



Upcoming Local Events

January 29, 2020

X-Ray Vision: The X-Ray Polarimetry Explorer (IXPE)

Ball Aerospace, Boulder, CO

[Register Link](#)

March 10, 2020

CSBR Colorado Aerospace Day
Colorado State Capitol, Denver, CO

[Register Link](#)

Upcoming National Events

February 25-28, 2020

8th Aircraft Noise and Emissions Reduction Symposium (ANERS)

Bordeaux, France

March 7-14, 2020

2020 IEEE Aerospace Conference
Big Sky, Montana

March 10-12, 2020

23rd AIAA International Space Planes and Hypersonic Systems and Technologies Conference

Montreal, Quebec, Canada

Note from the Editor

What can AIAA do for you? As a professional organization representing you, a member in the aerospace industry, I hope you can take advantage of the resources available to you.

At the national level, I recently participated in the AIAA SciTech 2020 conference in Orlando, FL. I was excited to meet fellow industry, government, and academic aerospace professionals. I met others in my area of interest by attending presentations in the Thermophysics Technical track. It was exciting to see the innovation and research that is continuing to propel our industry into the future. The technical discussions with individuals I do not normally interact with helps provide me with more perspective and insights. In addition to attending the conference, I participated with the Thermophysics Technical Committee, introducing me to more members that want to support the Thermophysics community.

The local AIAA council is also providing opportunities, such as the recent successful Annual Technical Symposium last November, in addition to industry programs and social opportunities to help with your networking.

I encourage you to take advantage of these opportunities and provide your suggestions of what resources and events you would like to see.

Adrian Nagle, AIAA RMS Newsletter Editor, *Ball Aerospace*

In this Newsletter

Topic	Page
Cool Science in Colorado Springs	3
AIAA RM and NDIA Tour: FE Warren Air Force Base	4
Student Essay Contest	5
AIAA Rocky Mountain Section Speakers Program: IXPE	6
AIAA Panel at Ball Aerospace Speaker Series	6
New AIAA Fellows in the Rocky Mountain Section	7
ASCEND Conference — Call for Content	10

Section Officers

Elected

Section Chairman	Dr. Merri Sanchez
Vice Chair	Tracy Copp
Secretary	Kevin Mortensen
Treasurer	Dr. Taylor Lilly
Vice Chairman – North CO	John Marcantonio
Vice Chairman – South CO	Dr. Todd Nathaniel
Vice Chairman – MT	Erik Eliassen
Vice Chairman – WY	Mark Kettles

Committees

Fellow-At-Large	Gene Dionne
Member-At-Large	Pamela Burke
Education and STEM	John Marcantonio
Honors and Awards	Stacey DeFore
Membership	Marshall Lee
Newsletter Editor	Adrian Nagle
Public Policy	Tracy Copp
Programs	Chris Zeller
Technical Committee Liaison	John Reed
Webmaster	John Grace
Young Professionals	Alexandra Dukes

We Need You! If you are interested in increasing your participation in AIAA Rocky Mountain Section, we need your help with positions in any of the committees. If you have an interest, please contact: Kevin Mortensen – kevin.mortensen@baesystems.com

AIAA RMS Call for YP Council Members: AIAA RMS would like you to shape section engagement including events and emphasis areas. This opportunity provides you: networking opportunities with industry leaders, the ability to make your event ideas a reality, and increased engagement with the aerospace industry outside of your day to day role. If you are interested in participating in the AIAA RMS Council, please email: Alex Dukes, AIAA RMS YP Chair, dukes.alexandra@gmail.com.

Cool Science in Colorado Springs

Sue Janssen, *United Launch Alliance (retired)*

Cool Science held the 10th annual Colorado Springs Cool Science Festival from October 12-20. The festival began with the Cool Science Carnival Day at UCCS on Saturday, October 12th. Dr. Lynnane George invited AIAA RMS to participate in the Carnival. (Lynnane is an AIAA Associate Fellow, faculty advisor for the UCCS student branch, instructor of Mechanical and Aerospace Engineering courses at UCCS, and a board member for Cool Science.) This is a very popular event in the community and this year they anticipated over 5000 people to attend! We couldn't pass up the chance to join in the fun and excitement.

Karolyn Evans prepared a "Household Chemical Rocket Propulsion" demonstration. The chemical reactions generate gas using chemicals such as baking soda, vinegar, Alka-seltzer™ and water. The gas is captured in balloons so it is easy to compare the volume and rate of the reaction. The Lockheed Martin Explorer Post provided the test tubes and stands.

