

THE FLIGHT PLAN

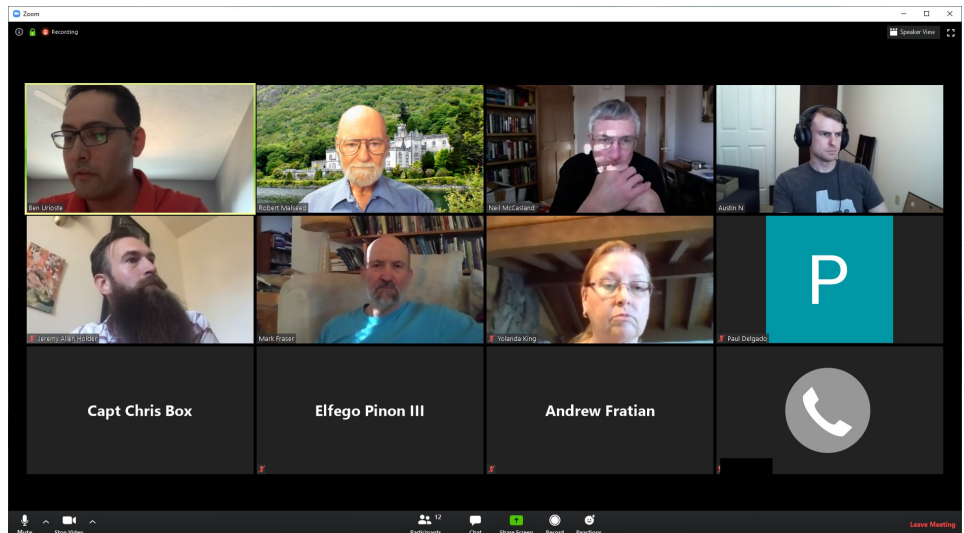
The Newsletter of AIAA Albuquerque Section
The American Institute of Aeronautics and Astronautics

APRIL 2020 SECTION MEETING: ROLL OUT SOLAR ARRAY (ROSA) DESIGN AND FLIGHT EXPERIMENT.

Capt. Christopher Box
Air Force Research Laboratory

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In the section's first-ever virtual meeting (via ZOOM) Captain Chris Box spoke to us about the Roll Out Solar Array (ROSA) (a novel, lightweight, rolled flexible blanket solar array for spacecraft). An external experiment on the International Space Station in June 2017 was conducted to unfurl this new solar array system, then measure the structural dynamics behavior and power production performance in the combined microgravity and extreme thermal environment of space. ROSA is an improvement from heritage rigid panel solar arrays because it shrinks mass by 20 percent and stowed volume by a factor of 4. This experiment was a collaboration between the Air Force Research Laboratory (experiment lead), the Department of Defense Space Test program, NASA, and Deployable Space Systems, Inc.



CALENDAR

Local Section Events

Next General meeting TBD

Copper Canyon Café: 5455 Gibson Blvd, Albuquerque
 5:30pm Meet and greet
 5:45pm Dinner (order when ready)
 6:30pm Presentation and discussion

Upcoming U.S. Launches

23 Jun Falcon 9 • Starlink 9/BlackSky
 Global 5 & 6

30 Jun Falcon 9 • GPS 3 SV03

Jul Falcon 9 • Anasis 2

15 Jul Minotaur 4 • NROL-129

20 Jul Atlas 5 • Mars 2020

1 Aug Falcon 9 • SXM 7

14 Aug LauncherOne • ELaNa-20

Aug Falcon 9 • GPS 3 SV04

26 Aug Delta 4-Heavy • NROL-44

30 Aug Falcon 9 • Crew 1

7 Sep Antares • NG-14

Sep Atlas 5 • NROL-101

Oct 21 Antares • NG-12

Oct Atlas 5 • CST-100 Starliner Orbital
 Flight Test 2

30 Oct Falcon 9 • Space X CRS 21

National AIAA Events

[Live Panel Discussion: Staking Your Claim to the Trillion-Dollar Space Economy \(Free Webinar\)](#)

23 JUNE 2020 1300 - 1430 (EASTERN DAYLIGHT TIME)

[Aerospace Career Pathways – Academia \(Member Exclusive Webinar\)](#)

24 JUNE 2020 1000 - 1100 (EASTERN DAYLIGHT TIME)

[Briefing: NASA's Jim Reuter \(Free Webinar\)](#)

29 JUNE 2020 1100 - 1200 (EASTERN DAYLIGHT TIME)

[Aerospace Career Pathways – Professional Engineering \(Member Exclusive Webinar\)](#)

13 JULY 2020 1000 - 1100 (EASTERN DAYLIGHT TIME)

[2020 AAS/AIAA Astrodynamics Specialist Conference](#)

9 AUGUST - 13 AUGUST 2020

[Aerospace Career Pathways – Entrepreneurship \(Member Exclusive Webinar\)](#)

18 AUGUST 2020 1330 - 1430 (EASTERN DAYLIGHT TIME)

[AIAA Propulsion and Energy Forum and Exposition \(AIAA Propulsion and Energy Forum\)](#)

24 AUGUST - 26 AUGUST 2020

[2020 Integrated Communications Navigation and Surveillance Conference \(ICNS\)](#)

9 SEPTEMBER - 11 SEPTEMBER 2020

LETTER FROM THE SECTION CHAIRMAN

Dear ABQ Section Members,

I hope this letter finds you and your family well. 2020 has thus far provided us all with a significant amount of unplanned and unparalleled events. As we all sort through serious political, ethical, and health concerns it's important now more than ever to build stronger communities and support networks focusing on what unites rather than divides us. To that end, AIAA ABQ Section is here to help you stay plugged in to your fellow aerospace professionals in our community. It is my great honor and pleasure to serve as your chair for AIAA ABQ Section for 2020-2021.

