge Space Inc.) and Shinichi
Nakasuka (The University of Tokyo)

00:11

11:30

12:00

IMPERIAL 1

ICES403-B: ICS Extravehicular Activity: Space Suit and Surface Mobility Operations

ORGANIZERS:

CINDA CHULLEN, NASA JOHNSON SPACE CENTER
CHRISTIE SAUERS, NASA JOHNSON SPACE CENTER

ICES-2023-327 A Decision Support System for Extravehicular Operations Under Significant Communication Latency

Timothy McGrath (JES Tech), Jason Norcross (KBR),
Brianna Sparks (NASA), Fernando Figueroa (NASA),
Jon Morris (D2K Technologies), Federico Piatti (D2K
Technologies) and Jeffrey Somers (NASA)

ICES-2023-352 Developing a Hybrid Spacesuit Simulator as a Research Tool for Assessing Extravehicular Activity Relevant Workload

Yayu Monica Hew (KBR Inc), Bradley Hoffmann (KBR
Inc), Zachary Wusk (KBR Inc), Karina Marshall-Goebel
(NASA Johnson Space Center) and Jeffrey Somers (NASA
Johnson Space Center)

IMPERIAL 2

IMPERIAL 3

ICES304-F: AIChE/IIC Physio-Chemical Life Support - Waste Management Systems - Technology and Process Development

ORGANIZERS:

JUSTINE RICHARDSON, NASA AMES RESEARCH CENTER
STEVE SEPKA, NASA
MATTEO LAMANTEA, THALES ALENIA SPACE
ANNIE MEIER, NASA KENNEDY SPACE CENTER
RAY PITTS, NASA KENNEDY SPACE CENTER

ICES-2023-75 Considerations For Waste-to-Base Future Research Paths

Steven Sepka (NASA), Michael Ewert (NASA), Jeffrey Lee
(NASA (retired)) and Andrew Shapiro (HeroX)

ICES-2023-359 Producing Air Revitalization Sorbents from Spacecraft Waste Biomass

Oscar Monje (ESC / Air Revitalization Lab), Joshua
Finn (NASA) and Orlando Melendez (NASA)



THURSDAY

20 JULY LATE MORNING

IMPERIAL 5

ICES302-J: AIChE/ICS/IIC Physio-chemical Life Support - Air Revitalization Systems - Technology and Process Development

ORGANIZERS:

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CENTER
GRACE BELANCHIK, NASA AMES RESEARCH CENTER
JIM KNOX, DYNETICS TECHNICAL SOLUTIONS
PATRICK OGER, AIRBUS

ICES-2023-208

Design, Build, Test of a CO₂ Removal
Testbed and Twin Robotically Manipulable
Testbed: Sensing Degradation and
Performing Maintenance with Robot/
Human Teaming

Daniela Ivey (UC-Davis), Ulubilge Ulusoy (USC), Samuel
Eshima (University of Colorado Boulder), Tammer
Barkouki (UC-Davis), Ayush Mohanty (Georgia Tech),
Monica Torralba (UC-Davis), Christopher Lindbeck
(Georgia Tech Research Institute), Stephen Balakirsky
(Georgia Tech Research Institute) et al.

ICES-2023-82

Leaky Waveguide Solid Sorbent Desorption
System Overview

Chris Delnero (Lockheed Martin Space), Clifton Courtney
(Lockheed Martin Aeronautics), Arun Bhattacharyya
(Lockheed Martin Space) and Kevin Payne (Lockheed
Martin Space)

IMPERIAL 7

IMPERIAL 9

ICES308-C: AIChE Advanced Technologies for In-Situ Resource Utilization

ORGANIZERS:

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JORDAN HOLQUIST, PARAGON SPACE DEVELOPMENT
CORPORATION
JERRY SANDERS, NASA JOHNSON SPACE CENTER

ICES-2023-455

Ionic Liquid Parameter Prediction
Leveraging Quantum Structure Property
Relationships

Mitchell Woolever (University of Colorado Boulder),
James Nabity (University of Colorado Boulder), Ronald
Cook (MDI LLC) and Eric Fox (NASA MSFC)

ICES-2023-313

Carbothermal Reduction System Overview
and Developments in Support of the
Artemis Program and a Commercial Lunar
Economy

Brant White (Sierra Space Corporation) and Nathan
Haggerty (Sierra Space Corporation)

ICES-2023-52

Extraterrestrial Mining Via Two Coupled
Thermal-Driven Phenomena

Jesus Dominguez (Jacobs JSEG/IG), Cara Black (NASA
Marshall Space flight Center), Brittany Brown (NASA
Marshall Space flight Center), Paul Hintze (NASA
Marshall Space flight Center), Shannon McCall (Jacobs
JSEG) and Kagen Crawford (NASA Marshall Space
Center)

11:00

11:30

12:00

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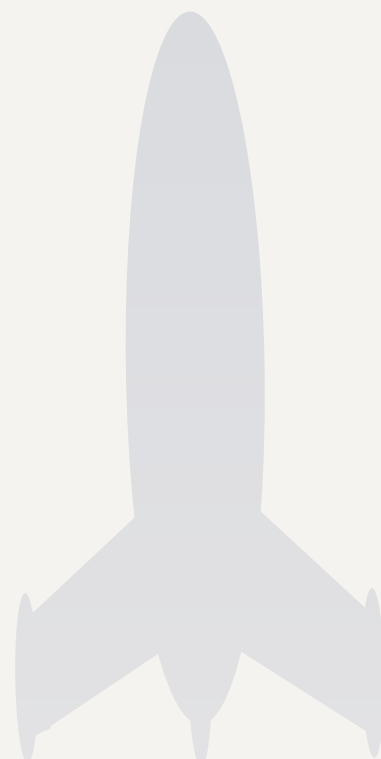
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