It was a beautiful fall Saturday and our station was on the Upper Plaza. A display of Atlas V rocket models enticed families to stop. Sue Janssen talked about the launch vehicles while Karolyn Evans and Cord Orona prepared the test tubes. Volunteer kids were excited to wear gloves and dump the solids into the liquids. Participants of all ages made observations about the differences in the reactions (volume, rate, temperature) and decided which combination of chemicals would make the best "rocket propellant."



Marc Straub, Executive Director of Cool Science, sent us a thank you note to Karolyn: "Now that the festival is over and I've had a chance to catch my breath (a little), I want to thank you and AIAA for giving your time to join us for the Cool Science Carnival Day at UCCS. I hope you enjoyed it as much as the 5,000 to 6,000 folks who attended. I probably say it every year, but I think this was our best Carnival Day ever and I really appreciate your contribution! [...] I hope to see you again next year, so please save Saturday, October 10, 2020 for the Cool Science Carnival Day at UCCS."

More information can be found at www.coolscience.org.



AIAA members Karolyn Evans (left) and Cord Orona (right) represent the Rocky Mountain Section at the Cool Science Festival.

AIAA RM and NDIA Tour: FE Warren Air Force Base

Mark Kettles, *Dish Network*

The Rocky Mountain sections of AIAA and NDIA toured the Francis E. Warren Air Force Base in Cheyenne, Wyoming, in October 2019. This was a joint effort bringing the two groups together in collaborative support of F.E. Warren AFB and the State of Wyoming as it continues to play its critical role in the defense of our nation.

Over 60 attendees from these two organizations attended this exceptional event touring the Warren ICBM & Heritage Museum as well as a Launch Control Center for simulation and training utilized by the base missileers.

The first stop on the tour was at the Heritage Museum where Glenn Robertson, Chief of Command Information, and Paula Taylor, Museum Director, led an intriguing tour bringing to light the rich history of the base. We learned that F.E. Warren AFB is the longest continuously operated Air Force Base in the nation, founded in 1867, and remaining continuously active ever since.

Its unbroken history beginning as a frontier fort, followed by a bomber training squadron and more recently supporting Atlas and Titan ICBM missiles is unparalleled. There were several items available for viewing from Captain John "Black Jack" Pershing, posted to the base prior to his leading American forces in Europe during World War I to repli-



cas of an operational Minuteman launch facility as it exists today.

Additionally, the group received an eye opening presentation from Lt. Emily Seaton, Chief of Community Relations, on the LGM-30 Minuteman III ICBM. This particular missile is an important element utilized as a part of the nation's strategic deterrent forces, which falls under the control of the Air Force Strike Command.



The current ICBM force consists of approximately 450 Minuteman III missiles located throughout the country. These missiles have a range of 6,000 miles or more traveling at speeds of up to Mach 23 and beyond. This product was the direct result of almost 60 years of continuous enhancement efforts perfecting its capabilities and achieving a near 100 percent alert rate.

As we moved from the museum to the Launch Control Center, we further learned what it means to be a missileer and how they train. Our tour guide explained the 24/7 duties of his elite teams as they continue to monitor the skies and defend our nation. Small groups were then guided through short simulations by a Missile Combat Crew allowing our respective groups to participate in a mock launch of theoretical missiles turning keys and pushing buttons.

The overall experience was extraordinary and a wonderful opportunity to bring AIAA and NDIA together in this jointly orchestrated educational effort. Bill Clark, President of Allied Mountain, LLC and member of NDIA Board of Directors put it best, “Bottom line it was well worth the time and cost to

attend and believe tours like these link together those of us that are scattered from Cheyenne to Pueblo.”



The Future of Space — Student Essay Contest

For 7th and 8th grade students in Montana, Wyoming and Colorado: The Rocky Mountain Section of the American Institute of Aeronautics and Astronautics (www.aiaa-rm.org) invites you to submit an original essay about future space technology and exploration. Answer the questions: “How advanced can you envision space technology and exploration through the next 50 years? What do we need to do now to achieve that?” Imagine what space missions will be in 50 years.