There are a few activities and changes we are implementing to improve our section and ultimately better serve you. First, we took a look at what we care about most and established a section Mission Statement: *"Inspire a community of professionals and students to advance aeronautics and astronautics in New Mexico."* This mission statement is a guidepost for future goals and activities. The Section Council and I believe that having a clear actionable strategy is the best way further aeronautics and astronautics interests in New Mexico. To that end we developed a series of goals for 2020-2021:



Task 1: Identify and contact TC members within our section.

- Request support for technical presentations
- Share section vision and goals
- Identify ways we can better serve the TC (sponsor events, host meetings, etc.)

Task 2: Investigate new distinguished lecturer process.

- Report any financial/programmatic commitments
- Schedule distinguish lectures for upcoming year

Task 3: Revamp AIAA image and what we present at community events.

- Develop guide on what we take to outreach events
- What should parents, children, and community leave with after visiting our booth?
- Work with AIAA leadership to procure more handouts

Task 4: Establish virtual mixers

- Student and professional members – career advice mentoring forum
- Professional mixer – networking and community building event

Task 5: Establish and maintain contact with other Region IV sections.

- Report on best practices and procedures
- Periodically attend other section meetings. Observe and Report

Task 6: Assist in development of Section Policies and Procedures

- Review and provide edits
- Suggest new ideas
- Establish timeline for completion

LETTER FROM THE SECTION CHAIRMAN—CONT.

Task 7: Take steps to incorporate aerospace engineering education in the NM k-12 public school system.

- Continue developing aerospace engineering curriculum materials for kids of different age levels.
- Develop research proposal studying the effects of incorporating aerospace engineering education on student outcomes
- Establish public school partnership for conducting pilot studies
- Secure funding for equipment and supplies for aerospace education materials.
- Identify supply chain vendors for aerospace education materials
- Secure municipal/county/state legislature support for aerospace engineering education in the public school system.

Our focus over the course of this year will be to make progress towards and complete some of the aforementioned tasks. Some of that tasks will require longer term investments but should yield greater rewards. We will provide quarterly updates on our progress. I am drawing on the expertise and commitment of the fellow section council members to assist and take ownership of each of these task areas. Additionally, we welcome any support from our members in completing these tasks.

Another change that we have implemented is the transition to a quarterly newsletter cycle. The purpose is to alleviate some of the editing work and provide a better product overall. We will be posting regularly on the section Engage website to maintain contact with our members. It will also allow us to provide updates without spamming your inbox. Please take a minute and get signed up for Engage so you can stay informed of section activities and events. We look forward to connecting to you there.

By now you have likely noticed that we are not meeting in person for our monthly section meetings. We have moved to an online format for our monthly meetings via Zoom. The ABQ Section will adhere to the governor's guidance regarding COVID-19. Meeting virtually has actually provided some overall value to our members. We are planning on continuing a "virtual" element of our section activities in the future, especially simulcast monthly meetings.

One final noteworthy change is that we will adopt some of the guidance used by other sections for voting and election of new officers. The chair, vice-chair, secretary, and treasurer positions will be selected via an election process. The *ex officio* council positions that include communications officer, corporate liaison, education officer and others will be appointed positions which were previously elected positions. We have been unofficially using this methodology but this formal appointment process allows us to dismiss and create new *ex officio* council positions to better serve the section's needs. The forthcoming section Policies and Procedures along with section By-Laws will serve as guides for future section leadership in this area.

Our hope for this year is to create an environment that will foster new ideas and collaboration within ABQ and surrounding counties and further aerospace interests in NM. We will work towards accomplishing these tasks and providing more value to our members. We value your membership and are very eager to serve you. We are also open to hearing your comments or suggestions on how we can improve our section. I wish you and your families the best and look forward to seeing you at our monthly section meetings or around town.

Benjamin Urioste

Benjamin Urioste is a technology leader for Deployable Space Structures in the Integrated Structural Systems Program at the Air Force Research Laboratory. Through research and development of exquisite Large Deployable Space Structures he supports the Air Force's mission of Space Superiority. He manages the Air Force's Tension Precision Structure portfolio, interfaces with industry partners, and creates collaborations with partnering DOD organizations.

LETTER FROM THE SECTION CHAIRMAN—CONT.

Mr. Urioste joined the Space Vehicles Directorate first as an onsite contractor, then transitioned to a civil servant in 2017. He leads a multi-directorate project that focuses on developing foundational technologies for the Air Force's future Space Based Antennas. In 2017 he co-authored a chapter on Space Flight Testing in a technical book series "Testing Large Ultra Lightweight Spacecraft."

He graduated with honors from the University of New Mexico with a Bachelor's Degree in Mechanical Engineering in 2017 and continues taking classes towards a master's degree in Mechanical Engineering. He was also selected for the prestigious DOD SMART Scholarship in 2017. He is very active in the local aerospace community and is the Chair of the Albuquerque section of the American Institute of Aeronautics and Astronautics (AIAA). He is also a member of the AIAA Spacecraft Structures Technical Committee.

