AIAA ALBUQUERQUE

MARCH 2022

SHAPING THE FUTURE OF AEROSPACE

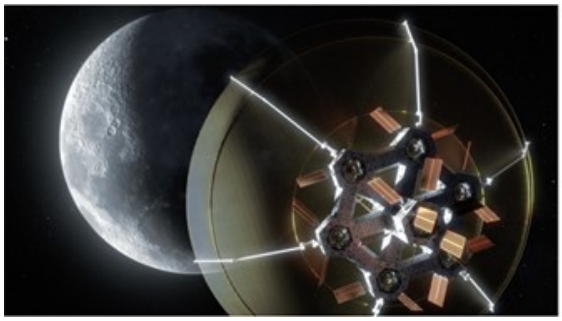
THE FLIGHT PLAN

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

MARCH 2022 SECTION MEETING:

State of the Space Industrial Base

Presenter ; *Dr. Thomas Cooley, Air Force Research Laboratory*



Abstract: The US space industrial base is tactically strong but strategically fragile. While the pace of innovation and investment in the US is at an all-time high, participants cautioned that this will not be sustained without strategic direction, robust adoption of commercial space capabilities expressed in meaningful contract opportunities, strategic workforce development, attention to fragile domestic supply lines, and addressing the anemic funding to prototype, validate and accelerate the adoption of innovative and disruptive space capabilities for national security. This talk will discuss key findings captured in the recently released State of the Space Industrial Base report

Speaker Bio: Dr. Thomas Cooley, a member of the scientific and technical cadre of senior executives, is the Chief Scientist, Space Vehicles Directorate, Air Force Research Laboratory, Air Force Materiel Command, Kirtland Air Force Base, New Mexico. As Chief Scientist, Dr. Cooley is responsible for the technical quality of ~$200 million annual Space & Air Force space science-and-technology investment. Additionally, Dr. Cooley coordinates these space investments with other government agencies, industry internal research, academia and international partners to develop cooperatively and to avoid duplication of effort and/or gaps. Currently, he is performing the duties of the Senior Technical Advisor to AFWERX ensuring SBIR and STTR funds are well integrated with the S&T effort from the Department of the Air Force.

When: Mar 17 2022 (Thursday) 5:45 – 6:00 Virtual meet and greet

Where: On-line via Zoom 6:00 ~ 7:00 Presentation & Discussion

Join Zoom Meeting

https://aiaa.zoom.us/j/92043450022

Meeting ID: 920 4345 0022

Click Here to RSVP

https://docs.google.com/forms/d/1T8z2aAe_WIRsqoNVZI2iKleXjwtDPPE07VXuluNhhCM/viewform

INSIDE THIS ISSUE:

CALENDAR

Local Section Events

Next General meeting 17 March 2022

Virtual Meeting Via Zoom

Meet & Greet 5:45 pm
Presentation Start 6:00 pm
Presentation End 7:00 pm

21 April - Larry Crumpler
First 200 days on Mars with Perseverance and Ingenuity

19 May—Vanessa Aubuchon
The Next Aeronautics Revolution

National AIAA Events

Congressional Visits Day 2022
14 MARCH - 18 MARCH 2022
Virtual

2022 Region IV Student Conference
1 APRIL - 2 APRIL 2022
San Antonio, Texas, USA

2022 AIAA Defense and Security Forum (AIAA DEFENSE Forum)
19 APRIL - 21 APRIL 2022
Laurel, Maryland, USA

2022 Aerospace Spotlight Awards Gala
27 APRIL 2022 1800 - 2200 (EASTERN DAYLIGHT TIME)
Washington, DC, USA

ASCENDxTexas: Accelerating the Business of Space Exploration
27 APRIL - 28 APRIL 2022
Houston, TX

Upcoming U.S. Launches

Early 2022 Falcon Heavy • USSF 44
Early 2022 Starship • Orbital Test Flight
Mar Falcon 9 • Starlink 4-12
Mar 30 Falcon 9 • Axiom Mission 1
Apr Falcon 9 • Transporter 4
Apr Atlas 5 • USSF 12
Apr 15 Falcon 9 • Crew 4
May 1 Falcon 9 • SpaceX CRS 25
NET Apr 12 SLS • Artemis 1
2nd Qtr Falcon Heavy • USSF 52
NET May 15 Falcon 9 • WorldView Legion 1&2
Mar 1 Atlas 5 • CST-100 Starliner Orbital Flight Test 2

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!