Requirements:

- Student must be in the 7th or 8th grade.
- Double-spaced, typewritten (Times New Roman, size 12 font), essay, in 1,000 words or less.
- Include student name, teacher name, grade, school name in top right-hand corner of the essay.
- Include teacher/parent/student contact information (name, phone number, email and mailing address) with the essay for acknowledgement and award notification.

Judging criteria:

- Originality of ideas presented
- Soundness of logic used to develop ideas
- Realism of ideas presented
- Quality of composition and clarity of expression
- Grammar and spelling
- Use of references or quotes to avoid plagiarism

Prizes at each grade level:

- First place \$100.
- Second place \$50. First place essays will be sent to the national competition.

Deadline:

- Essay **MUST** be submitted by March 15, 2020.
- E-mail essays and contact information to essay2020@aiaa-rm.org

X-Ray Vision: The X-Ray Polarimetry Explorer (IXPE)

AIAA Rocky Mountain Section Speakers Program

On January 29, 2020, AIAA members gathered at Ball Aerospace in Boulder, Colorado, to hear Dr. William Deininger, Spacecraft Chief Engineer for the X-Ray Polarimetry Explorer (IXPE) mission.

IXPE is a NASA Small Explorer (SMEX), designed to expand understanding of high-energy astrophysical processes and sources. As an international collaboration, IXPE will conduct X-ray imaging polarimetry for multiple categories of cosmic X-ray sources such as neutron stars, stellar-mass black holes, supernova remnants, and active galactic nuclei. The IXPE Observatory consists of spacecraft and payload. The payload includes three X-ray telescopes each consisting of a polarization-sensitive, gas pixel X-ray detector, paired with its corresponding grazing incidence mirror module assembly (MMA). A deployable boom provides the correct separation (focal length) between the detector units (DU) and MMAs. These payload elements are supported by the IXPE spacecraft which is derived from the BCP-small spacecraft architecture.

Dr William Deininger is a Senior Staff Consultant in Mission



Systems Engineering at Ball Aerospace. Dr. Deininger currently is the Ball Chief Engineer on the NASA IXPE Project. Previously, he was the Project Systems Engineer (on the Green Propellant Infusion Mission (GPIM)), Kepler Flight Segment Manager, and multiple spacecraft concept studies. Prior to joining Ball, Dr. Deininger worked at FiatAvio-BPD in Italy, as a Member of the Technical Staff at JPL. Dr. Deininger received a Ph.D. in Aerospace Engineering from Università degli Studi di Pisa in Italy, an M.S. in Plasma Physics from Colorado State University, and a B.S. in Physics from the State University of New York at Cortland.. He is an Associate Fellow of AIAA, and was the 2017 RM-AIAA Engineer of the year.

AIAA Panel at Ball Aerospace Speaker Series

Mattie Peck, *Ball Aerospace*

On August 29, 2019, representatives of the national and Rocky Mountain Chapter of AIAA connected with over 60 Ball Aerospace employees at their monthly Speaker Series, an event that aims to inform and further employee development.

VP of Engineering at Ball Aerospace, Mike Gazarik, welcomed attendees and shared his personal experience as an AIAA Member and its benefits in the aerospace industry.

Marshall Lee gave a look at membership on a local and national level – showcasing opportunities to participate, as well as educational and networking events.

The speaker portion of the event ended with a panel of

distinguished AIAA members who shared the impact of AIAA membership on their various

roles within the aerospace industry: Chris McLean, Chris Zeller, Adrian Nagle, Heidi Hallowell and Denise Henry.

After the program, Ball Aerospace held a reception for employees to learn more about AIAA opportunities from attendees who were internal and external to Ball. The event featured high engagement and palpable interest in AIAA and its many benefits to aerospace industry employees.



New AIAA Fellows in the Rocky Mountain Section

Gene Dionne, *AIAA Fellow and RMS Council Member*

The American Institute of Aeronautics and Astronautics (AIAA) announced its Class of 2020 Associate Fellows in October. AIAA will formally honor and induct the class at its AIAA Associate Fellows Induction Ceremony on Monday, 6 January 2020, at the Hyatt Regency Orlando in Orlando, Florida, during its 2020 AIAA SciTech Forum, 6–10 January.

“Aerospace is constantly evolving to solve problems and push the boundaries of the possible,” said John Langford, AIAA president. “The newest class of Associate Fellows is building on the great work that has come before them to push us faster and farther here on Earth as well as in space. Congratulations to the Class of 2020 Associate Fellows!”

