

THE FLIGHT PLAN

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

LAURA MCGILL IS NEW AIAA PRESIDENT-ELECT

Robert A. Malseed, Treasurer

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Laura become deputy director of nuclear deterrence at Sandia National Laboratories in January, a new position created to oversee development, production and management of the U.S. nuclear stockpile. She oversaw 7,800 engineers as the Raytheon Corp. vice president of engineering for the former Missile Systems division, 2015-May 2020. As chief engineer, 2004-2006, she oversaw development and production of the Tomahawk cruise missiles primarily launched by the U.S. Navy. She was inducted into the National Academy of Engineering, October 2019. AIAA RECORD: AIAA member for 40 years since joining as an undergraduate student; fellow since 2007; member of AIAA Board of Directors/Trustees, 2005-2018; led and participated in a variety of AIAA executive and technical committees, including chair of the Ground Testing Committee, 1998-2000; currently chair of the Honors and Awards Committee, since 2019. Laura received her Bachelor of Science in aeronautical and astronautical engineering from the University of Washington, 1983. Master of Science in aerospace systems from West Coast University, 1992.



Welcome to Albuquerque !



CALENDAR

Local Section Events

Next General meeting TBD

Virtual Meeting Via Zoom

Start 6:00 pm

End 7:30 pm

National AIAA Events

[The American Rocketry Challenge](#)

15 JUNE - 30 JUNE 2021

[Spaceport America Cup](#)

18 JUNE - 20 JUNE 2021

[3rd Cognitive Communications for Aerospace Applications \(CCAA\) Workshop](#)

21 JUNE - 23 JUNE 2021

[2021 AIAA Aviation and Aeronautics Forum and Exposition \(2021 AIAA AVIATION Forum\)](#)

2 AUGUST - 6 AUGUST 2021

[AIAA/IEEE Electric Aircraft Technologies Symposium \(EATS\)](#)

11 AUGUST - 13 AUGUST 2021

[Aerospace Spotlight Awards Gala](#)

12 AUGUST 2021 1700 - 1900 (EASTERN DAYLIGHT TIME)

[2021 AIAA Defense and Security Forum \(AIAA DEFENSE Forum\)](#)

14 SEPTEMBER - 16 SEPTEMBER 2021

[Upcoming U.S. Launches](#)

TBD Electron • STP-27RM

Jun 17 Falcon 9 • GPS 3 SV05

Jun 23 Atlas 5 • STP-3

Jun Minotaur 1 • NROL-111

Jul Falcon 9 • Transporter 2

Jul Falcon Heavy • USSF 44

Jul 30 Atlas 5 • CST-100 Starliner OFT 2

Aug 1 Antares • NG-16

Aug Atlas 5 • USSF 8 (GSSAP 5&6)

Aug 18 Falcon 9 • SpaceX CRS 23

Sep 15 Falcon 9 • Inspiration 4

Sep Falcon 9 • WorldView Legion 1&2

Oct Falcon Heavy • USSF 52

ALBUQUERQUE SECTION OFFICER NEEDED

By Robert A. Malseed, Treasurer

Your Albuquerque Section needs you to serve on the section Council. Our **Communications** position is currently vacant. (It would be nice to return to monthly newsletters.)

“The **Communications Officer** shall be responsible for the Section publication activities including, but not limited to, the periodic preparation and distribution of the Section newsletter and any other print or social media required to support Section activities.”



WE WANT YOU!

ALBUQUERQUE SECTION MEETING 18 MARCH



Making a Difference at Mach 2

Lt. Col. Tucker Hamilton, USAF F-35 Developmental Test Director of Operations



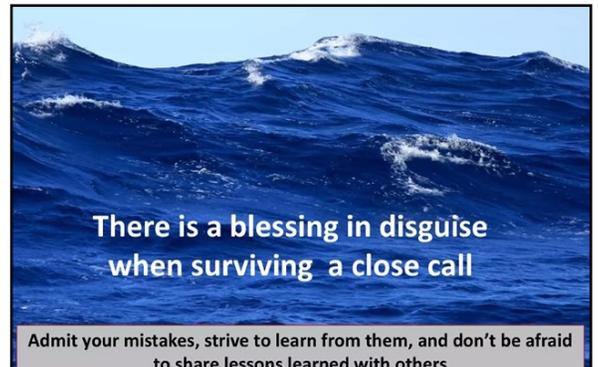
Lt. Col. Hamilton talked about his flying experiences showing pictures and videos of what it takes and what it is like to be an Experimental Fighter Test Pilot. His stories included major life-threatening aircraft accidents, close saves, combat flying revelations, serendipitous opportunities testing first of its kind technology, flying over 30 aircraft from a zeppelin to a MiG-15 to an A-10, and managing the Joint Strike Fighter Developmental Test program for all three services. He started his Air Force career as an operational F-15C pilot. He then served as an Air Liaison Officer in Germany where he was the director of operations for a key command and control squadron. While serving in Germany he was hand-selected to be the initial cadre for the first MC-12 squadron in Afghanistan; heralding in the Air Force's first tactical Intelligence, Surveillance, and Reconnaissance aircraft. He served as the Chief Instructor for 200+ aircrew and accumulated over 400 combat hours. After these experiences he went to test pilot school and eventually went to Washington DC to work the F-35 program. After his F-35 work in D.C. he transitioned to Edwards AFB, CA where he currently flies the F-35 as the Developmental Test Director of Operations. He spoke about his surviving a mid-air collision, and then advocating collision avoidance systems.



Carrying many types of armament.



A mid-air collision that he survived.



ALBUQUERQUE SECTION MEETING 15 APRIL



A Conversation on Scholarly Research and the Human Condition
Dr. Ravi Chaudhary, Falcon Innovations AT.



Dr. Ravi Chaudhary shared his experiences during his career as a pilot and engineer, and lead a group discussion on the importance of scholarly inquiry in the age of COVID. He spoke on AIAA student research, his work on the Delta II Launch Vehicle and Space Station, and growth in the Commercial Space Industry.

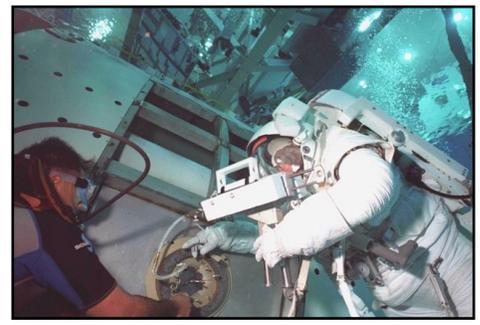
Dr. Ravi Chaudhary is the CEO of Falcon Innovations ATS, a firm dedicated to providing c-suite and client-based strategic advice in the aerospace, defense, and transportation industries. Ravi is a former member of the Senior Executive Service in Government, Presidential Appointee, and Air Force Officer. He is an Associate Fellow of the American Institute of Aeronautics and Astronautics. Dr. Chaudhary holds a Doctorate in Executive Leadership from Georgetown University, and engineering degrees from St. Mary's University and the Air Force Academy. He has logged over 3000 hours as a pilot and flight test engineer (760 combat hours) and multiple deployments since Sept 11, 2001



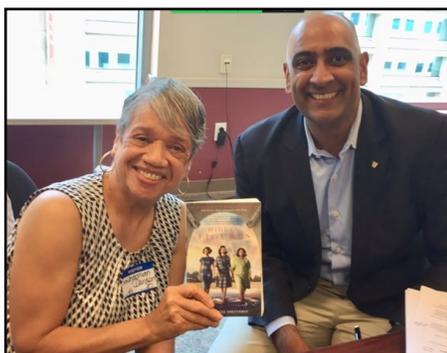
Academy days



Successful programs



Neutral Buoyancy



With a "Hidden Figure"