YOUNG PROFESSIONALS SPOTLIGHT

By Kyle Lynch, Young Professionals

In each issue of the Albuquerque section newsletter, we spotlight a young professional in the section and get their perspective on their career and the future of aerospace.

Ashley Saltzman

Briefly describe your present position and role.

I have been working as a postdoctoral researcher at Sandia National Labs for the past year. I am currently focused on developing laser diagnostics for use in hypersonic flows and explosive environments.

What has your career path looked like so far? Tell us about your education and career search. Do you have a long-term career goal?

I went to NC State University for my B.S. in mechanical engineering. I had a number of positive research experiences during my time there, including undergraduate research and internships at Sandia and NASA Langley. I really enjoyed these experiences, studying solid mechanics of biomaterials and aerospace structures, which motivated me to pursue research as a career. In my PhD at Virginia Tech, I got more involved in aerospace and fluids work, focusing on laser diagnostics motivated by supersonic jet noise reduction. I formed a lot of connections at VT, which led to my current position at Sandia. While I would like to stay technical for the foreseeable future, I would eventually like to work in more of a policy-centric or systems engineering role.

Continuous learning and education is an integral part of modern engineering and science. What are you striving to learn this year?

Interdisciplinary skills and knowledge are really important for team collaboration, so I'd like to learn more about a variety of topics outside my research focus, such as system integration, and large-scale testing.

What aerospace technology are you most excited about or think may have the biggest transformative impact in the next 10 or 20 years?

Widespread drone delivery systems seem like an achievable target for the next 20 years. I first experienced drone delivery with Wing (Alphabet) near Virginia Tech, and the novelty and convenience was pretty unreal (and useful during a pandemic!). Those qualities, along with the potential for rapid medicine and equipment delivery, are pretty easy to get excited about.

Interested in sharing your story or know someone who would? Let us know! Reach out to Kyle Lynch (klynch@sandia.gov) for future spotlights.

HONORS AND AWARDS NEWS OF SECTION MEMBERS

By Stephen Seiffert—Honors and Awards Officer

Call For Scholarship Applications 2022

A call for university students to apply for the Albuquerque AIAA Section's established annual scholarship is announced; this year's value is $1500, to be awarded in May of 2022. Undergraduates or graduate students enrolled in the University of NM, the NM Institute of Mining and Technology, NM Highlands University, and Northern NM College are eligible for application.

The **application deadline is April 10.** A winner announcement will be posted on or about **May 1** and presentation of the award is at the annual **AIAA Awards Banquet** held in **mid-May** in Albuquerque.

Undergraduate applicants must have completed at least 60 hours in a degree-granting curriculum by the end of the semester of application to apply. Graduate students must be admitted to a degree program to apply.

Note to students from applicable schools: The announcement, application and referencing instructions, including deadlines, and application forms are posted on the **UNM School of Engineering website**: www.soe.unm.edu/scholarship/.

Reminder: Send Application Forms 2022 to the AIAA Albuquerque Section for processing to the AIAA Honors & Awards Committee Chair at: seiffert@flash.net , with alternate surface-routed mailings, as applicable, to:

AIAA Albuquerque Section
P.O. Box 20818
Albuquerque, NM 87154-0818

Points of contact regarding the scholarship include:

UNM: Daniel Banuti dbanuti@unm.edu
NMT: Dr. Mostafa Hassanalien mostafa.hassanalian@nmt.edu

Congratulations to these new AIAA Fellows

Lawrence Robertson US Air Force Research Lab

For outstanding technical achievement and leadership in support of the U.S. national security mission and service to the AIAA Guidance, Navigation, and Control community.

Walter Rutledge CENTRA Technology, Inc.

For sustained and diverse contributions to the aeronautics and flight test communities enabling our nation to field land-and sea-based intermediate range hypersonic weapons.