The grade of Associate Fellow recognizes individuals “who have accomplished or been in charge of important engineering or scientific work, or who have done original work of outstanding merit, or who have otherwise made outstanding contributions to the arts, sciences, or technology of aeronautics or astronautics.” To be selected as an Associate Fellow an individual must be an AIAA Senior Member in good standing, with at least twelve years professional experience, and be recommended by a minimum of three current Associate Fellows.

“I am proud to welcome the these newly minted Associate Fellows to the esteemed roster of aerospace professionals,” said Dan Dumbacher, AIAA executive director. “Their dedication to aerospace, from making meaningful contributions to their field to mentoring students and young professionals, inspires us all.”

The Rocky Mountain Section (RMS) was graced with one of the largest group of new Associate Fellows in recent memory with eleven, the second largest number in the country’s 58 sections! The eleven new Associate Fellows are:

Tracy Copp is a senior project engineer at Ball Aerospace in Boulder, specializing in intellectual assurance involving holistic risk assessments on space programs – incorporating elements such as intellectual property, policy, export controls, cybersecurity and supply chain security - and integrating product assurance/security into all phases of aerospace program development and execution. Her 20 year career in aerospace before intellectual assurance has largely been in materials engineering at Ball, United Space Alli-



Class of 2019 AIAA Associate Fellows

ance and US Geological Survey. She attended Colorado School of Mines for her undergraduate (BS Chemistry) and graduate (MS Materials Science) studies. She has been very active in AIAA at the Section level, recently as the Public Policy Officer, elected Vice Chair in 2019 and assists in many other areas including outreach to student chapters, membership and hosting AIAA events such as the Trajectories gathering at Colorado School of Mines.

Steve Denker is the Vice-President for Intelligence and Analytic Development at Lockheed Martin Space in Colorado and Fairfax County, Virginia, where he leads key satellite ground programs and oversees multiple intelligence and analytic development programs in support of space ground systems within the Mission Solutions line of business. He recently retired as a Lt. Gen. in the USAF after 32 years where he led teams on the cutting-edge of spacecraft development, testing and operations. In his last assignment, he partnered with other senior leaders to lead the technical activities focused on integrating the US government intelligence community and military space and ground enterprises. In that assignment, he served as Deputy Director National Reconnaissance Office where he co-managed with the DNRO the execution of their annual \$9B+ R&D, acquisition, launch, and operational budget and portfolio including 18 major acquisition programs. He attended the University of Minnesota-Institute of Technology for his BS in Aerospace Engineering & Mechanics, the University of Southern California for his MS in Systems Management and the Industrial College of the Armed Forces for a MS in National Resource Strategy

Dr. Joseph Footdale is a Principal Mechanical Engineer at Ball Aerospace and is an industry-leading expert in the

field of space-based structural and material engineering, contributing to the invention, development and promotion of various state-of-the-art deployable space structure technologies. He's an engineering innovator and has led the industry in the development and adoption of high strain composite (HSC) structures. An emerging class of deployables, HSCs can undergo large deformations for launch and then return to their original forms once on orbit. Dr. Footdale is a founding member of AIAA's High Strain Composites Technical Subcommittee, which is responsible for educating and promoting the use of the technology in the industry. Before moving to Ball he was a project engineer at CSA Engineering and senior engineer at LoadPath LLC, where he served as principal investigator, project manager or lead engineer on various deployable space structures efforts. He earned his BS degree in Mechanical Engineering at Loyola Marymount University, MS in Aerospace Engineering Sciences at CU Boulder and Ph. D. in Aerospace Engineering Sciences also at CU Boulder.

Dr. Mehdi Ghoreyshi is an aerospace research engineer and a government contractor at the US Air Force Academy. There he supports courses in advanced computational aerodynamics and aircraft design. He also is a visiting lecturer at the University of Colorado at Colorado Springs where he teaches rocket propulsion, MATLAB, aerodynamics, gas turbine and rocket propulsion. He also is a principal technical/project investigator for U.S. Navy's Naval Air Systems Command, U.S. Army's CC DEVCOM, soldier Center, NATO Research and Technology Organization and the USG's High Performance Computing Modernization Program. He earned his BS in Aerospace Engineering at Sharif University of Technology, Tehran, Iran. His MS in Thermal Power from Cranfield University in Bedfordshire, UK and PhD in Gas Turbine Engineering also from Cranfield University.