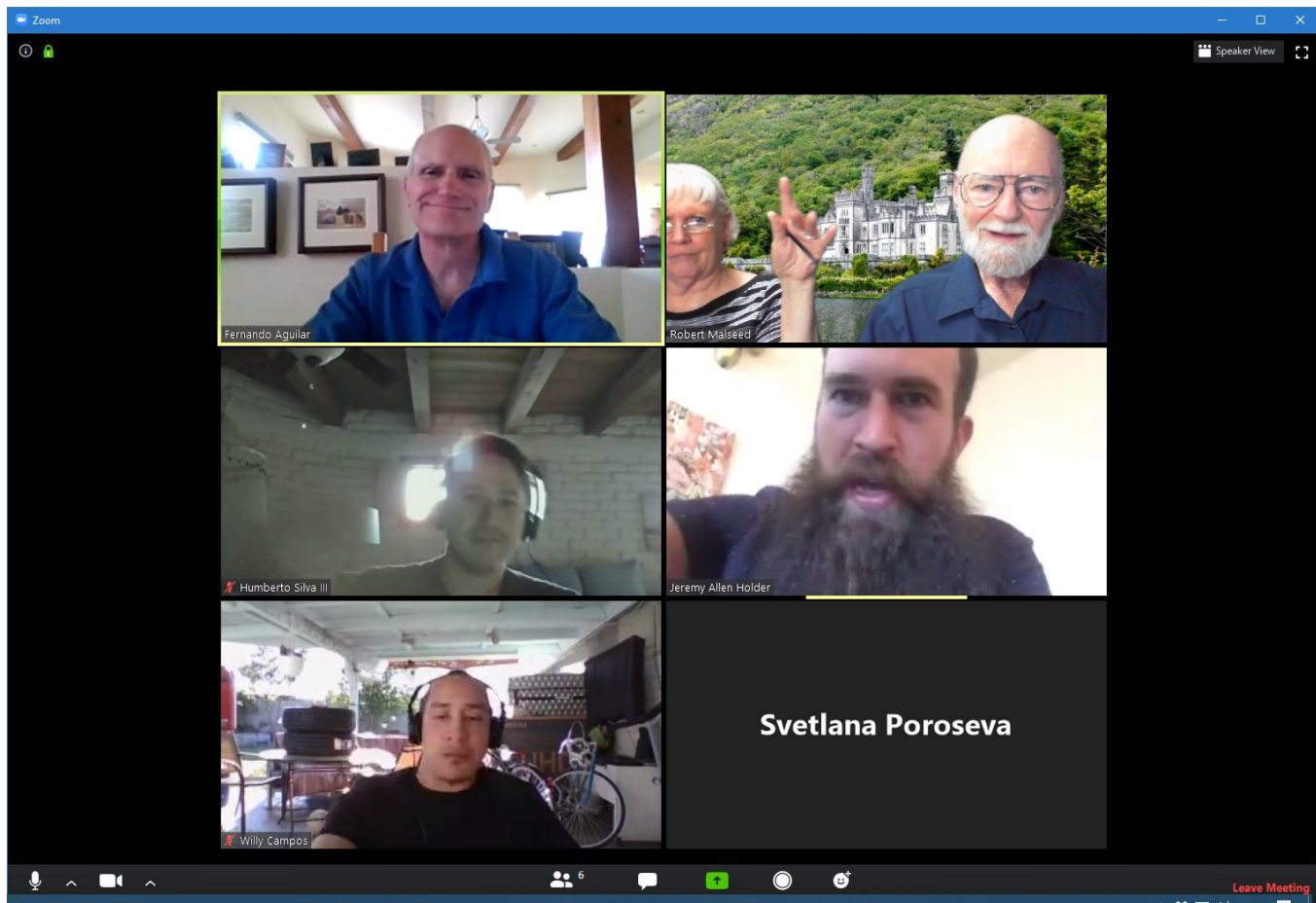
Ben enjoys spending time with his wife and daughter and mentoring students. His hobbies include woodworking, gardening, and playing guitar.

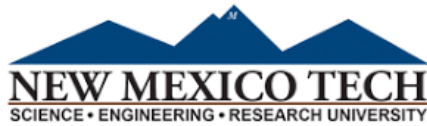


STUDENT BRANCH NEWS

VIRTUAL (ZOOM) MEETING 23 APR 2020

Fernando "Doc" Aguilar (the faculty head for the UNM Lobo Launch senior design project.) presented a talk about his lifetime of launching rockets and the unique opportunity for students in the LOBO Launch Program.





STUDENT BRANCH NEWS

BRANCH ELECTS CHAIR & VICE CHAIR



Chair, Savannah Bradley

Hi, I'm Savannah and I am the Chair for the NMT AIAA Student Branch. I am from Albuquerque, NM. I am a FAA certified hot air balloon and drone pilot and I have no idea where my life would be without aviation. I am a junior at NMT studying mechanical engineering. In the future, I hope to get a PhD in aeronautical engineering and find ways to improve our current technologies. I am excited to be a part of AIAA and share my love for aviation.



Vice Chair, Raechelle Sandoval

My name is Raechelle and I am the Vice Chair for the NMT AIAA Student Branch. I am originally from Gallup, NM. I am a junior at NMT studying mechanical engineering. My career goal is to work for NASA and explore the unknown. I am excited to be a part of AIAA to work together and advance our knowledge as a group.