Zoom attendees

ALBUQUERQUE SECTION MEETING 20 MAY



Building a Portable Subsonic Wind Tunnel



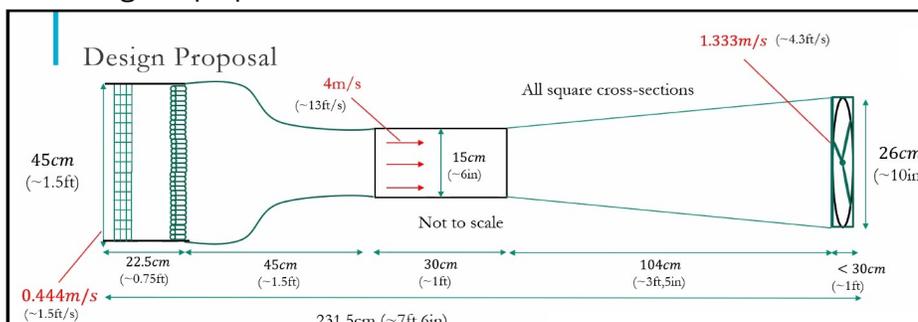
Practical insights into tunnel fabrication & testing from a project management & systems engineering perspective

Sonny Ji, Tyler Talbott, Ely Teran, Brenden Herkenhoff, Jarod Fisher.

The Wind Tunnel team presented the process of developing a small scale, portable wind tunnel commissioned by AIAA Albuquerque. The UNM team members discussed the fabrication of the tunnel design as suggested by Dr. Paul Delgado (2020) specifically for STEM outreach purposes. We address the issues involved in the design and construction of the tunnel which could be used for scientific measurement of forces and moments as well as nominal operation for streamline visualization. They also spoke of the important lessons learned for replication of wind tunnels of similar scale and cost, both from a systems engineering perspective and a project management perspective. The AIAA Albuquerque Portable Wind Tunnel was fabricated by a team of undergraduate mechanical and electrical engineering students from the University of New Mexico (UNM) and New Mexico Tech (NMT) and led by Dr. Paul M Delgado (Senior Aeronautical Engineer, Sandia National Laboratories). The student team includes:

Sonny Ji	Tyler Talbott	Ely Teran	Brenden Herkenhoff	Jarod Fisher
				
<ul style="list-style-type: none"> • 2nd Year ECE Student • University of New Mexico • Secretary of UNM AIAA Student Branch • Lab Tech at UNM WHY-Lab 	<ul style="list-style-type: none"> • 3rd Year ME Student • University of New Mexico • AFOTEC Intern • Researcher in the AI for Accelerators Group at UNM 	<ul style="list-style-type: none"> • 3rd Year ME Student • University of New Mexico • 1st Generation American • LOBO Motorsports Systems Engineer 	<ul style="list-style-type: none"> • B.S. Mech. Engineering • New Mexico Tech • AIAA Scholarship Recipient • Researcher at the Autonomous Flight & Aquatic Systems Laboratory (NMT) 	<ul style="list-style-type: none"> • 4th Year ME Student • New Mexico Tech • AFROTC Cadet Wing Commander • Researcher at the Autonomous Flight & Aquatic Systems Laboratory (NMT)

The design as proposed:



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With a few photos

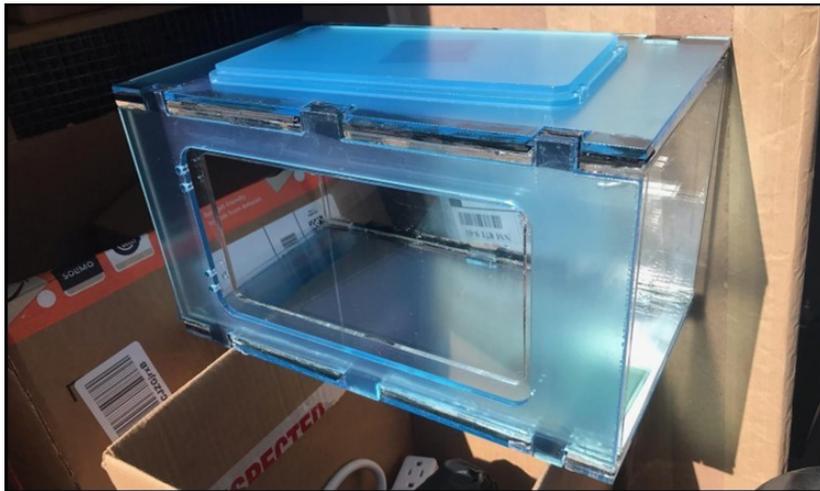
ALBUQUERQUE SECTION MEETING 20 MAY

Continued



Making a mock-up for initial assessments.

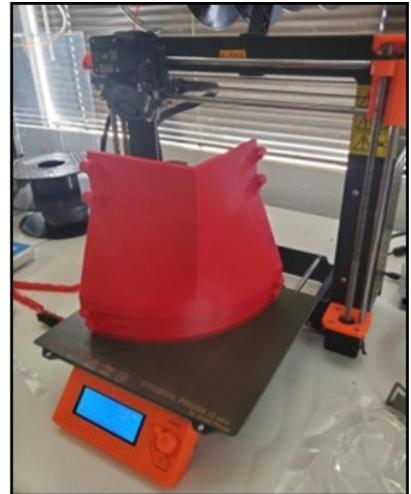
The test section



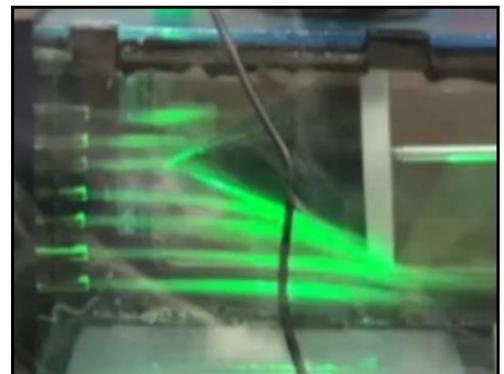
Overall view



3-D printing a fan motor adapter



Laser illumination for flow visualization



HONORS AND AWARDS NEWS OF SECTION MEMBERS

By Stephen Seiffert—Honors and Awards Officer

Institute National Awards

1. Dr Humberto Silva III of Sandia National Laboratories has been selected to receive the **2021 AIAA Engineer of the Year Award**.

The AIAA Engineer of the Year Award is presented to a member of AIAA who has recently made an individual, technical contribution in the application of scientific and mathematical principles leading to a significant technical accomplishment, representative of AIAA's national/ international recognition.

Dr. Silva is being honored "For pioneering the modernization of re-entry vehicle probability loss of assured safety assessments including conduction, convection, chemical kinetics, radiation and associated thermophysical material uncertainty." This premier award is awarded during the annual AIAA Aerospace Spotlight Awards Gala.

2. Dr Walter H. Rutledge of CENTRA Technology, Inc., Albuquerque has been selected to present the **2021 AIAA Wright Brothers Lecture in Aeronautics**, lecture topic, "Hypersonics for National Security: Conventional Prompt Strike."