Dr. Stefan Heinz is a mathematics Professor at the University of Wyoming in Laramie and has been a leading researcher in the field of turbulence modeling for reacting and non-reacting turbulent flows since 2004. He is a widely recognized technical expert in the field of mathematical modeling. Before alighting at U. of Wyoming, he taught and/or was a technical researcher at the Technical University of Munich, Germany, the Delft University of Technology in the Netherlands and the Fraunhofer-Institute for Atmospheric Environmental Research in Garmisch-Partenkirchen, Germany. He is well published in his field with 38 refereed journal papers and has authored two books and edited a third technical book. Dr. Heinz was elected as a Fellow of the Hanse-Wissenschaftskolleg, Institute for Advanced Study

in Germany in 2015. He has a Ph.D. in Theoretical Physics from the Academy of Sciences in Berlin, Germany and MS and BS from Humboldt-Universitat also in Berlin, Germany.

Dr. Timothy Jung is an aeronautical engineer and a Senior Staff Consultant for Engineering Systems Inc. (ESi). He joined ESi following a 25-year career in the U.S. Air Force where his broad range of duties included advisor to the Ministry of Defense in Kabul, Afghanistan and Director of the Aeronautic Laboratory at the Air Force Academy. In the Air Force, Dr. Jung was also an aircraft commander and instructor pilot with over 2,400 flight hours in aircraft ranging from sailplanes to supersonic fighters and bombers including the T-1A, the Beech 400 business jet. In his final assignment he taught undergraduates flight test techniques in the T-41D (Cessna 172). He has extensive experience in wind tunnel testing, aircraft design and performance. He has a Ph.D. in aerospace engineering and is a licensed professional engineer in Colorado. His MS in Aeronautical Engineering was earned at the Air Force Institute of Technology and MS in Technology Management is from the South Dakota School of Mines and Technology. He graduated from the USAFA with a BS in Aeronautical Engineering.

Dr. David Kaufman is the Vice President and General Manager of the National Defense (ND) Strategic Business Unit at Ball Aerospace, where he is responsible for the design, development, and deployment of space systems and advanced technologies, supporting the defense and intelligence communities. Before this role at Ball, Dr. Kaufman was Director, National Security Space and Sr. Program Manager of a classified, national security space program. Before joining Ball, Dr. Kaufman worked at Orbital Express as a program manager and Hughes Space and Comm. as a systems engineering lead. He has published a large number of technical papers for IEEE and AIAA, has multiple patents and is often requested to be a speaker or panelist for symposiums and conferences. His Ph.D. in mechanical engineering is from the California Institute of Technology, MS in ME is also from Caltech and he has a BA in Mathematics from Willamette University and BS in ME from Stanford University.

Joe Landon recently joined Lockheed Martin Space as VP of Advanced Programs Development for the company's Commercial and Civil Space line of business. In this role Mr. Landon is responsible for leading business growth and strategy and leads the technical team that performs

internal research and development projects to advance space exploration technology for the future. Before Lockheed Martin, Joe was the Chief Financial Officer for Planetary Resources, Inc. for eight years, where he managed the financial team setting and executing financial strategy and equity fundraising for space exploration programs. During that time he also co-founded and was the Chairman of the Board of Space Angels venture capital fund and was the CEO of Planetary Power, Inc. that developed electrical power generation technology for off-grid commercial applications. Preceding those roles, he worked at McMaster-Carr Supply Co. and Boeing Satellite Systems as a system engineer. He also has served as a member of the World Economic Forum's Global Future Council on the Future of Space Technologies. He has an MBA from Harvard Business School, a MS in Aerospace Engineering from University of Southern California and BS in Engineering-Physics from Embry-Riddle Aeronautical University.

Lt. Col. Barrett McCann is Department Head, Director of Academic Assessment, and Senior Military Faculty in the Department of Aeronautics at the U.S. Air Force Academy and is a career Air Force acquisition officer. His career has included developmental engineering assignments at the Air Force Research Laboratory, Eglin Air Force Base, Fla.; and in the Airborne Laser System Program Office, Aeronautical Systems Center, Kirtland Air Force Base, N.M. He was a member of the Air Force Academy aeronautics faculty from 2003 to 2006. He served as F-22 Lead Program Element Monitor, Office of the Assistant Secretary of the Air Force for Acquisition, Headquarters U.S. Air Force in Washington. He served one year as an Air Advisor in Kabul, Afghanistan, advising the Afghan Air Force Headquarters Plans Officer on air campaign planning where he earned the Bronze Star. He has a BS degree in Aeronautical Engineering from the USAFA, a MS in Aerospace Engineering from Texas A&M, a Masters of Military Operational Art and Science degree from ACSC, and a Ph.D. in Aeronautics and Astronautics from the University of Washington.