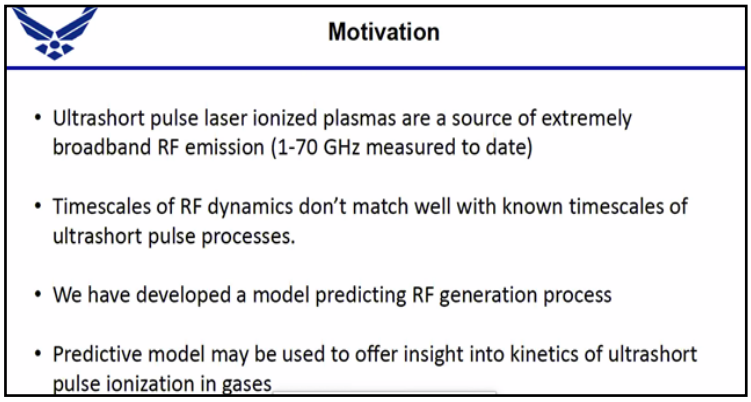
JANUARY MEETING

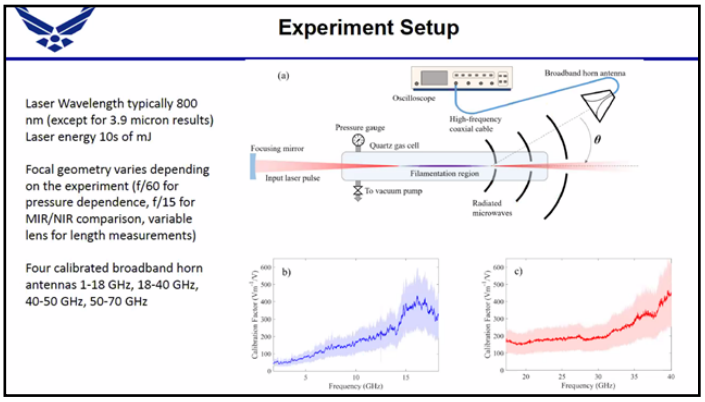
Robert Malseed, Treasurer

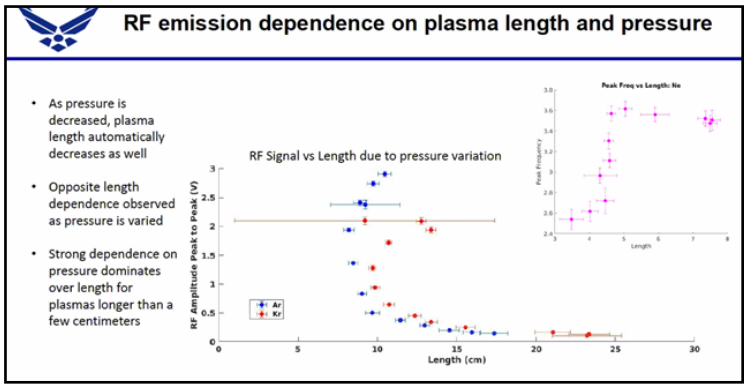
Decade spanning radiofrequency emission from ultrashort laser generated plasmas

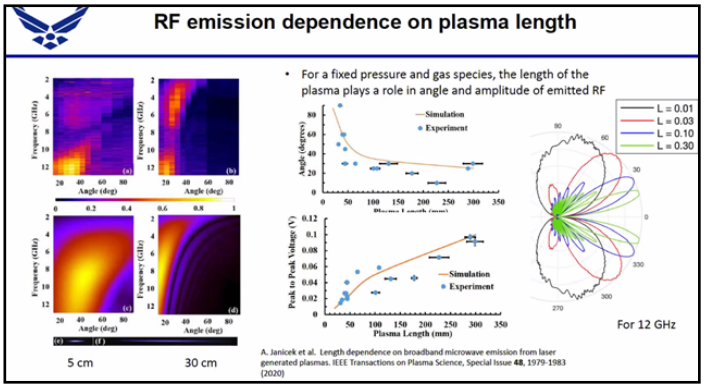
Dr. Jennifer Elle, Air For Research Laboratory – Directed Energy