The Wright Brothers Lectureship commemorates the first powered flights made by Orville and Wilbur Wright at Kitty Hawk, North Carolina, in 1903 and emphasizes significant advances in aeronautics by recognizing recent accomplishment of a significant "First in Aeronautical Engineering". The lecture highlights the details and approaches to meeting both the technical and programmatic challenges involved thereof the lecture topic. The lecture is presented biennially (in odd-numbered years), and will be presented in conjunction with the AIAA Defense Forum in September 2021 in Laurel, Maryland. The award consists of a medal and certificate, and the lecture will be published in the AIAA Journal of Aircraft.

3. Dr. Robert J. Walters of the Advanced Space Power Program Manager Air Force Research Laboratory Space Vehicles Directorate has been selected recipient of the **2021 AIAA Aerospace Power Systems Award**.

The Aerospace Power Systems Award, established in 1981, is presented for a significant contribution in the broad field of aerospace power systems, specifically as related to the application of engineering sciences and systems engineering to the production, storage, distribution, and processing of aerospace power.

Dr. Walters is being honored "For significant technical contributions and leadership in the area of space photovoltaic technology development and solar cell radiation damage research." This award will be presented during the AIAA Propulsion & Energy Forum Awards Ceremony on Wednesday, 11 August 2021, during the virtual AIAA Propulsion & Energy Forum and Exposition. The award consists of a certificate and engraved medal.

Best Paper in an Aerospace Sciences Discipline by Respective Technical Committee

Best Papers in a specific aerospace sciences discipline are selected from papers presented at technical forums by the respective technical committee.

Best Paper - Aerospace Sciences Group

2020 Aerodynamic Measurement Technology Best Paper Award

"Extending the Frequency Limits of 'Postage-Stamp PIV' to MHz Rates" (AIAA 2020-2018)

1. **Melissa M. Soehnel**, Test Operations Engineer, Sandia National Laboratories, Corecipient
2. **Russell Spiller**, Test Operations Engineer, Sandia National Laboratories, Corecipient
3. **Dr. Steven J. Beresh**, R&d Engineer, Sandia National Laboratories, Corecipient

Membership Anniversaries

1. **Dr. Vit Babuska**, Associate Fellow, Sandia National Laboratories, **25 Year Anniversary**
2. **Dr. Bharadwaju K. Singaraju**, Fellow, Singaraju Consulting Services, LLC, **25 Year Anniversary**
3. **Dr. Stanley E. Logan**, Associate Fellow, SELogan & Assoc. Inc., **70 Year Anniversary**

(Continued on page 8)

HONORS AND AWARDS NEWS OF SECTION MEMBERS

By Stephen Seiffert—Honors and Awards Officer

(Continued from page 7)

Fellow — Class of 2021

For advances in guidance, navigation, and control of space missions, including large precision optical systems, active and passive vibration mitigation, and proximity operations.

1. **Richard S. Erwin**, U.S. Air Force

Associate Fellow — Class of 2021

Individuals who have accomplished or been in charge of important engineering or scientific work, or have done original work of outstanding merit, or have otherwise made outstanding contributions to the arts, sciences, or technology of aeronautics or astronautics.

1. **Eleni M. Sims**, Project/Product Engineer, The Aerospace Corporation
2. **Brent S. Taft**, Senior Mechanical Engineer, Air Force Research Lab
3. **Justin L. Wagner**, Principle Member of the Technical Staff

Emeritus Member

Robert A. Malseed, Associate Fellow, (50 year Anniversary)

WALT RUTLEDGE IS NAMED AUBURN UNIVERSITY AEROSPACE ENGINEERING OUTSTANDING ALUMNUS FOR 2021

Robert A. Malseed, Treasurer

News from Auburn The 2021 Outstanding Alumnus in the Department of Aerospace Engineering is **Dr. Walter Rutledge**. Walt earned his bachelor's degree from Auburn in 1978 and his master's in 1980. He also has a Ph.D. from the University of Texas in 1990. Walt spent the majority of his career working for Sandia National Laboratory serving in a variety of roles including as Technical Manager of the Aerospace Department and Applied Aerospace Engineering and Advanced Concepts Department. More recently, Walt has been on special assignment at the Pentagon working on hypersonics related programs in the Office of the Undersecretary for Defense. Walt was recognized at a recent virtual ceremony .

Walt has been an Albuquerque Section member for many years, and was Chairman in 1984-85 and in 1991-92. (He asked me to be Treasurer in 1991, and here I (Robert) still am!!!)

SECTION COUNCIL MEMBERS FOR 2021-2022

Robert A. Malseed, Treasurer

In April the Albuquerque Section elected officers for the 2021 - 2022 year. Other council members are remaining in their previous positions.

Chair	Paul Delgado	Membership	Erin Pettyjohn	Career Enhancement	Andrea Loper
Vice Chair	Reid Shaeffer	Honors & Awards	Stev Seiffert	Young Professionals.....	Kyle Lynch
Secretary	Terry Caipen	Public Policy.....	Mark Fraser	UNM Branch Advisor	Svetlana Poroseva
Treasurer	Robert Malseed	Corporate Liaison.....	Neil McCasland	NMT Branch Advisor	Mostafa Hassanalian
Communications....	VACANT	Education	Humberto Silva III		
Programs	Nick Morley	STEM K-12.....	Elfego Pinon III		

SCIENCE FAIR WINNERS

By Robert A. Malseed, Treasurer – AIAA Albuquerque

The week of 22—27 March Robert Malseed and Stev Seiffert of our section judged Central New Mexico STEM Research Challenge (Science Fair) projects to choose four students to be the winners of our awards this year. We awarded \$125 to each of four students: two Junior Division (Mid School) and two Senior division (High School). Judging this year was virtual.



Our Junior Division Winners and their Projects are:

Phoebe Witt (Jefferson Middle School) Exoplanet Hunt

Phoebe was also the Junior Division overall third place winner as well as qualifying to go to state competition. She won First Place in Junior Physics & Astronomy, and also won special awards from Albuquerque Astronomical Society, American Association of University Women, BlueHalo CASE, Broadcom Masters, Directed Energy Professional Society, IEEE Photonics Society, Kiwanis Club of Coronado, Regional Research Challenge Junior Achievement, Sun Vista Enterprises, and the USAF.

Dominic Teeters (Holy Child Catholic School) Turbine Troubles

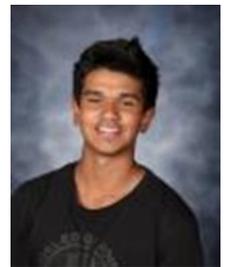
Dominic qualified to go to state competition, and won third place in Junior Physics & Astronomy. He also won special awards from Civil Air Patrol, Directed Energy Professional Society, Explora Science Center, and Regional Research Challenge Junior Achievement.



Our Senior Division Winners and their Projects are:

Milidu Jayaweera (LaCueva High School) A Novel AI-based GPS Anti-spoofing System with Subspace Differential Direction-of-Arrival Estimation and Deep Learning Against Dynamic Spoofers

Milidu was also a Senior Grand Award winner & ISEF Finalist as well as qualifying to go to state competition. He won first place in Senior Engineering and also won special awards from Directed Energy Professional Society, International Test Evaluation Association, Mu Alpha Theta, New Mexico Gas Company, and USAF



McKenna Collins (Albuquerque Institute of Math & Science) Using Hemispheric Sensing with Trajectory Prediction for Satellites to Mechanically Dodge Space Debris

McKenna was also a Senior Grand Award winner & ISEF Finalist as well as qualifying to go to state competition. She won second place in Senior Engineering and also won special awards from Civil Air Patrol, Directed Energy Professional Society, International Test Evaluation Association, and New Mexico Gas Company. At state level she won 3rd place Senior Engineering as well as 2 special awards.