Carolyn Overmyer is the Deputy Manager and Certified Principal Engineer for the Orion Service Module at Lockheed Martin Space. In this capacity she oversees all development, design, test, assembly and evaluation for Orion Spacecraft mechanisms and pyrotechnics including crew mechanisms, Service Module structures, and the development of a docking capability that will be used for Orion and future Lunar Gateway modules. Additionally, Carolyn is also the principle lead for the integration of the Orion Euro-

pean Service Module, which involves the unique contract arrangement between Airbus, ESA, NASA and LM. She was part of the leadership team that designed, built and successfully flew the Orion Exploration Flight Test Vehicle in December 2014. She has also been the Engineering Program Manager for the Integrated Mission Management Program and System Engineering, Integration and Test (SEIT) Manager for the classified Diamond Program where she was responsible for managing the technical design, development, test and installation of a large government ground data processing system and database. She also held leadership roles at NASA which included complex challenges and international partnerships like Russian Module Integration and Extravehicular Activity (EVA) assembly on the International Space Station, and various Airbus and Energia SPACEHAB projects. Carolyn was recognized in 2019 by the Rocky Mountain Section as Engineer of the Year. She earned an MBA from the University of Houston and a BS in Aerospace Engineering from University of Texas at Austin.

Dr. Blair Thompson is a Senior Instructor of aerospace operations at the USAF Space Command's Advanced Space Operations School at Peterson AFB. He instructs advanced space technology and operations courses including: orbital relative motion, rendezvous and proximity operations (RPO), global space situational awareness, radar and electro-optical sensors, orbital engagement maneuvers (OEM) and astrodynamics. Before that Dr. Thompson was a senior research engineer at Odyssey Space Research doing GNC engineering analysis for docking/berthing of autonomous and manned spacecraft with the ISS. While there he also was the Vice Commandant of the AF Reserve National Space Institute as an AF Reserve officer. Previous to that he worked for Lockheed Martin Technical Operations supporting on-orbit satellites at SPADOC in Cheyenne Mountain. He was an active duty US Army officer in the early 90's. He earned a Ph.D. in Aerospace Engineering Sciences from UC Boulder, a MS in EE from the University of Idaho, a MS in Aerospace Engineering Sciences from UC Boulder, a ME in Space Operations from UC Colorado Springs and a BS in EE from West Point.

Please join the Rocky Mountain Section leadership in congratulating our new Associate Fellows.

[\[Link to AIAA Press Release\]](#)

ASCEND Conference — Call for Content



The American Institute of Aeronautics and Astronautics (AIAA) has issued a Call for Content for ASCEND, a new outcomes-focused, transdisciplinary conference dedicated to the space economy.

ASCEND stands for Accelerating Space Commerce, Exploration, and New Discovery, and is designed to bring together technical and business leaders to solve problems that affect the entire planet and beyond.

ASCEND's inaugural event will occur 16–18 November 2020 in Las Vegas, Nevada, will focus on three macro themes:

- Accelerating the near-term commercialization of space
- Enabling the long-term human exploration and settlement of space
- Exploring the security, policy, and legal ramifications of space endeavors

Scientists, engineers, economists, educators, legal professionals, artists, investors, and entrepreneurs are among the wide range of experts invited to submit content.

ASCEND will explore emerging space-related applications and opportunities across all industries such as aerospace, agriculture, construction, entertainment, hospitality, manufacturing, mining, pharmaceuticals, and telecommunications.

Call for Content categories include, but are not limited to:

- Defining the space economy
- Education, outreach and workforce development
- Information systems and software
- National science priorities
- National security space
- Propulsion
- Space exploration architectures and enabling infrastructures
- Space life sciences and systems
- Space policy and law
- Space resource utilization
- Space traffic management and integration
- Transformative research and technologies

Subject-matter experts may submit to lead an engagement session, or present technical papers on their work in progress, completed research, and case studies. Submissions will be accepted at ascend.events/cfc through 17 March 2020.

Please contact Nathan Boll, nathanb@aiaa.org, for more information about submissions. To register, visit www.ascend.events.