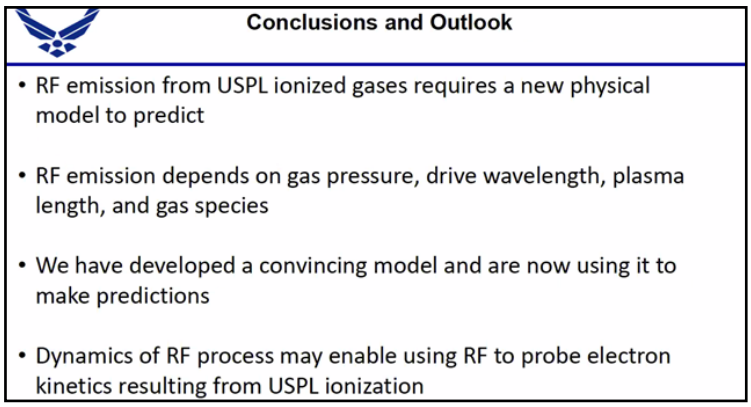
The unique electron distribution, timescales and geometry of ultrashort pulse laser generated plasmas are a novel source of radio-frequency electromagnetic emission, with a bandwidth larger than 70 GHz. To identify the emission mechanism, we characterize the RF signal for a wide variety of experimental conditions. Dr. Jennifer Elle is a research physicist within the Directed Energy Directorate at the Air Force Research Laboratory, Kirtland AFB, Albuquerque NM. She received her B.S. in Physics from University of Idaho in 2007 and her Ph.D. in physics from the University of Maryland, College Park in 2015. She specializes in optical diagnostics for ultrashort pulse laser matter interactions in gases and solids and plasma dynamics due to laser ionization of gases, and is currently the PI for the directorate's ultrashort pulse laser program. *Here are a few of her 3 dozen slides:*











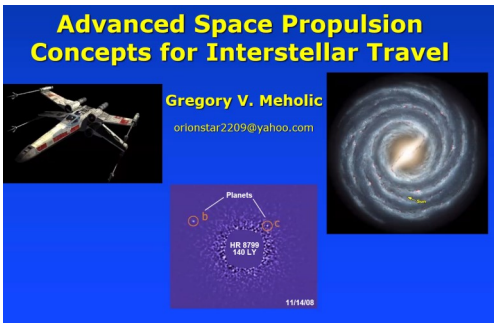
FEBRUARY MEETING

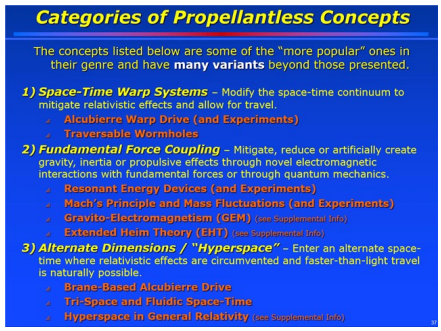
Robert Malseed, Treasurer

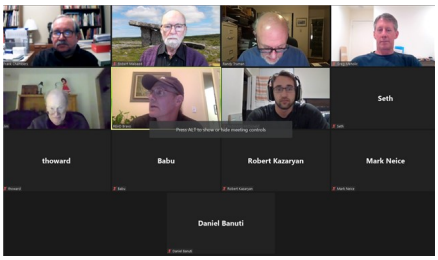
Advanced Space Propulsion Concepts for Interstellar Travel

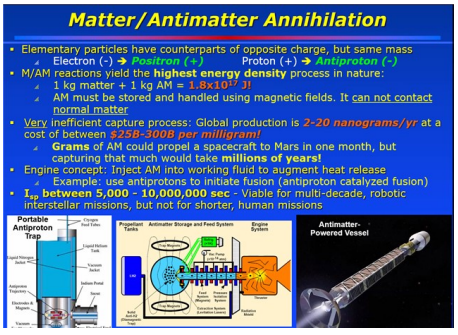
Mr Gregory Meholic, The Aerospace Corporation

