



**Submit Award
Nominations!**

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February 20, 2019

*Speakers Program: InSight Mission to
Study the Interior of Mars-- Stu Spath
Lockheed Martin, InSight Program
Manager*

Lockheed Martin Space, Waterton
Campus

[Info and Registration](#)

March 11, 2019

*Colorado Aerospace Day
Colorado Capitol, Denver, CO
[More Info \(when available\)](#)*

March 20, 2019

*Congressional Visits Day (CVD)
Washington, D.C.
[More info](#)*

April 19, 2019

*AIAA RMS Honors and Awards Banquet
TBD, Denver, CO
[Nominations](#)*

Note from the Editor

Adrian Nagle, *Ball Aerospace*

This issue reviews the success of the Annual Technical Symposium hosted by your local AIAA Rocky Mountain Section volunteers and sponsored by local aerospace businesses.

There is always more ahead. Read the announcements for the Congressional Visitors Day and the Colorado Aerospace Day which kicks off Colorado Aerospace Week March 11. Follow the links to register or find attendance details.

The AIAA RMS Honors and Awards banquet is planned for April. The speakers and location details will be announced in the next newsletter. Meanwhile, please nominate members for Engineer of the Year, Young Engineer of the Year, Educator of the Year (College), and Educator of the Year (K-12) by following the online nomination process linked to the announcement on page 7.

Look for more programs to be announced in the next few months. If you have suggestions, please let us know. The recent Speaker Programs events have been amazing.

Continue to familiarize yourself with the new AIAA website called Engage. Please update your profile using the online resources in Engage.

Adrian Nagle

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SECTION OFFICERS

Elected

Section Chairman	Dr. Rusty Powell
Chairman Elect	Dr. Merri Sanchez
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	OPEN
Honors and Awards	Stacey DeFore
Membership	Marshall Lee
Newsletter Editor	Adrian Nagle
Public Policy	Tracy Copp
Pre-College Outreach	OPEN
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

Wyoming Aerospace

Aeronautics is the high performer for the state of Wyoming at \$1.4 Billion annually. According to Fly Wyoming, Air service in Wyoming supports more than 12,000 jobs and improves the efficiency of 38,000 jobs.

They are additionally making a valiant effort to support and grow their aerospace presence, currently represented at approximately \$30 Million annually in Wyoming, while collaborating with companies in Colorado and beyond to increase this effort.

UW College of Engineering and Applied Sciences further supports these endeavors.

University of Colorado / LASP Hosts AIAA- Rocky Mountain Section Annual Technical Symposium

Wesley Kenison

On October 29th, 2018 the AIAA – Rocky Mountain Section held its 7th Annual Technical Symposium at the University of Colorado South Denver Campus.

Hosted by CU and the Laboratory for Atmospheric and Space Physics (LASP), the symposium featured 22 speakers, 3 panels, 10 poster presentations, 2 keynote speakers, and an exhibitor marketplace with 20 vendor/sponsor booths.

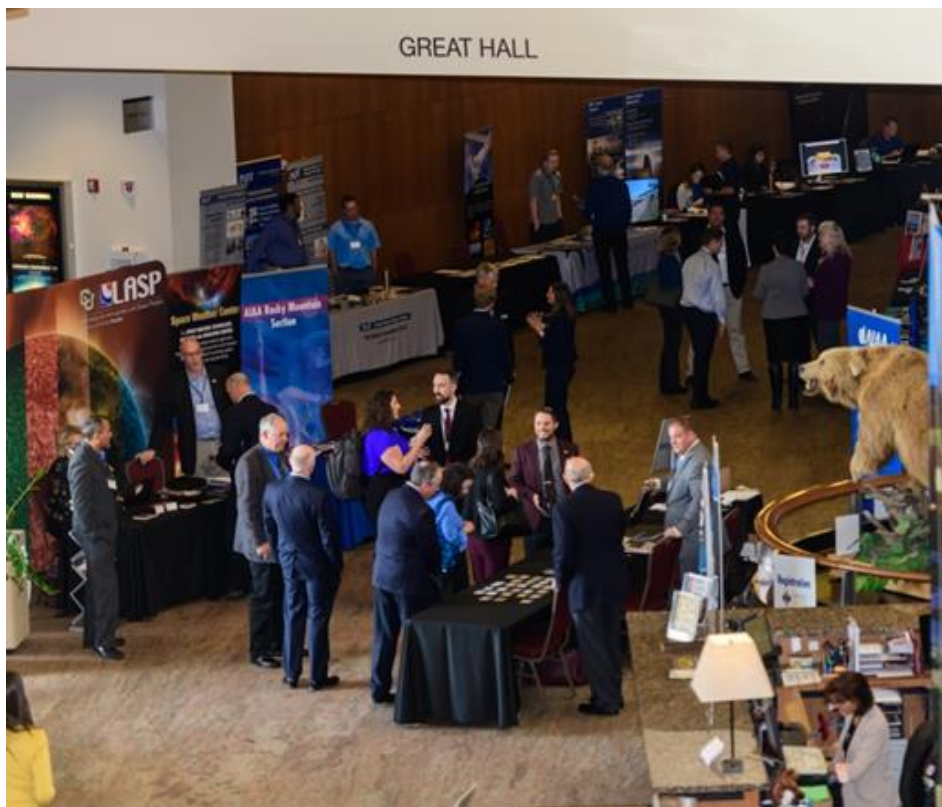
The full day conference began with an opening address by Colorado Aerospace Champion, Jay Lindell, Major General (Ret), USAF, welcoming the crowd of nearly 200 attendees. The opening was followed by a panel on Space and Global security.