BASIL HASSAN BEGINS TERM AS AIAA PRESIDENT

Albuquerque Section member, Basil Hassan, began his 2020-2022 term as AIAA President in May. Hassan “is director of the Chief Research Office at Sandia National Laboratories,” where he “leads Sandia’s research strategy development including the execution of the Laboratory Directed Research and Development program and oversees Sandia’s external partnership and technology transfer programs.” Hassan “helped support NASA in determining the cause of the Space Shuttle Columbia accident in 2003 and was part of the team that shutdown the Deepwater Horizon oil well after the explosion and spill in 2010.” AIAA Executive Director Dan Dumbacher said, “We are pleased to welcome Basil Hassan as AIAA’s new president. ... He begins his term at a pivotal moment in the aerospace industry as we adapt to the changes caused by the coronavirus pandemic and rise to the challenge of the recovery to follow. Leadership will be essential to guide the aerospace community in transforming what we have learned during this downturn into a stronger future.”



ALBUQUERQUE SECTION OFFICER ELECTION RESULTS

By Robert Malseed—Treasurer

Chair	Mr. Ben Urioste
Vice-Chair	Dr. Paul M. Delgado
Secretary	Dr. Terry Caipen
Treasurer	Mr. Robert Malseed
Publications (Acting)	Mr. Robert Malseed
Young Professionals	Mr. Kyle P. Lynch
Membership	Ms. Erin Pettyjohn
Honors & Awards	Dr. Stephen Seiffert
Public Policy	Mr. Mark Fraser
Corporate Liaison	Dr. Neil McCasland
Education	Dr. Humberto Silva III
Programs	Dr. Nick Morley
Career Enhancement	Ms. Andrea Loper
STEM K-12	Dr. Elfego Pinon III

These individuals took office effective 1 June 2020.

The newest members of the section council are Paul Delgado (Vice Chair) and Kyle Lynch (Young Professionals)..

Ex Officio council members:

Dr. Svetlana Poroseva, is the UNM Student Branch Advisor.

Dr. Mostafa Hassanalian is the NMT Student Branch Advisor.

VIRGIN GALACTIC SPACESHIP TWO CONDUCTS UNPOWERED GLIDE FLIGHTS FROM SPACEPORT AMERICA

From AIAA Daily Launch, 4 May 20

[SPACE](#) (5/1) reported that on May 1, the Virgin Galactic SpaceShipTwo suborbital spacecraft, called VSS Unity, “conducted its first unpowered glide flight [from] Spaceport America...notching a milestone on the path to commercial operations, Virgin Galactic representatives announced.” Unity’s “test campaign had been based in Mojave until February of this year, when the vehicle arrived at Spaceport America beneath the wings of its WhiteKnightTwo carrier plane, which is called VMS Eve.” Unity “is designed to be carried aloft by WhiteKnightTwo, then dropped at an altitude of about 50,000 feet (15,000 meters). At that point,” Unity’s “onboard rocket motor kicks on, blasting the vehicle up to suborbital space.” The “latter step didn’t happen during today’s glide flight. Unity’s pilots, Dave Mackay and C.J. Sturckow, steered the space plane through some unpowered milestones, reaching a top speed of Mach 0.7, before bringing it down for a runway landing at Spaceport America, Virgin Galactic representatives said.”

The [AP](#) (5/1) reported that Virgin Galactic CEO George Whitesides said, “I am grateful for the commitment displayed by everyone involved, not only in helping to support relief efforts in both New Mexico and California, but also for the dedication and creativity which will allow us to continue safely towards our goal of commercial launch.” Virgin Galactic “has not set a date for the first commercial flights but has said it anticipates doing so in 2020.”

[Space News](#) (6/25, Subscription Publication) reports that on Thursday, Virgin Galactic “conducted its second test flight of its” SpaceShipTwo suborbital vehicle from Spaceport America in New Mexico, “and now says it is ready to resume powered flights of the spacecraft.” The company said that during the “high speed” test, the spacecraft reached speeds of Mach 0.85.

[CNBC](#) (6/25) reports that Virgin Galactic CEO George Whitesides said in a statement, “I am thrilled with the team’s hard work to complete today’s test flight successfully. It was an important test that, pending data review, means we can now start preparing the vehicles for powered flight.”

The [AP](#) (6/25) reports that while the company “is in the midst of final testing, officials have yet to offer a date for the start of commercial flights. Officials said the data from the latest flight has to be analyzed.” Additionally, modifications have to be made to the cabin, and inspections have to be completed.

HAPSMOBILE PLANS TO FLY PSEUDO-SATELLITE UAV FROM SPACEPORT AMERICA

[FlightGlobal](#) (6/16) reports that HAPSMobile “plans to flight test its high-altitude, pseudo satellite, the HAWK30, at New Mexico’s Spaceport America.” The UAV “is solar-powered and designed to stay aloft for six months” while transmitting “cellular data over an area of about 3.1 million ha (7.8 million acres).” The UAV “is being pitched as an alternative to cellular towers or communications satellites.”

HONORS & AWARDS NEWS BRIEFS

By Stephen Seiffert—Honors & Awards

The Albuquerque Section AIAA Selects 2019 Scholarship Winner

The Albuquerque AIAA Section has an established annual scholarship award. The scholarship award is presented in May of each calendar year at our Section's Honors and Awards Banquet. The scholarship application is available to undergraduate and graduate students enrolled in any of the four universities that are within the boundaries of the Albuquerque AIAA Section: The University of NM, the NM Institute of Mining and Technology, NM Highlands University, and Northern New Mexico College. The applicant(s) must have demonstrated all-around excellence in the pursuit of study in the art, science, and/or technologies of aeronautics and/or astronautics.