SARA LANCTOT IS A NASA PATHWAYS AGENCY CROSS-CENTER COLLABORATION INTERN

By Robert A. Malseed, Treasurer

SOCORRO, N.M. – Sara Lanctot, an NMT undergraduate, was selected to be a panelist for the “NASA STEM Stars” webinar discussion with four of her fellow NASA Pathways Agency Cross-Center Collaboration (PAXC) interns.

Lanctot, a student in mechanical engineering at NMT, discussed her personal and educational journey that led to an internship with NASA in a live event at noon Wednesday, April 14.

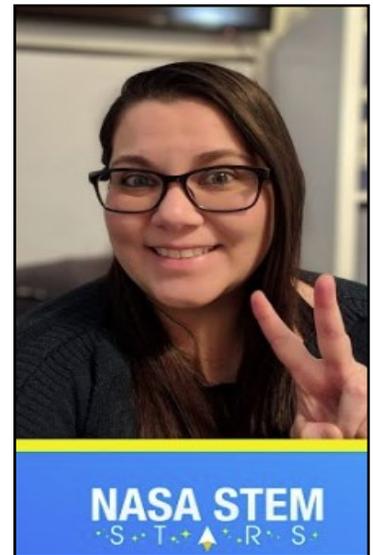
Lanctot is currently interning for NASA Armstrong Flight Center in California. Due to the pandemic, she is doing her internship online from home in Santa Fe. “It is a great experience; I love it!” Lanctot said. “They make you feel like you’re among family, and they are very supportive of student work/research. I have had an enjoyable experience during my internship, where I have learned a lot from the work I am doing in logistics and outside the agency. NASA has its own intern club, which helps to do networking and learn about many other areas.”

Lanctot is majoring in mechanical engineering with a minor in aerospace engineering. Her internship is for the spring semester and has accepted an internship with Los Alamos National Lab for the summer.

She has done several research projects with NMT faculty member Dr. Mostafa Hassanalian. Her wide range of research includes work on lunar dust mitigation for EVA suits; moon exploration robotics to assist Artemis Missions; autonomous drones for underground mines and for polar research; and drilling mechanisms for space and Earth ice sampling.

She has two published papers, one accepted for the AIAA Aviation Conference, and five more that are under review for the AIAA (American Institute of Aeronautics and Astronautics) and seven poster presentations.

“NASA STEM Stars” is a webchat series that connects students with subject matter experts to learn about STEM careers and ask questions about STEM topics.



STUDENT BRANCH CHAIR FEATURED ON TV

By Robert A. Malseed, Treasurer

The chairperson of the New Mexico Tech AIAA student branch, Ms. Savannah Bradley was featured on the Tamron Hall daytime talk show. She was there to promote hot air ballooning and New Mexico.

In 2016, at age 16, Savannah was the youngest pilot to fly in the International Balloon Fiesta.

This accomplishment is also mentioned in this month’s issue of New Mexico magazine. (page 16)

Here is the link to her interview.

<https://www.youtube.com/watch?app=desktop&v=iNAn-yhAGfk>



UNM STUDENT BRANCH ACTIVITY

By Jeremy Holder, Chairman – UNM Student Branch

On March 11, 2021 the UNM section of AIAA held a Model Rocket giveaway for student members. All officers were present, and we had four student members come by to pick up rockets. Of the four students three were current freshman and one was an incoming student still in high school. It was a great opportunity to showcase the groups focus to promote activity not just in an academic way but also a socially engaging way for future aerospace professionals. We will be planning a launch date soon for those students and officers to launch their rockets



FIRST HUMAN SPACE FLIGHT FROM NEW MEXICO

By Robert A. Malseed, Treasurer

Virgin Galactic on Saturday, 22 May, made its first rocket-powered flight from New Mexico to the fringe of space in a manned shuttle, as the company forges toward offering tourist flights to the edge of the Earth's atmosphere. Virgin Galactic announced that its VSS Unity shuttle accelerated to three times the speed of sound and reached an altitude of just over 55 miles (89 kilometers) above sea level before making its gliding return through the atmosphere.



CAREER ENHANCEMENT

By Andrea Loper, Career Enhancement Officer

May was Mental Health Month. As we continue to navigate the challenges of everyday life, we still have moments where anxiety, depression, relationships, isolation, or just a bad day stop us from having the quality of life we want for ourselves and others. Mental Health America has information and strategies to help you and your family members manage the common struggles that impact mental health and resilience. Check out the Mental Health America website <https://www.mhanational.org>, or, if connected with the Air Force, The Personal and Work Life Program (PW&L) offered through the Employee Assistance Program (www.afpc.af.mil/eap). Another resource from the Employee Assistance Program is this pamphlet:

["Understanding Your Teenagers Mental Health"](#).

Kirtland AFB also offers help through various base agencies whose contact information may be found in this Excel spreadsheet list of [Kirtland Helping Agency Contacts](#). Help is available with: Marriage/Family, Parenting, Relationships, Anger, Finances, Separation/Retirement, Work/Employment, Anxiety/Panic, Depression/Sadness, Deployment/Reunion, Grief/Death, Sexual Assault, School (Children), Workplace Bullying/Hostile Work Environment, Abuse/Neglect (Domestic), Alcohol/Drugs, Discrimination, Fitness/Nutrition, Volunteering, Homicidal Thoughts, Suicidal Thoughts, Medication, Mediation/Facilitation.

JOE SHOLTIS SPEAKS TO LA-LV SECTION

Overview and History of The Use of Nuclear Power Systems in Space

By Robert Malseed—Treasurer

Albuquerque section member, Joe Sholtis (Lt. Col., USAF, Ret.) spoke at a meeting of the Los Angeles—Las Vegas Section of AIAA on 22 May. He showed how nuclear power has been used on space craft to provide heat and electrical power, and may also be used for propulsion. The history of space nuclear power has included some accidents and malfunctions that illustrate the importance of addressing safety issues with each of the various nuclear systems. Dozens of space missions have used these systems. Notable missions include the Voyager spacecraft that have now traveled beyond the heliosphere into interstellar space. Within our solar system, The Cassini mission to Saturn and Titan, the New Horizons mission to Pluto and beyond, Mars Rovers, Mars Science Lab, Mars-2020, and numerous other programs have showcased the benefits of space nuclear power. Future missions possibly include returns to explore Earth’s moon, Saturn’s Titan, Neptune’s Triton, and other icy moons of our solar system, as well as a return to Mars.



Space Nuclear Power & Propulsion

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Presentation to AIAA Los Angeles – Las Vegas Section, 22 May 2021

PRESENTATION OVERVIEW

- **INTRODUCTION** - The History, Promise & Challenge of Space Nuclear Technology
- **HISTORICAL OVERVIEW OF U.S. & SOVIET / RUSSIAN SPACE NUCLEAR SYSTEMS**
 - U.S. RTGs, RHUs & Reactors Launched
 - U.S. Reactors Pursued for Space Power & Propulsion
 - Soviet / Russian Use of Space Nuclear Power Systems
- **FORMER & CURRENT/RECENT U.S. SPACE NUCLEAR SYSTEMS & MISSIONS**
 - Current U.S. Space Nuclear Systems
 - The GPHS-RTG & the Cassini Mission to Saturn & its Moons
 - Mars Exploration Rovers A & B, “Spirit” & “Opportunity” Rover Missions
 - New Horizons – Pluto, Pluto Flyby & Kuiper Belt Exploration Mission
 - Mars Science Laboratory (MSL) “Curiosity” Rover Mission
 - Mars-2020 “Perseverance” Rover Mission (July 2020 launch; Feb 2021 EDL)
- **PLANNED U.S. SPACE NUCLEAR SYSTEMS & FUTURE MISSIONS**
 - The NextGen RTG
 - A Dynamic Radioisotope Power System
 - The Kilopower Reactor Power System
 - Return to the Moon & Fission Surface Power
 - Dragonfly: An RTG-powered drone for exploration of Saturn’s Titan
 - The Trident Mission to Neptune’s Triton???
 - The Interstellar Probe Mission???
 - Onward to Mars & ??????