After the morning panel, the conference broke out into presentation on Unmanned Aircraft Systems, and Advanced Manufacturing topics, followed by a panel on the Commercialization of Space. The morning presentations were rounded out with presentations on Aeronautics and Astronautics topics.

The keynote luncheon was highlighted with a presentation by United Launch Alliance President and CEO, Salvator (Tory) Bruno, who spoke about the development and progress of the ULA's new Vulcan Rocket

and ACES upper stage. Bruno also discussed the development of Sensible Modular Autonomous Return Technology (SMART) reuse concepts, which aims to recover the booster engines after first stage burnout.

A big focus during the day's events was the subject of space weather. Afternoon presentations included a panel on the topic featuring experts from LASP, NOAA, NCAR, Ball Aerospace, and the National Solar



Observatory, followed by a presentation on the Next Generation Defense Weather Mission being developed at Ball Aerospace.

The day ended with a keynote presentation by Bradley Cheetham, President and CEO of Advanced Space. In his presentation, Mr. Cheetham discussed the development of a

Cislunar Autonomous Positioning System (CAPS) that he hopes will become a critical piece of infrastructure enabling cislunar navigation.

Full details of the conference, including abstracts of all presentations can be viewed on the ATS website at aiaa-rm.tech.



Trial Living on Mars – On Earth

Alexandra Dukes, *Lockheed Martin Space Systems*

Our pathway to Mars starts here on Earth, 45 minutes down “Cow Dung Road” through the Utah desert, in a small, corn silo like habitat titled the Mars Desert Research Station, or MDRS for short. MDRS is a research facility run by The Mars Society designed to further our understanding of how future crews will live, work, and thrive on the Martian surface. As a new full time employee in the space industry and a budding AIAA professional member, I was



thrilled by the opportunity to further contribute to human space exploration. I was the Crew Journalist on Crew 202 for a 14 day mission. A crew made up of students and alumni from Purdue University. Boiler up! Their mission: perform valuable research to enable future Mars exploration. My mission: assist in their research and share our incredible experience with the outside world.

Living on Mars is fairly straight forward. Before starting any task, ask yourself, “Is this something that would be done on Mars?”. This includes conserving water, attempting to cook edible food from shelf stable tins, and never leaving the habitat



without donning a suit and following airlock protocol. It is hard to describe the mission. Surreal. Amazing. Crazy. In what felt much longer than two weeks, six people who started as nearly strangers became a family. We had no access to news or updates about our home. Completely cut off from the rest of the world. Upon “returning to Earth”, I’ve been asked what was the hardest and the best part about living on “Mars”? As a self-

proclaimed connoisseur of food, it was truly the dehydrated Colby-Jack cheese that horrified me the most. I could forget everything else. The fact that we could only take a 2 minute Navy shower every 2-3 days or ripping off the tape holding your microphone to your face after an Extra-Vehicular Activity (EVA). No. It was the Colby-Jack that will haunt me. Cheese is a high fat food. The process of dehydrating cheese removes all the moisture from the shreds. As the “cheese” rehydrated, it would turn into this congealed slime you just hoped would give the meal a taste of cheese rather than the texture of whatever it actually was. There were fleeting moments where the crew would reminisce about ice cream and hot showers, feeling the sunshine on our face instead of through a helmet... But these were few and far between and paled to the amazing adventure we were a part of.