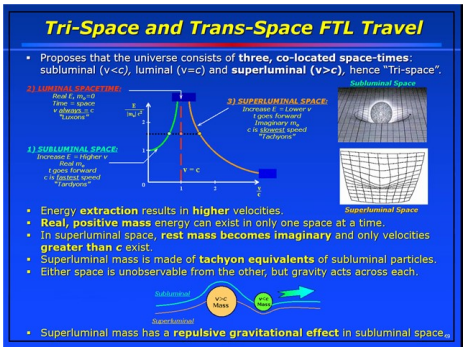
The presentation examined just a few of the compelling reasons why humans should explore the heavens. The talk centered around the key technology required to make such missions possible—propulsion. A brief discussion was given on the state of the art of in-space chemical propulsion systems to develop a foundation of where engine technology is today. The talk then took an evolutionary approach by exploring some of the more advanced engine systems intended for long-range solar system exploration, such as nuclear engines, antimatter engines, and interstellar ramjets, which define the capability limits of chemical propulsion. After comparing the predicted performance of these advanced concepts to the requirements for interstellar journeys, the focus then shifted to describe a new paradigm of "propellantless" propulsion schemes that have their basis in modern theoretical physics and cosmology. If found attainable, concepts such as space-time manipulation, faster-than-light (FTL) travel, wormholes, quantum drives, and so on, may provide the only viable propulsion options to enable reasonable trip times to distant stars. To show that these ideas are not merely the dreams of science fiction, brief descriptions were given on the latest, global, experimental efforts to explore the fundamentals behind some of these intriguing concepts. The talk ended with some inspiring conclusions and hopefully instilled the belief that mankind will someday move beyond the bounds of our solar neighborhood.