CASSINI: Mission to Saturn

Operations at Saturn

Video: Cassini’s 13 year mission at Saturn

Cassini’s Huygens probe gave us our first looks at Titan, and the Dragonfly, with its nuclear power could provide us a means to further explore its harsh environment.



SCHOLARSHIP AWARD WINNER

By Stephen Seiffert—Honors and Awards Officer

In recognition of Distinguished Academic Achievement

Congratulations to Brenden Herkenhoff, Mechanical Engineering student at the New Mexico Institute of Mining and Technology and member of our student branch there. Brenden has won our 2021 \$1,000 scholarship to use in his pursuit of advanced degrees at NM Tech.



NEW FREE AIAA HIGH SCHOOL MEMBERSHIP NEW

Our section currently has six members in the new High School Student grade.

MEMBERSHIP IS FREE AND INCLUDES:

- AIAA Mentor Match 
- STEM-focused webinars and on-demand content 
- Access to our exclusive Engage community platform 
- Online subscription to *Aerospace America* 
- Discounts to AIAA forums and events 

Go to aiaa.org/hs to sign up . Questions? Contact custserv@aiaa.org

UNM STUDY: SNEEZE GUARDS COULD MAKE FULL-CAPACITY AIRPLANES MUCH SAFER FROM COVID-19 SPREAD

By Robert Malseed—Treasurer

Section member, and member of our UNM Student Branch, Mohamed Abuhegazy was one of the researchers and authors of the study as was Dr. Svetlana V. Poroseva, the student branch advisor.

The ongoing COVID-19 pandemic has significantly reduced the number of people willing to fly due to safety concerns, and to ease fears, some airlines have opted to leave middle seats open to increase the amount of space for social distancing.

But the findings of a study led by researchers from The University of New Mexico and Imperial College London suggest that nonporous plastic shields (often called “sneeze guards”) installed between seats can prevent significant amounts of COVID-19 particles from being transmitted between passengers, thus allowing for fuller airplanes, and in turn, more revenue for airlines.

The study, “Simulation of aerosol transmission on a Boeing 737 airplane with intervention measures for COVID-19 mitigation,” was published March 16 in *Physics of Fluids*. Authors of the paper are Khaled Talaat of the UNM Department of Nuclear Engineering, Mohamed Abuhegazy of the UNM Department of Mechanical Engineering, Omar A. Mahfoze of the Department of Aeronautics at the Imperial College London, Osman Anderoglu, assistant professor of nuclear engineering at UNM, and Svetlana V. Poroseva, associate professor of mechanical engineering at UNM.

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The study looked specifically at the Boeing 737 cabin and its ventilation system and cannot automatically be generalized to other airplanes with different ventilation systems or other public spaces without further study, Abuhegazy said.

The study compared aerosol transmission in three situations: an airplane at full capacity, an airplane at reduced capacity (no middle seats) and an airplane at full capacity with sneeze guards between passengers. The team was able to conduct a series of simulations to model aerosol transport in a section of the cabin using particle sizes similar to those emitted during speech, breathing, and coughing.

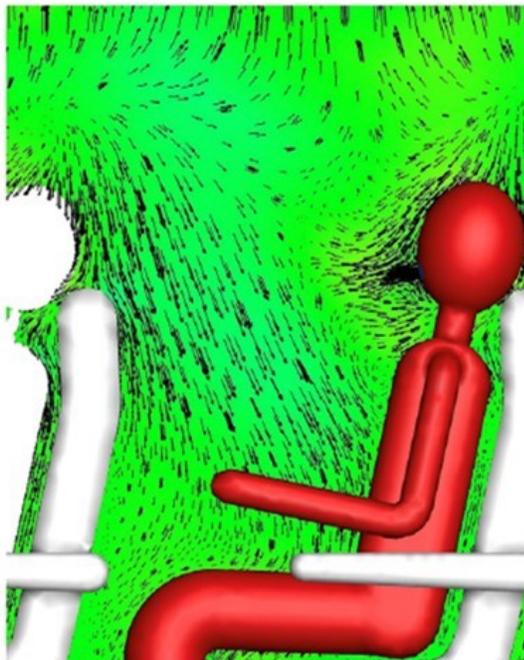
The researchers compared the velocity distribution of air through a section of the cabin, finding that there were substantial differences in the flow pattern after sneeze guards were installed. The shields essentially kept the airflow and the particles on the passenger who emitted them.

Based on the amount of aerosol transmission and inhalable particles present in the cabin, “The findings indicate that sneeze guards between passengers are about equally as effective as leaving middle seats vacant,” Abuhegazy said.

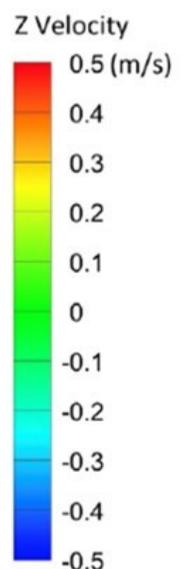
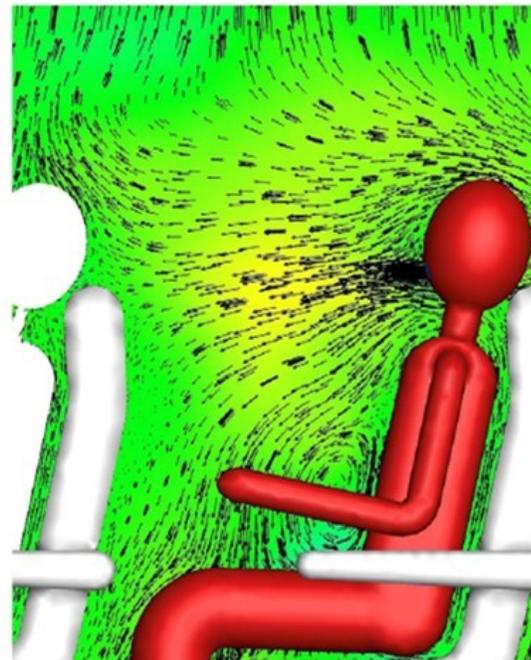
He said that in terms of economics, using sneeze guards in full-capacity flights may be more cost-effective than reducing passenger capacity through vacating middle seats, considering that the shields are reusable (sanitizing the shields after each flight was recommended, as was covering seats and disinfecting walls between flights). Another finding recommended that passengers be boarded in smaller groups, starting in the back, and waiting two to three minutes between groups, as the study found that aerosol particles were settled in that timeframe. The study did not look at the increased time for boarding needed for that to be implemented.

Computational fluid-particle dynamic simulations were employed to investigate aerosol transmission and intervention measures on a Boeing 737 cabin zone.