The crew went on an EVA for 12 out of the 14 days we were in simulation. Every time we were out in the field, we would look at each landscape and think “nothing could be more beautiful than this”, and then we would go out and say the same thing the next day. Although, my personal favorite view was not during an EVA at all. Everything on

Mars has a personality, and the power generator had a particularly hostile personality one night. The tunnel to the solar telescope is a chicken wire fence with a zip tied tarp over the top. The only space at the habitat where the sky opened up for us. We gathered in the 2 foot walkway between the telescope and the fence surrounding it. The only light pollution at MDRS comes from the habitat and in low power mode, nothing lit up the night but the stars. I’ve never seen so many. The



constellations that are so crisp and clear back home became an I Spy game among the hundreds of glittering lights. The stars were interrupted by a thick streak of white, a paint brush taken from one horizon through the top of the globe to the other. The milky way in its entirety. The same magnificent view future Martians will see from their own home.

Living on “Mars” made me incredibly aware of my own consumption of water and food, and of my disposal of waste. It was a realization of how constantly connected we are to the world. The ability to be called upon by news or people or an app and how losing that ability rewires how your brain approaches the day. Most of all, I left excited. Excited for the journey ahead. For the next great adventure humankind is starting on its way to the Moon with eyes towards Mars, and I could not be more proud to be a part of it.



AIAA Rocky Mountain Section

Annual Honors and Awards Nominations

The Rocky Mountain Section would like to recognize AIAA members' achievements and service to the aeronautics, astronautics, and aerospace industry. The AIAA-RMS awards program is intended to honor truly outstanding engineers and educators, in order to make the celebration of our profession noteworthy and meaningful. The following Engineer of the Year and Educator of the Year awards provide a forum to recognize our deserving colleagues.

- Professional Engineer of the Year
- Young Engineer of the Year (under age 35)
- Educator of the Year-Collegiate Level
- Educator of the Year- K-12 Level

The online nomination form contains criteria and required information for each award. Please provide the required information completely and concisely. **There is a one-page limit for all**

nomination justifications with character restriction enable on the online form. Note, it is a requirement that each nominee must be an AIAA member in order to win. If you wish to confirm a nominee's member status before submitting the nomination package, please contact the awards committee at awards@aiaa-rm.org.

The deadline for submissions is 7 p.m. on Friday, April 5th, 2019. You will receive an auto-generated reply confirming your nomination submission. Early submissions are appreciated by the Awards Committee. A panel will be selected to evaluate the nominations and identify the outstanding nominee in each award category. The panel consists of members of AIAA with an objective to identify the outstanding nominee in each award category. Deliberations are private and decisions are final.

Awards will be presented at the AIAA-RM annual awards banquet on April 19, 2019.

Please submit nominations online and any direct questions to Stacey DeFore, AIAA-RM 2018-2019 Honors and Awards Chair at: awards@aiaa-rm.org

Additionally, the AIAA Rocky Mountain Section is seeking members to be part of the Engineer of the Year and Educator of the Year awards selection committee. Committee members will be required to review the award submittals and potentially participate in phone discussions at the beginning of April to select a winner in each category. If interested in volunteering as part of the awards committee, please contact the awards committee at awards@aiaa-rm.org.





AEROSPACE DAY
AT THE COLORADO CAPITOL
MONDAY
March 11, 2019
8:30 am - 6:00pm
200 East Colfax Avenue, Denver, CO 80203



<https://2019adc.eventbrite.com>

TENTATIVE AGENDA:

- 8:30 AM – 9:00 AM: Vendor Booth Set Up, Rotunda, North & West Foyer
- 9:00 AM – 10:00 AM: Welcome and Breakfast Reception, Socialize & Visit Company Displays, North & West Foyer
- 10:00 AM - 11:30 AM: Visit to House and Senate, House and Senate Chambers
- 11:30 AM – 1:15 PM: Lunch Reception, Rotunda, North & West Foyer – Visit Exhibits
- 1:15 PM – Group Photo/Demo UAV Demo and Aerial photo on Capitol Steps
- 1:30 PM – 3:00 PM: Socialize & Visit Company Displays, North & West Foyer
- 3:00 PM - 4:00 PM: Tear Down of Exhibit Booths
- 4:00 PM - 5:00 PM: Aerospace & Defense Caucus Panel Discussion
- 4:00 PM – 6:00 PM: Afternoon Reception

CONTACT: Christie.J.Lee@lmco.com

AIAA – Lockheed Martin Insight Landing Celebration

Marshall Lee, *Sypris Electronics*

On December 7, 2018, Rocky Mountain Section joined Lockheed Martin to celebrate their recent successful landing of the Mars InSight spacecraft. Attendees also heard about OSIRES-REx rendezvous with the asteroid Bennu, along with several other LM Space Systems programs such as their civil (GOES weather satellite), commercial (ArabSat/HellaSat satellites) and military related work that we as an Aerospace Community have reason to celebrate.