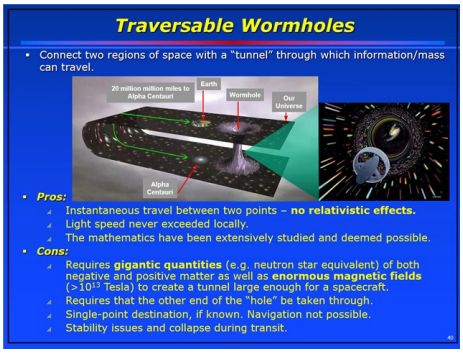


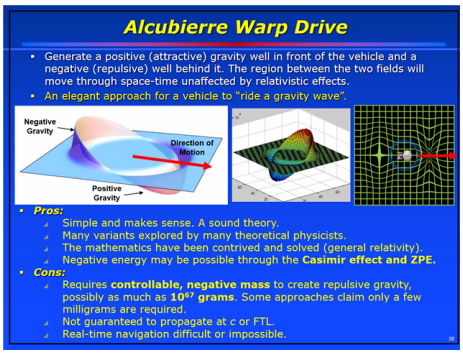


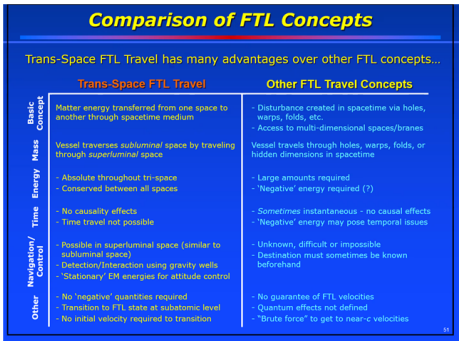


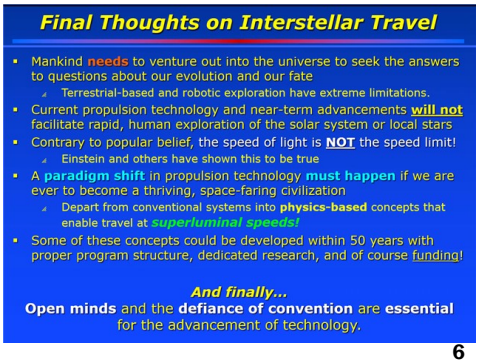










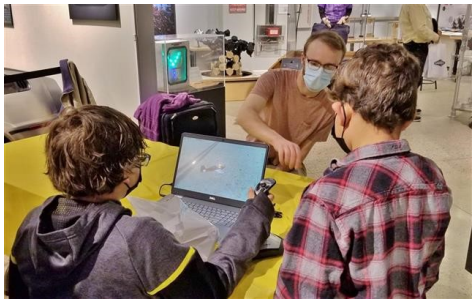


ALBUQUERQUE SECTION AT NUCLEAR MUSEUM STEAM EVENT

By Robert Malseed, Treasurer

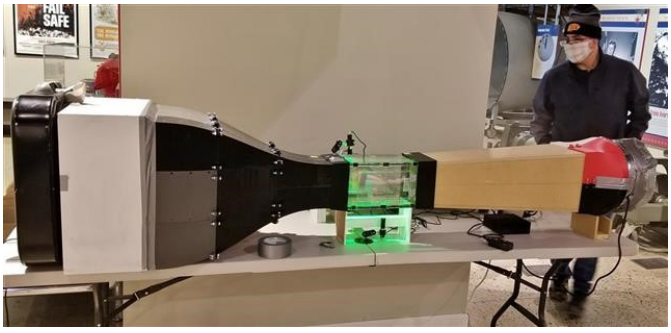
On 12 February several Albuquerque Section members went the National Museum of Nuclear Science and History for the annual "Discovery STEAM Day." Many families attended the event. The event teaches kids about **S**cience, **T**echnology, **E**ngineering, **A**rt, and **M**ath while giving them hands-on activities to enjoy. We took our DreamFlyer motion-based flight simulator, our low speed wind tunnel, our desk top flight simulator, as well as air-to-air missile guidance components, and videos relating to astronautics.

DreamFlyer



Desktop Simulator

Missile Guidance



Wind Tunnel

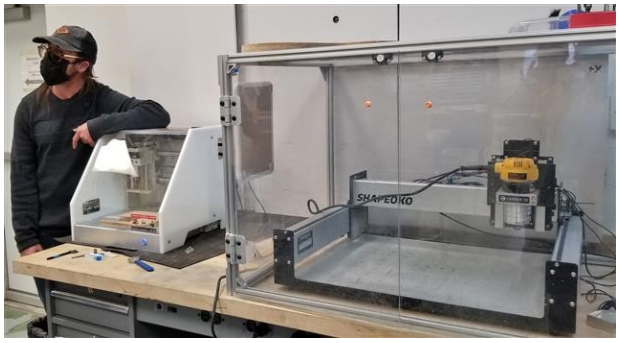
SECTION MEMBERS VISIT AFRL MAKER HUB

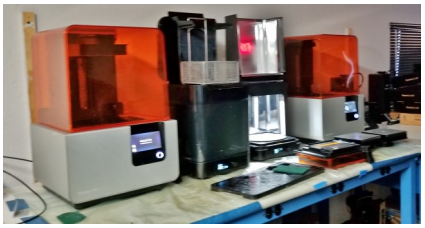
By Robert Malseed, Treasurer

On 10 February several members of the Albuquerque Section visited the Air Force Research Labs Maker Hub. The facility has a variety of equipment available for use.

3D printers—both Fused Deposition Modeling and Stereolithography printers.

Laser Cutter / Engraver, Wood and metal lathes, CNC Router, Poster Printer, And More…





AFRL MAKER HUB ALBUQUERQUE IS OPEN TO ANYONE WITH BASE ACCESS. THEY PROVIDE BASIC OPERATIONS AND SAFETY TRAINING COURSES ON MAKERSPACE EQUIPMENT. THEY PROVIDE A COLLABORATIVE SPACE FOR LEARNING AND ITERATIVE DESIGN. PLEASE, FEEL FREE TO STOP IN FOR MORE INFORMATION AND A TOUR.

2022 SCIENCE FAIR AIAA AWARD JUDGES NEEDED

By Robert Malseed, Treasurer

2 Central New Mexico
0 STEM Research Challenge
2 2

March 24 - 25, 2022
EXPO New Mexico
Manuel Lujan Building

Our in-person participation will be on the **24th** and **25th**. On the 24th we will interview Junior Division students. On the 25th we will interview Senior Division, and ,if necessary, Elementary Division students.

This year the STEM Research Challenge is a hybrid affair. Judges may look at the project presentations on-line in the Virtual Showcase beginning on 14 March. This will help us to decide whom we should interview on the 24th and 25th.