This year's winner of a \$1,000 scholarship is Mr. Kavin Kullama, graduating senior, Computer Engineering student at the University of New Mexico. Mr. Kullama was the 2018-2019 scholarship recipient. In recognition, our AIAA Section, Certificate of Achievement was sent directly to Mr. Kullama at home, in lieu of a formal presentation at our Annual May AIAA Honors & Awards Presentation Banquet, cancelled this year because of COVID-19 concerns. Kavin will return to the university this fall to begin a master's program in Computer Engineering.

Thanks to Dr. Neil McCasland, Corporate Liaison, and other AIAA members for conducting the evaluations.

“US Space Force Welcomes a LOBO” - From the UNM Newsroom, inside UNM Alumni News - Air Force ROTC

Former AIAA Section Scholarship recipient Kyle Williams (2016-2017), graduate from The University of New Mexico with a bachelor's degree in mechanical engineering, has joined the Air Force, with the rank of 2nd Lt., Space Operations Officer involved in satellite communications, tracking, and space surveillance, a component of the U. S. Space Force (USSF), the Department of Defense's newest military Branch. During his mechanical engineering studies at UNM, Kyle was a member of the Air Force ROTC program at the university. The USSF evolved out of the Air Force Space Command (USPC) in 2019 as a military service branch within the Air Force.

In the UNM news release, 2nd Lt. Williams' was quoted as saying: “Having now earned a commission into the USSF, I feel pride and responsibility knowing that I will have a role in the newest branch during its infancy. Part of that role will be assisting the USSF in maintaining and enhancing the competitive edge of the Department of Defense in space while adapting new strategic challenges.”



SECTION MEMBER JOINS NATIONAL ACADEMIES COMMITTEE

By Robert Malseed—Treasurer

Albuquerque Section member, Joe Sholtis Jr. of Sholtis Engineering & Safety Consulting has been selected to serve as a member of a National Academies Committee study of 'space nuclear propulsion technologies' (i.e., both nuclear thermal propulsion, NTP, and nuclear electric propulsion, NEP) for NASA in-space crewed & cargo missions to Mars, as well as remote exploration missions beyond.

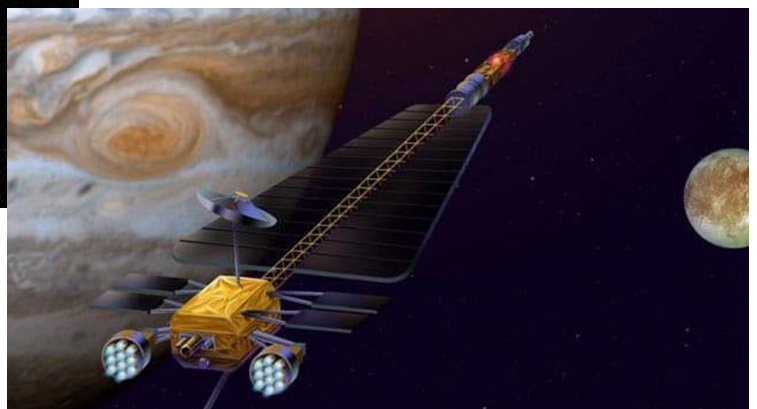
The National Academies of Sciences, Engineering, and Medicine will convene an ad hoc committee to identify primary technical and programmatic challenges, merits, and risks for developing and demonstrating space nuclear propulsion technologies of interest to future exploration missions. Nuclear propulsion has been shown to offer the potential for rapid human transit to Mars with one-way transit times less than 9 months and total roundtrip times including Mars surface stays less than 3 years. The committee will also determine the key milestones and a top-level development and demonstration roadmap for each technology. Additionally, the committee will identify missions that could be enabled by successful development of each technology.

The space nuclear propulsion technologies of specific interest are:

1. High-performance nuclear thermal propulsion that heats hydrogen propellant to 2500 K or more and produces specific thrust of at least 900 seconds.
2. Nuclear electric propulsion that converts thermal energy to electricity to power plasma thrusters for highly efficient and rapid transport of large payloads (e.g., a propulsion system with a power level of 5 MWe or more and a thrust-to-mass ratio that is substantially higher than the current state of the art).

For more info, go to:

<https://www8.nationalacademies.org/pa/projectview.aspx?key=51888>



AIAA AND ROYAL AERONAUTICAL SOCIETY SIGN MOU TO JOIN FORCES ON FUTURE AEROSPACE OUTREACH

By Robert Malseed—Treasurer, who attended the announcement meeting.

May 14, 2020 – Reston, Va. —The American Institute of Aeronautics and Astronautics (AIAA) and the Royal Aeronautical Society (RAeS) have entered into a Memorandum of Understanding (MOU) to enable the two preeminent professional aerospace societies to collaborate on future endeavors.

“AIAA looks forward to collaborating with the Royal Aeronautical Society to unite our strengths in helping shape the aerospace community and giving meaningful benefits to our members,” said Dan Dumbacher, AIAA executive director. “As virtual events become the norm, we can more easily take a collective international approach to inform and engage the aerospace community. By doing so, we hope to capture the imaginations of students, whom the aerospace community needs if we are to continue exploring and making new discoveries. Working together, AIAA and RAeS plan to show the creativity, dedication and science that drives aerospace professionals and open up the possibilities of the future of aerospace.”