From Lockheed Martin, Tim Gasparrini, VP & GM Deputy, Commercial Civil Space presented the program status rundown leading the celebration, and Scott Hovarter, Business Development, Deep Space Exploration, Commercial Civil Space hosted the event for AIAA at their Waterton facility.

New to RMS this year, these jointly held celebrations at aerospace corporations in our section highlight the many benefits of AIAA membership for individual employees at these companies.

Wanda Sigur attended the Lockheed event and spoke eloquently about the advantages of professional society membership in general, with a few specifics on AIAA. In addition, several Rocky Mountain council members spoke about their personal experiences of being an active member of AIAA, including Gene Dionne (ret. LM; AIAA



Fellow), Paul Anderson (LM Orion; AIAA Associate Fellow), John Reed (ULA; AIAA Associate Fellow), and Joe Troutman (EnerSys; AIAA Aerospace Power Systems Technical Committee Chair).

Based on the success of this inaugural event in adding new members, RMS Membership Committee is planning several other similar celebrations in the first half of 2019.

Scheduled for Tuesday, February 12, 2019, AIAA RMS will co-host a celebration of the recent successful launch of GPS III SV01, again at Lockheed Martin. Following that event, United Launch Alliance (ULA) has agreed to hold an AIAA awareness event celebrating their recent successes.

RMS Membership Committee is working towards having closer and tighter relationships with our section aerospace companies to drive more participation from our membership base including the Fellows and Associate Fellows.

If you're interested in joining our efforts to grow membership, please contact Marshall Lee, Membership Chair – marshall.lee@sypris.com.

November 2019 Pioneer Astronautics: From Mars Direct to Moon Direct

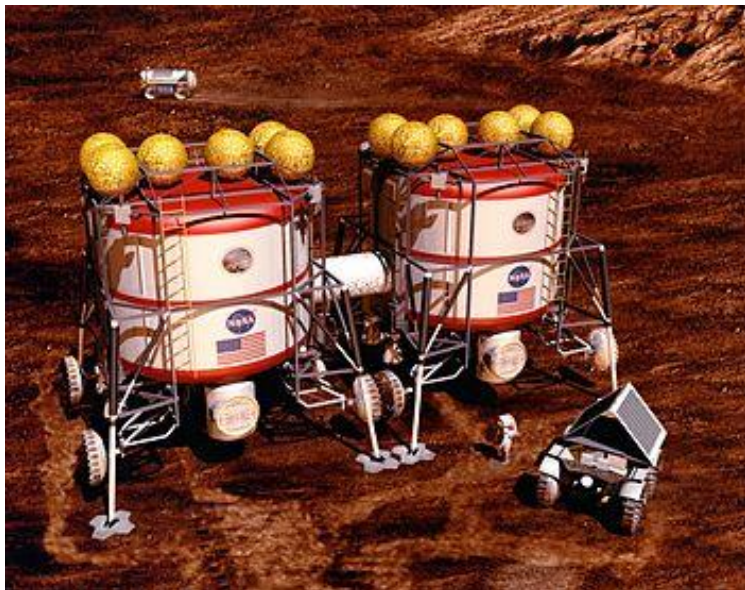
Chris Zeller, *Ball Aerospace*

In November at Ball Aerospace in Broomfield, Dr. Robert Zubrin shared with Rocky Mountain AIAA his plan for achievable, low cost human exploration of Mars and how the same plan could be adapted to exploration of the moon as well. Dr. Zubrin's approach to Mars exploration, known as Mars Direct was originally detailed in a research paper by Robert Zubrin and David Baker in 1990 while working at Martin Marietta, and later became the basis for Zubrin's popular 1996 book *The Case for Mars*. His proposal includes launching a single unmanned lander with return capsule and habitat to Mars on a Homan transfer trajectory to generate the return fuel in-situ followed by a second identical manned vehicle one synoptic period later. Zubrin's plan



eventually formed the basis for NASA's Design Reference Mission for human Mars exploration. Zubrin established the Mars Society in 1998, an international organization advocating a manned Mars mission as a goal, by private funding if possible. Dr. Zubrin is also the founder and president of Pioneer Astronautics which continues to conduct research into innovative aerospace technologies and Pioneer Energy which has developed novel methods Enhanced Oil Recovery and several synthetic fuels.