(a) No shields



(b) With shields



STUDENT MEMBERS WIN “NASA MINDS” AWARDS

By Mostafa Hassanalian—NM Tech Student Branch Advisor

New Mexico Tech, in partnership with Southwestern Indian Polytechnic Institute (SIPI), was part of the NASA MINDS competition with two teams and was competing with **35** other teams across the country. Here are the details of our teams and their impressive achievement:

Underclassman Teams

Team 1: Monitoring Miners: Monitoring Artemis's Water Extraction Pipelines against Corrosion and Abrasion by Lunar Dust for Extended Habitation

NMT Students: Mario Escarcega (team lead), Kimberley Kelso, Meghan Cephus, Nakii Tsosie, Raechelle Sandoval, Skyler Hughes

Advisor: Dr. Arvin Ebrahimkhanlou

The Monitoring Minors team received **2nd** place and an award of \$1,500 in the Underclassman category. The team was also recognized as 2nd place and 3rd places for their Technical Poster and Technical Paper, respectively.

Senior Teams

Team 2: Moon hoppers: Swarming of Jumping Lunar Robot

Students: (NMT): Brenden Herkenhoff (team lead), Sara Lanctot, Trent Bjorkman, Nathaniel Serda, (SIPI): Veronica Martinez, TiShai Yazzie, Teejay Johnson, Caresse Davis. It might be good to mention that two of the former SIPI students are currently NMT students.

Advisors: Dr. Mostafa Hassanalian (NMT) and Dr. Nader Vadiiee (SIPI)

The Moon Hopper team received **2nd place** and an award of \$2,500 in the senior category. The team also received **1st place** in the Systems Engineering Paper Award (\$500).

NASA's Minority University Research and Education Project (MUREP) Innovative New Designs for Space (MINDS) is a multi-semester undergraduate level activity that supports NASA's Artemis mission and Human Exploration and Operations Mission Directorate. Please join us in congratulating the students on a job well done.



APR, MAY, JUN IN AIR & SPACE HISTORY***APRIL 2021*****75 Years Ago - 1946**

April 16: First German V-2 rocket launched in the U.S. reached an altitude of five miles. White Sands Proving Grounds (WSPG), NM.

70 Years Ago - 1951

April 18: First Aerobee rocket launched with a biomedical experiment. Holloman AFB, NM.

60 Years Ago - 1961

April 12: Vostok 1, Yuri Gagarin launched, 0600 UTC, Baikonur, USSR. First human in orbit.

April 25: Mercury Atlas 3 launched, capsule test, first stage failure, abort successful, 11:15 a.m. EST, Cape Canaveral, Fla.

April 27: Explorer 11 (S 15) launched by a Juno, 9:17 a.m., EST, Cape Canaveral, Fla. April 28: Little Joe 5B launched. Suborbital Mercury capsule test. 9:04 a.m., WFF, VA.

55 Years Ago: 1966

April 7: Atlas Centaur 8 launched, containing Surveyor mass model, 8:00 p.m., EST, Cape Canaveral, Fla.

April 8: OAO 1 launched by Atlas Agena, satellite lost after two days due to spacecraft systems failure. 2:35 p.m., EST, Cape Canaveral, Fla.

April 23: First Saturn 5 is tested at Mississippi Test Facility.

50 Years Ago - 1971

April 19: Salyut 1 launched By Proton K from Baikonur. First launch of an orbital scientific station.

April 24: San Marco 3 launched by Scout, 2:32 a.m., EDT, San Marco Platform, Kenya. April 27: James C. Fletcher took office as the fourth NASA Administrator.

45 Years Ago - 1976

April 17: Closest Ever Flyby of the Sun by Spacecraft (Helios 2).

April 22: NATO III A launched by Delta, 2046 UTC, Cape Canaveral, Fla.

40 Years Ago - 1981

April 12: STS-1 (Space Shuttle *Columbia*) launched, 7:00 a.m., EST, KSC. Crew: John W. Young and Robert L. Crippen. First flight of Space Shuttle *Columbia*, and first flight of new Space Transportation System. Landed April 14 at 10:21 a.m., PST, Edwards AFB, CA. Mission Duration: 2 days, 6 hours, 20 minutes.

35 Years Ago - 1986

April 18: Titan 34D exploded shortly after lift-off from Vandenberg AFB. Crippled U.S. launch and surveillance capability.

30 Years Ago - 1991

April 5: STS-37 (Space Shuttle *Atlantis*) launched, 9:22 a.m.. EST. KSC. Crew: Steven R. Nagel. Kenneth D. Cameron. Linda M. Godwin, Jerry L. Ross and Jerome "Jay" Apt. After launch of Gamma Ray Observatory (later named Compton Gamma Ray Ob-

(Continued on page 17)

APR, MAY, JUN IN AIR & SPACE HISTORY

(Continued from page 16)

servatory) on the 7th, the Shuttle landed at Edwards AFB, CA, April 11, at 9:55 a.m., EST. Mission Duration: 6 days, 32 minutes.

April 28: STS-39 (Space Shuttle *Discovery*) launched, 7:33 a.m., EDT. KSC. Crew: Michael L. Coats, L. Blaine Hammond, Guion S. Bluford, Gregory S. Harbaugh, Richard J. Hieb, Donald R. McMonagle, and Charles Lacy Veach. DoD Mission AFP-675 launched into orbit May 1. Landed at KSC, May 6, 2:55 p.m. EDT. Mission duration: 8 days, 7 hours and 22 minutes.

April 28: USA-70 deployed from Space Shuttle *Discovery*.

20 Years Ago – 2001

April 7: Mars Odyssey, an orbiter designed to map and search for water on Mars, was launched by a Delta 2 rocket from Cape Canaveral at 15:02 UTC on 7 April 2001. It reached Mars on October 23, 7:30 pm PDT at 10:30 EDT.

April 28: The Russian Soyuz-TM 32 launched from Baikonur by a Soyuz-U rocket at 07:37 UTC, carrying Talgat A. Musabayev and Yuri M. Baturin. This mission also carried the first commercial space tourist, U.S. businessman Dennis Tito. Launch of the first “taxi” flight to the ISS (6A), bringing a “fresh” Soyuz crew return vehicle for the ISS crew.

April 19: STS-100 (Space Shuttle *Endeavour*) launched 2:40 p.m. EDT from KSC. Crew: Kent V. Rominger, Jeffrey S. Ashby, Chris A. Hadfield, Scott E. Parazynski, John L. Phillips, Umberto Guidoni (Italy), and Yuri V. Lonchakov (Russia). Mission to install Canadarm-2 on the ISS, and to transport an Italian cargo container, Raffaello. Landing May 1, 2001 at 12:10 p.m. EDT. Mission duration: 11 days, 21 hours, 30 minutes.

15 Years Ago – 2006

April 28: The two meteorological satellites CloudSat and CALIPSO (Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation) were launched by a Delta 2 rocket from Vandenberg AFB at 6:02 a.m. EDT. They work in concert with the three earlier satellites (Aqua, PARASOL, and Aura), all forming what is named as A-Train. All five have almost the same orbit, crossing the equator within 15 minutes of each other.

10 Years Ago – 2011

April 4: The Russian Soyuz-TMA 21 launched from Baikonur at 22:18 UT by a Soyuz launch vehicle. The Soyuz-TMA 21 spacecraft carried a crew of three and docked with the International Space Station (ISS) *Poisk* module on April 6 at 23:09 UT. Crew: Alexander Samokutyaev, Andrey Borisenko, and American astronaut Ron Garan. It was dedicated to the the 50th anniversary of Yuri Gagarin’s first manned space mission.