Professor Jonathan Cooper, president of the RAeS commented, “As the aerospace sector rises to tackle the challenging environment we are all operating in, the Royal Aeronautical Society looks forward to joining forces with the American Institute of Aeronautics and Astronautics to support the workforce, apprentices and students through this period, and also after we have overcome the pandemic.

There are many exciting opportunities ahead for the tomorrow’s aerospace professional as we embrace the future of flight and strive to reach new frontiers whilst also tackling the hard questions on climate change and sustainability.”

AIAA and RAeS plan to cooperate in the following areas:

- Promoting learned activities such as lectures, conferences, and other activities of mutual interest;
- Recognizing our members with joint honors and awards initiatives;
- Other areas of interest that may arise.

About AIAA

The American Institute of Aeronautics and Astronautics (AIAA) is the world’s largest aerospace technical society. With nearly 30,000 individual members from 91 countries, and 100 corporate members, AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense. For more information, visit www.aiaa.org, or follow AIAA on [Twitter](#), [Facebook](#), or [LinkedIn](#).

About the Royal Aeronautical Society (RAeS)

The Royal Aeronautical Society is the world’s only professional body and learned society dedicated to the entire aerospace community. Established in 1866 to further the art, science and engineering of aeronautics, the Society has been at the forefront of developments in aerospace ever since. The Society seeks to (i) promote the highest possible standards in aerospace disciplines; (ii) provide specialist information and act as a central forum for the exchange of ideas; and (iii) play a leading role in influencing opinion on aerospace matters. For more information about the Royal Aeronautical Society visit www.aerosociety.com, or follow RAeS on [Twitter](#), [Facebook](#), [Instagram](#) or [LinkedIn](#).

APRIL IN AIR & SPACE HISTORY

70 Years Ago – 1950

April 1: Dr. Wernher von Braun moved from Fort Bliss, TX to Redstone Arsenal, AL.

60 Years Ago - 1960

April 1: Tiros 1 (Television and InfraRed Observation Satellite) launched aboard Thor rocket, 6:40 a.m., EST, Cape Canaveral, Fla., first weather observation satellite and took the first television image of the Earth from space.

April 13: Transit I-B launched by Thor Ablestar, 7:03 a.m., EST, Cape Canaveral, Fla., first navigational satellite.

April 13: First flight of Robert M. White, X-15 pilot, Dryden FRF, CA.

April 15: Discoverer 11 launched aboard Thor rocket, 3:30 p.m., EST, Vandenberg AFB. Part of Corona spy satellite program.

55 Years Ago - 1965

April 3: Snapshot 1 (Snap 10A) launched by Atlas Agena D, 1:27 p.m., PST, Vandenberg AFB. First nuclear reactor in space. NASA- Atomic Energy Commission (AEC) cooperative program.

April 6: Early Bird (Intelsat 1) launched by Thor Delta, 6:48 p.m. EST, Cape Canaveral, Fla. First commercial communications satellite -- placed in synchronous orbit over the Atlantic Ocean.

April 23: Molniya 1 launched , 0211 UTC, Baikonur, USSR.

April 29: Explorer 27 launched by a Scout rocket, 10:17 a.m., EST., Wallops Island, VA.

50 Years Ago – 1970

April 8: Nimbus 4 launched, 3:18 a.m., EST, Vandenberg AFB. Also launched Topo 1. Rocket: Thor Agena.

April 11: Apollo 13 launched on its ill-fated flight to the moon. Crew: James A. Lovell Jr., John L. Swigert Jr., and Fred W. Haise Jr. aborted the mission after the service module oxygen tank ruptured on April 13.

April 22: Intelsat III F-7 launched by Thor Delta, 7:46 p.m., EST, Cape Canaveral, Fla.

April 24: China 1 (PRC 1). Also known as Dong Fang Hong-1 (DFH-1), launched by Long March. First Chinese satellite making the PRC the fifth nation to launch its own satellite.

45 Years Ago – 1975

April 9: GOES 3 launched by Delta, 7:48 p.m., EDT, Vandenberg AFB.

40 Years Ago – 1980

April 26: NavStar 6 launched by Atlas F, Vandenberg AFB.

35 Years Ago – 1985

April 12: STS-51D (Space Shuttle Discovery) launched from KSC at 8:59 a.m.. EST. Astronauts Karol J. Bobko, Don E. Williams. Margaret Rhea Seddon, S. David Griggs, Jeffrey A. Hoffman, Charles D. Walker and Senator E. J. "Jake" Garn aboard. Landed at KSC on April 19 at 8:45 a.m., EST. Mission duration: 6 days. 23 hours, and 55 minutes.

APRIL IN AIR & SPACE HISTORY

April 12: Telesat 1 launched by Shuttle Discovery.

April 12: Syncom IV 3 launched by Shuttle Discovery. Booster motor failed to fire.

April 29: STS-51B (Space Shuttle Challenger) launched from KSC at 12:02 p.m., EDT with astronauts Robert F. Overmyer, Frederick D. Gregory, Don L. Lind, Norman E. Thagard, William E. Thornton, Lodewijk van den Berg and Taylor G. Wang aboard. Carried Spacelab 3 in the cargo bay. Landed at Edwards AFB, CA, May 6 at 9:11 a.m., PDT. Mission Duration: 7 days, 0 hours, 8 minutes.

April 29: NUSAT 1 launched by Shuttle Challenger.

30 Years Ago – 1990

April 5: PEGSAT launched by Pegasus newly developed launch vehicle system. The rocket was carried aloft by an L-1011 aircraft flying out of Vandenberg AFB.