Dr. Zubrin entertained and amazed the crowd of AIAA professional members with a mix of well thought-out common sense ideas with humor and occasional biting sarcasm aimed at current proposals for space exploration. He also answered questions from the audience on topics ranging from his time spent at Martin Marietta, to current Mars missions and the work of his two companies Pioneer Astronautics and Pioneer energy. Dr. Zubrin finished by signing copies of his book *The Case for Mars* and a new humor book *How to Live on Mars*. Dr. Zubrin has authored over 15 books on topics ranging from Space Exploration to history to biofuels.



January 2019 Sierra Nevada Corporation: Dream Becomes Reality—*Dream Chaser*

Chris Zeller, *Ball Aerospace*

In January, Dr. John Bain, briefed Rocky Mountain AIAA at Sierra Nevada Corporation (SNC) offices in Louisville, CO on the recent success of the SNC Dream Chaser vehicle which was recently selected to move forward into full production under NASA's Commercial Resupply Services (CRS) 2 to supply cargo to the International Space Station. Dr. Bain, who has prior experience as a flight test engineer on the Space Shuttle, Space Station, NASA X-38, Boeing 787, Airbus 380 and many other aircraft is currently the Dream Chaser GNC Entry, Descent, and Landing Lead. Understandably, Dr. Bain's talk tended to focus on Dream Chaser's recent achievement in demonstrating Dream Chaser flight characteristics and landing capabilities which culminated in Dream Chaser's successful Approach and Landing Test (ALT-2) in November 2017. This point was further underscored by the virtual Elephant in the Room, the backdrop of the actual



Engineering Test Article flown in the ALT-1 and ALT-2 tests. Dr. Bain showed videos of the tests and described what it was like to be at the test site for the flights. He also spoke about SNC's diverse capabilities from space actuators to satellites beyond the Dream Chaser program. Dr. Bain concluded by answering questions and allowing members to photograph the test article and various spacecraft models in the lobby.



Upcoming Program:

February 2019 Program InSight Mission to Study the Interior of Mars– Stu Spath, Lockheed Martin, InSight Program Manager

Wednesday, February 20, 2019 6:00 pm

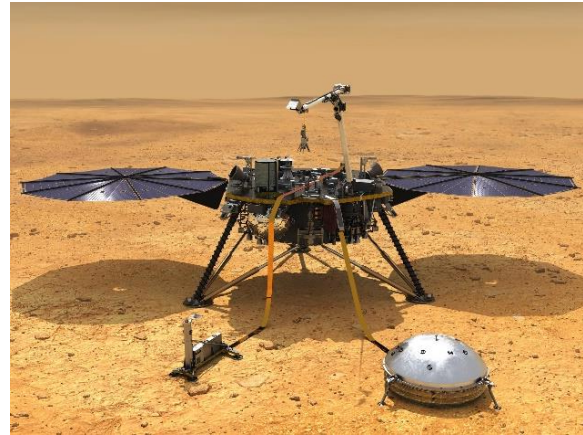
6:00 pm - Social

6:30 pm - Program

Lockheed Martin Space, Waterton Campus
Engineering Building 2nd Floor Titan Conference Center

On May 5, 2018, NASA's latest Mars lander was launched from Vandenberg Air Force Base on its journey to the Red Planet. The primary objective of InSight (Interior Exploration using Seismic Investigations, Geodesy, and Heat Transport) is to illuminate the fundamentals of formation and evolution of terrestrial planets by investigating the interior structure and processes of Mars. On November 26, 2018, the InSight flight system arrived at Mars and meticulously executed necessary activities to safely touch down. The primary science instrument (a seismometer) has been successfully placed on the Martian soil using the robotic arm and the secondary payload (a heat flow probe) is prepared for its deployment next month. Science operations are scheduled to last through November 2020.

This month's presentation highlights the key spacecraft design challenges for the development team, discusses the major



events during the integration and test campaign, and details the sequence of events during entry/descent/landing (aka seven minutes of terror).

Stu Spath is the Director of Deep Space Exploration at Lockheed Martin Space in Waterton, CO. Stu has served as the InSight Program Manager since the proposal phase in early 2011. Other previous positions include: Deputy Program Manager for the Gravity Recovery and Interior Laboratory (GRAIL), Proposal Manager for Mars Atmosphere and Volatile Evolution (MAVEN); Chief Systems Engineer for Mars Telecom Orbiter (MTO); and Observatory Engineering Team Manager for Spitzer Space Telescope. Stu holds a Master of Science in Electrical Engineering from the University of California at Los Angeles and a Bachelor of Science in Electrical Engineering from Purdue University.

US citizenship required

R.S.V.P By Monday 2/18/19 through Eventbrite [Here](#)

For questions: Chris Zeller 303-939-4636 czeller@ball.com