MAY 2021

140 Years Ago – 1881

May 11: Theodore von Kármán born in Budapest, Hungary.

70 Years Ago – 1951

May 14: The Air Force Missile Test Center established at Cape Canaveral, Fla.

60 Years Ago – 1961

May 5: Freedom 7, astronaut Alan B. Shepard Jr., first U.S. suborbital flight, 9:34 a.m., EST. Eastern Space Missile Center. FL, launched atop a Redstone IRBM.

May 25: President John F. Kennedy sets Apollo lunar landing and return goal within the decade, in a speech to Congress, Washington, D.C.

55 Years Ago – 1966

May 15: Nimbus 2 launched by Thor Agena, 3:55 a.m., EDT, Vandenberg AFB, CA.

(Continued on page 18)

APR, MAY, JUN IN AIR & SPACE HISTORY

(Continued from page 17)

May 25: Atmosphere Explorer B (AE-B) or Explorer 32 launched. Upper atmospheric experiments, 9:00 EST, Cape Canaveral, Fla.

50 Years Ago – 1971

May 19: Mars 2 launched, by Proton-K, 1616 UTC. Baikonur, USSR, first Mars impact.

May 28: Mars 3 launched, 1522 UTC, Baikonur, USSR. First Mars soft landing.

May 30: Mariner 9 launched by Atlas Centaur. First spacecraft to orbit Mars, lifted off at 6:23 p.m., EDT, Cape Canaveral, Fla.

45 Years Ago – 1976

May 4: Lageos launched by Delta. 7:00 a.m., PDT, Cape Canaveral, Fla.

May 13: Comstar 1A launched by Atlas Centaur, 6:28 p.m., EDT. Cape Canaveral, Fla.

40 Years Ago – 1981

May 22: The second geostationary weather satellite, GOES 5 launched by Delta, 6:29 p.m., EDT, Cape Canaveral, Fla. This satellite continuously monitored the temperature, clouds and moisture levels in the atmosphere until it was deactivated in the summer of 1990.

May 23: Intelsat 5B F-1 launched, 6:42 p.m., EDT, Cape Canaveral, Fla.

35 Years Ago – 1986

May: [“Pioneering the Space Frontier: The Report of the National Commission on Space”](#) (commonly called the NCOS or “Paine Report”) released.

May 12: James C. Fletcher takes office as seventh NASA Administrator, his second term in the office.

30 Years Ago – 1991

May 3: [“America at the Threshold: America's Space Exploration Initiative”](#), commonly known as the “Stafford Report” or “Synthesis Group”, released.

May 14: NOAA 12 launched by Atlas E, 11:52 a.m., EDT, Vandenberg AFB, CA.

May 18: Soyuz TM-12 launched from Baikonur on May 18, 1991, by the U.S.S.R and docked with the MIR space station. On board were two Soviet crewmen: Anatoli P. Artsebarsky and Sergei K. Krikalev; and one British astronaut, Helen P. Sharman, who was the first UK citizen to fly in space.

25 Years Ago – 1996

May 19: STS-77 (Space Shuttle *Endeavour*) launched at 6:30 a.m. EDT, KSC. Crew: John H. Casper, Curtis L. Brown, Daniel W. Bursch, Mario Runco, Jr., Marc Garneau (Canada), and Andrew S. W. Thomas. Released an inflatable antenna, IAE, a platform called Spartan 207, and an experimental 35 kg. minispacecraft, PAMS-STU deployed on flight day 4. Landed May 29 at 7:09 a.m., EDT, KSC. Mission Duration: 10 days and 40 minutes.

20 Years Ago – 2001

May 8: XM 1, also known as Roll, a geosynchronous relay satellite designed to provide one hundred channels of digital music and entertainment to motorists in North America, was launched by a Zenit rocket from a floating platform, Odyssey on the equatorial Pacific ocean operated by the Sea Launch consortium at 6:10 am EDT. (XM 2, also known as Rock, was launched in March 2001.)

(Continued on page 19)

APR, MAY, JUN IN AIR & SPACE HISTORY

(Continued from page 18)

May 25: Galileo probe, Callisto flyby.

15 Years Ago – 2006

May 24: GOES 13, a (NOAA) geostationary weather satellite, launched by a Delta 4 rocket from Cape Canaveral at 6:11 pm EDT.

10 Years Ago – 2011

May 16: STS 134 (Space Shuttle *Endeavour*) launched 8:56 am, EDT, KSC. Crew: Mark Kelly, Gregory H. Johnson, Michael Fincke, Greg Chamitoff, Andrew Feustel and European Space Agency's Roberto Vittori. Delivered the Alpha Magnetic Spectrometer (AMS) and spare parts. Shuttle *Endeavour* docked with the International Space Station's (ISS) *Harmony* module on May 18. Landed June 1, at 2:34 a.m. EDT, KSC. Mission Duration: 16 days. This was the the 25th and final flight for *Endeavour*.

JUNE 2021**75 Years Ago – 1946**

June 28: First fully instrumented upper air research V-2 launched, reached height of 67 miles. White Sands Proving Grounds, NM.

65 Years Ago – 1956

June 29: Aerobee Hi NRL-50, a sounding rocket with ionosphere research instruments, was launched by the U.S. Naval Research Laboratory at White Sands Missile Range, N.M.

60 Years Ago – 1961

June 30: Meteoroid Satellite A or Explorer S55 launched by Scout, failed to orbit, 1:09 p.m.. EDT, Wallops Flight Center, VA.

55 Years Ago – 1966

June 2: Surveyor 1 landed on the moon, first US spacecraft to do so. Launched by Atlas Centaur, May 30, 9:41 a.m., EST, Cape Canaveral, Fla.

June 3: Gemini 9 (Gemini Titan 9A) launched, astronauts Thomas P. Stafford and Eugene A. Cernan. 8:39 a.m., EST, Cape Canaveral, Fla.

June 6: OGO 3 launched by Atlas Agena, 10:48 p.m., EDT, Vandenberg AFB, CA. June 23: Pageos launched by Thor Agena, 8:12 p.m., EDT, Vandenberg AFB, CA.

50 Years Ago – 1971

June 4: Last flight of the X-24A, Dryden Flight Research Facility, CA. Pilot John A. Manke.

June 6: Soyuz 11 launched, 0455 UTC, Baikonur, USSR. First crew to the Salyut 1 space station and to work on a space station. Crew composed of Georgi T. Dobrovolskiy, Vladislav N. Volkov and Viktor I. Patseyev. They died during reentry, June 30.

June 20: Planetary Atmosphere Experiment Test (PAET) launched, 3:31 p.m., EDT, on Scout launch vehicle, Wallops Flight Center, VA. Ames Research Center used this 137-pound (62.1-kilogram) spacecraft, to study spacecraft heating and entry into Earth's atmosphere.

45 Years Ago – 1976

June 9: Marisat 2 launched by Delta, 8:09 p.m., EDT, Cape Canaveral, Fla.

(Continued on page 20)

APR, MAY, JUN IN AIR & SPACE HISTORY

(Continued from page 19)

June 18: Gravity Probe A launched by Scout, 7:41 a.m., EDT, Wallops Flight Center, VA.

June 19: The Viking 1 orbiter arrived in Mars orbit. The primary mission objectives were to obtain high resolution images of the Martian surface, characterize the structure and composition of the atmosphere and surface, and search for evidence of life.