April 11: Department of Defense triple satellite launched with an Atlas E booster, Vandenberg AFB.

April 13: Palapa B2R launched 6:28 p.m., EDT. Cape Canaveral, Fla.

April 24: STS-31, (Space Shuttle Discovery) launched from KSC at 8:33 a.m., EDT with astronauts Loren J. Shriver, Charles F. Bolden. Steven A. Hawley, Bruce McCandless and Kathryn D. Sullivan. Deployment of Hubble Space Telescope (HST). Landed April 29, 1990, 6:49:57 a.m. PDT, Edwards Air Force Base, CA. Mission duration: 5 days, 1 hour, and 16 minutes.

April 25 - Hubble Space Telescope launched from shuttle Discovery, weighing approximately 25,000 pounds (11,355 kg). First image taken by Wide Field/Planetary Camera released May 20. Spherical aberration in the optical system announced publicly June 27.

25 Years Ago – 1995

April 3: MICROLAB 1 minisatellite with a global lightning mapper launched by a Pegasus rocket carried aloft by an L-1011 aircraft flying out of Vandenberg AFB.

April 3: ORBCOMM FM2 and ORBCOMM FM1 minisatellites launched by the same Pegasus rocket which launched the MICROLAB 1. The main payload consisted of a transponder to relay the GPSdetermined locations of cargo trucks, and data from oil pipeline monitors.

20 Years Ago – 2000

April 4: Soyuz TM-30 launched at 05:01 UTC from Baikonur. Last Soyuz mission to the 14 year-old Mir space station. Crew: Sergei Zalyotin , Alexandr Kaleri, aboard a Soyuz-U rocket from Baikonur.

MAY IN AIR & SPACE HISTORY

85 Years Ago - 1935

May 31: Dr. Robert H. Goddard launched a rocket to the height of 7,500 feet. Roswell, NM.

75 Years Ago - 1945

May 7: Wallops Flight Research Facility was established as a facility under the administrative control of the Langley Aeronautical Research Laboratory, Wallops Island. VA.

70 Years Ago - 1950

May 11: Viking Rocket No. 5 launched from the deck of the U.S.S. Norton Sound. The vehicle reached an altitude of 106.4 miles in the Pacific Ocean near Jarvis Island.

May 12: After a final flight by test pilot Chuck Yeager, the Bell X-1-1 was retired and given to the Smithsonian Institution.

60 Years Ago - 1960

May 1: U-2 pilot Francis Gary Powers was shot down over the U.S.S.R.

May 9: Mercury spacecraft off-the-pad abort test of the launch escape system, Wallops, Island, VA.

May 15: Sputnik 4 launched, 0000 UTC, Baikonur, USSR.

May 24: Midas 2 launched on an Atlas by the Department of Defense (1st Experimental Infrared Surveillance Satellite), 1:37 p.m., EDT, Cape Canaveral, Fla.

55 Years Ago - 1965

May 25: Pegasus 2 launched on Saturn 8 (SA-8), 3:35 a.m., EDT, Cape Canaveral, Fla. Launched also Apollo Boiler Plate BP-26.

45 Years Ago - 1975

May 7: Explorer 53 (SAS-C) launched by a Scout from the San Marco Range in Kenya, Africa at 6:45 p.m., EDT.

May 7: Anik 3 (Telsat-C or 3) launched by a Delta, 7:35 p.m., EDT, Cape Canaveral, Fla.

May 22: Intelsat IV F- I launched aboard Atlas Centaur, 6:04 p.m., EDT. Cape Canaveral, Fla.

May 24: Soyuz 18 launched aboard Soyuz rocket at 1458 UTC, from Baikonur. Crew: Pyotr I. Klimuk, and Vitali I. Sevastyanov.

May 31: European Space Agency (ESA) founded.

40 Years Ago - 1980

May 29: NOAA-B Failed to reach proper orbit. Launched aboard Atlas F, 6:53 a.m., EDT, Vandenberg AFB.

25 Years Ago - 1995

May 20: SPEKTR, a Russian module to be docked with MIR station, was launched from Baikonur cosmodrome by a Proton-K rocket at 05:33 UTC.

MAY IN AIR & SPACE HISTORY

May 23: GOES-J, named GOES 9 after the launch, an American geostationary, meteorological spacecraft was launched from Cape Canaveral by an Atlas 1 rocket at 05:52 UTC.

20 Years Ago – 2000

May 19: STS-101, (Space Shuttle Atlantis) was launched from KSC, 6:11 a.m. EDT. Crew: James D. Halsell, Jr., Scott J. Horowitz, Mary Ellen Weber, Jeffrey N. Williams, James S. Voss, Susan J. Helms, and cosmonaut Yuri V. Usachev. Space Station Assembly Flight ISS-2A-2a, SPACEHAB. Landing on May 29, 2000, 2:20 a.m. EDT, KSC. Mission Duration: 9 days, 20 hours, 36 minutes.