June 22: Salyut 5 (USSR Space Station) launched by Proton K from Baikonur at 18:04:00 UTC.

40 Years Ago – 1981

June 8: Molniya 3-16 launched at 03:33:00 UTC by Modified SS-6 (Sapwood) or Molniya from Plesetsk, for long-range telephone and telegraph radio communications and transmission of television programs in the USSR. It replaced the Molniya 3-14.

35 Years Ago – 1986

June 6: [“Report of the Presidential Commission on the Space Shuttle Challenger Accident” \(commonly called the Rogers Commission Report\) released.](#)

30 Years Ago – 1991

June 5: STS-40 (Space Shuttle *Columbia*). Launched at 9:25 a.m., EDT, KSC. Crew: Bryan D. O'Connor, Sidney M. Gutierrez, M. Rhea Seddon, James Bagian, Tamara Jernigan, F. Andrew Gaffney, and Millie Hughes-Fulford. Spacelab (SLS-1) in cargo bay. Landed June 14 at 8:39 a.m. PDT, at Edwards Air Force Base, CA. Mission Duration: 9 days, 2 hours, and 14 minutes.

25 Years Ago – 1996

June 20: STS-78 (Space Shuttle *Columbia*) launched at 10:49 a.m. EDT, KSC. Crew: Terence T. Henricks, Kevin R. Kregel, Susan J. Helms, Richard M. Linnehan, Charles E. Brady, Jr., Jean-Jacques Favier (France), and Robert Brent Thirsk (Canada). Carried Spacelab (LMS-1). Landed July 7 at 8:37 a.m., EDT, at KSC. Mission Duration: 16 days, 21 hours, and 48 minutes.

June 27: Galileo probe, Ganymede flyby.

20 Years Ago – 2001

June 30: MAP (Microwave Anisotropy Probe), an NASA Explorer mission measuring the temperature of the cosmic background radiation (the remnant heat from the Big Bang), was launched by a Delta 2 rocket from Cape Canaveral at 3:46 EDT.

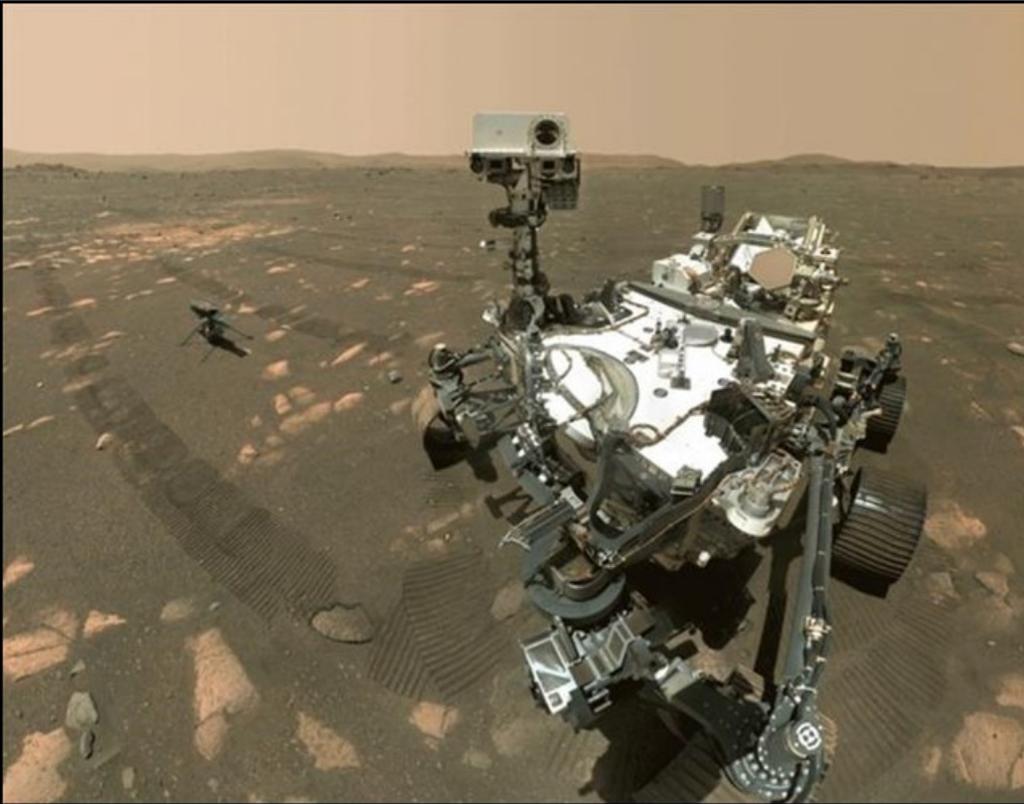
15 Years Ago – 2006

June 30: NASA announces name of the Crew Launch Vehicle, Ares 1 and heavy-lift cargo booster, Ares 5.

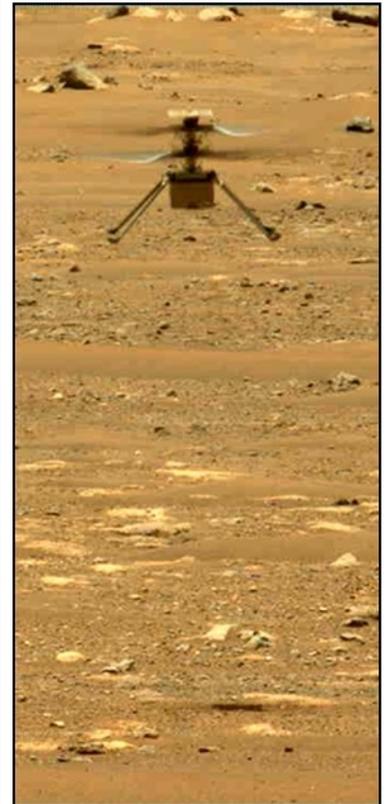
10 Years Ago – 2011

June 7: The Russian Soyuz-TMA 2M was launched from Baikonur at 20:12 UT by a Soyuz launch vehicle carrying Expedition 28's Mike Fossum, Sergei Volkov and Japanese astronaut Satoshi Furukawa to the ISS.

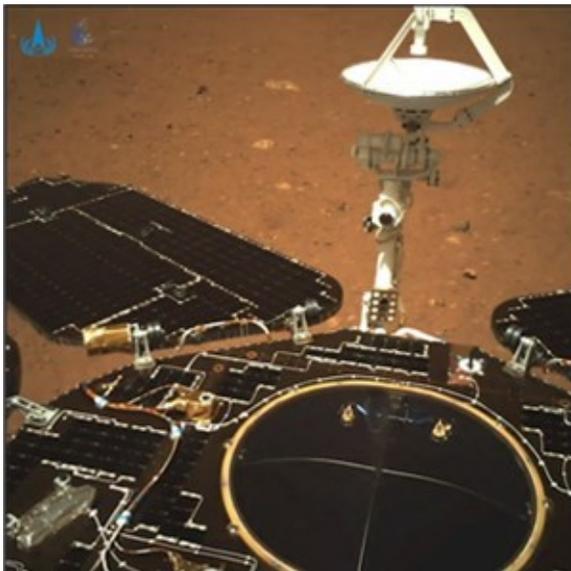
IMAGES OF THE QUARTER (FROM MARS)



Perseverance rover and Ingenuity helicopter



Ingenuity in flight on Mars.



Photos from China's Zhurong rover..

PARTING THOUGHTS

“If I have seen further it is by standing on the shoulders of Giants.”

- Isaac Newton

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