15 Years Ago – 2005

May: Announcement that the Voyager 1 spacecraft, 8.7 billion miles from the Sun, had entered the heliosheath on its way to interstellar space. 10 Years Ago – 2010 May 20: Akatsuki, also called Planet-C or Venus Climate Orbiter, launched on an H-2A rocket from Tanegashima at 21:58 UTC to study Venus' climate from orbit. Called first interplanetary weather craft by Japanese officials. 5 Years Ago – 2015 May 20: LightSail A was launched 03:05:00 UTC by an Atlas V from Cape Canaveral. It accomplished a challenging test mission. Unfurling its 32 square meter mylar solar sail on June 7, it is a 3-Unit CubeSat developed and operated by The Planetary Society to demonstrate sunlight, or rather solar pressure, as a means of spacecraft propulsion for potential future use in large sails for deep space propulsion. Also launched was NASA's METIS (Materials Exposure and Technology Innovation in Space) experiment to expose nearly 100 different materials samples to the space environment for more than 200 days. METIS is based on the MISSE (Materials on International Space Station Experiment), which flew more than 4,000 samples in space from 2001 to 2013. METIS flew a variety of materials including polymers, composites and coatings.

JUNE IN AIR & SPACE HISTORY

75 Years Ago - 1945

June 27: First rocket launched from Wallops. Five 3.25-inch rockets were fired to check tracking and radar measuring and gain launch experience.

70 Years Ago – 1950

June 27: George Pal's influential film, "Destination Moon" premieres in New York.

60 Years Ago – 1960

June 22: Transit 2-A and Solrad 1 were launched by Thor at 1:54 a.m., EDT, Cape Canaveral, Fla.. This was the first multiple payload launched into multiple orbits.

June 29: Discoverer 12 failed to achieve orbit, 6:01 p.m., EDT, Vandenberg AFB. Thor Agena rocket used.

55 Years Ago - 1965

June 3: Gemini Titan 4 launched from Cape Canaveral, Fla. at 11:16 a.m., EDT. Astronauts James A. McDivitt and Edward H. White aboard the Gemini 4 spacecraft. White makes the first U.S. extravehicular excursion 4 hours and 18 minutes into the flight.

June 8: Luna 6 Launch (Soviet Moon Flyby)

June 18: First launch of the Titan 3C launch vehicle from the Cape Canaveral, Fla.

50 Years Ago - 1970

June 1: Soyuz 9 launched from Baikonur cosmodrome, USSR. Cosmonauts Andrian G. Nikolayev and Vitali I. Sevastyanov.

June 2: First M2-F3 glide flight, with William H. Dana as the pilot, DFRF, CA.

45 Years Ago - 1975

June 8: Venera 9 Launch (Soviet Venus Orbiter/Lander) Aboard a Proton K launcher from Baikonur.

June 14: Venera 10, Venus Landing. Launch aboard Proton K from Baikonur.

June 21: OSO 8 launched at 7:43 a.m., EDT, Cape Canaveral, Fla.

40 Years Ago – 1980

June 5: The Soviet Union's first crewed Soyuz T capsule, incorporating an automatic docking system, was launched into orbit.

35 Years Ago - 1985

June 17: STS-51G (Space Shuttle *Discovery*) was launched from KSC at 7:33 a.m., EDT. Crew: Daniel C. Brandenstein, John O. Creighton, Shannon W. Lucid, John M. Fabian, Steven R. Nagel, Patrick Baudry (France), and Sultan Al-Saud (from Saudi Arabia - first Arab in space). On the 17th Morelos-A was launched, Arabsat 1B launched on the 18th, and the next day Telstar 3D was shoved into orbit. Spartan 1 was launched on the 20th and retrieved from orbit and returned on the 24th. Landed at Edwards AFB, CA 6:13 a.m., PDT. Mission Duration: 7 days, 1 hour, and 38 minutes.

JUNE IN AIR & SPACE HISTORY

30 Years Ago - 1990

June 1: ROSAT (Roentgen Satellite) launched onboard a Delta II launch vehicle, 5:47 p.m., EDT, Cape Canaveral, Fla.. Cooperative effort between the U.S., U.K. and the Federal Republic of Germany.

June 12: INSAT 1D launched from Cape Canaveral, Fla. by a Delta at 5:52 UTC.

June 23: Intelsat 6 F-4 launched by a Titan 3 at 7:19 a.m., EDT, from Cape Canaveral, Fla.

25 Years Ago – 1995

June 27: STS-71 (Space Shuttle *Atlantis*) launched at 3:32 p.m. EDT. First Shuttle-Mir docking. Crew: Robert L. Gibson, Charles J. Precourt, Ellen S. Baker, Gregory J. Harbaugh, Bonnie J. Dunbar, Anatoly Y. Solovyev (Russia), and Nikolai M. Budarin (Russia). Landing: July 7, 1995, 10:54 a.m. EDT, Kennedy Space Center, Fla. (KSC). Mission Duration: 9 days, 19 hours, 23 minutes.

20 Years Ago – 2000

June 30: TDRS 8, an American Tracking and Data Relay was launched by an Atlas 2A rocket from Cape Canaveral, Fla. at about 13:00 UTC and was placed in geosynchronous orbit.

10 Years Ago – 2010

June 15: Soyuz-TMA 19 was launched to the ISS from Baikonur Cosmodrome with a Soyuz FG rocket at 21:35 UTC. Expedition 24 Crew: NASA astronauts Doug Wheelock and Shannon Walker; Russian cosmonaut Fyodor Yurchikhin.

IMAGES OF THE QUARTER

Space X Takes US Astronauts to the International Space Station.



SpaceX's Crew Dragon capsule, carried two NASA astronauts, Douglas G. Hurley and Robert L. Behnken, to the International Space Station from Kennedy Space Center in Florida.

PARTING THOUGHTS

"Mystery creates wonder and wonder is the basis of man's desire to understand."

— Neil Armstrong

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