Virtual Showcase link: https://tinyurl.com/yp4h9y7p

Enter this Key: **CNMSRC2022**

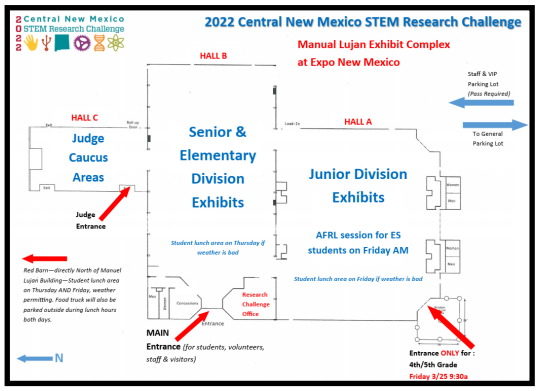
Our section will choose four individual projects (usually 2 junior and 2 senior) for our annual awards. The winners will each receive a certificate and $150 check, and a High School membership in AIAA.

DATES: **Thursday, March 24** ~ Junior Division **&** **Friday, March 25** ~ Elementary & Senior Divisions (below schedule will repeat both days)

PLACE: Manuel Lujan Exhibit Complex at Expo NM (check in ~ Hall C)

SCHEDULE:		
	12 noon - 12:30 pm	Check in – Packet pick-up; **refreshments available!**
	12:00 pm - 1:15 pm	Review of projects without exhibitors
	1:30 pm - 3:15 pm	Interview exhibitors
	1:30 pm - 3:30 pm	Selection of award winners and submission of results

If you can help with the judging, please contact Treasurer, Robert Malseed, (Robert@malseed.com) for details to include Fair Ground maps and exhibit Hall maps.



2022 REGION IV STUDENT CONFERENCE

By Tito Silva—Education Officer

ATTENTION: Seeking Judges to Evaluate Student Work

Venue: UT San Antonio, TX
Dates: 04/01/2022 to 04/02/2022

Seeking Technical and Oral Judges

Position Descriptions:

Technical Judge: Reads and scores papers in advance of the oral presentation portion of the conference.

Time commitment: 45m to 1h per paper

Review Period: 03/08/2022 to 03/25/2022

Oral Judge: Scores and evaluates student paper presentations in person at the conference.

Time Commitment: 30m per presentation 2 full days

You will be provided a rubric and instructions.

Just show up prepared to read papers or score presentations.

Please only sign up for one portion of the judging program.

Click Here to sign up to read papers

Contact Tito Silva at **hrsilva@sandia.gov** if interested in oral evaluations

NM TECH STUDENT MEMBER TO PARTICIPATE IN THE CALTECH SPACE CHALLENGE 2022

By Robert Malseed, Treasurer

Mariah Gammill is a graduate student supervised by Dr. Mostafa Hassanalian at New Mexico Tech who is researching the possibility of utilizing natural energy harvesting mechanisms on Saturn's moon, Titan, for a fixed-wing drone mission. In particular, she is looking at harvesting wind and thermal gradients on Titan to perform dynamic and thermal soaring. Mariah has collaborated on multiple research projects with other graduate and undergraduate students during her time at New Mexico Tech on topics such as: energy harvesting for a drone monitoring solar farms, the design and fabrication of an electromagnetic attachment mechanism for a hybrid Mars drone, the conceptual design of a refueling mechanism for a UAV with liquid-methane harvesting capabilities on Titan, and understanding relationships between mechanoluminescent materials and strain for structural health monitoring. She has presented these results at many conferences including AIAA's AVIATION, ASCEND, Propulsion and Energy, and SciTech conferences. Currently, she is also working on a NASA funded project to investigate the feasibility of implementing UAVs and UGVs for autonomous inspections and digital twin generation of NASA facilities. Most recently, she was accepted to participate in the 2022 Caltech Space Challenge, which takes place in March in Pasadena, California. She was one of 32 students selected from over 900 applicants to participate. The challenge will involve competing against another team to design a sample return mission concept to Saturn's moon, Titan.

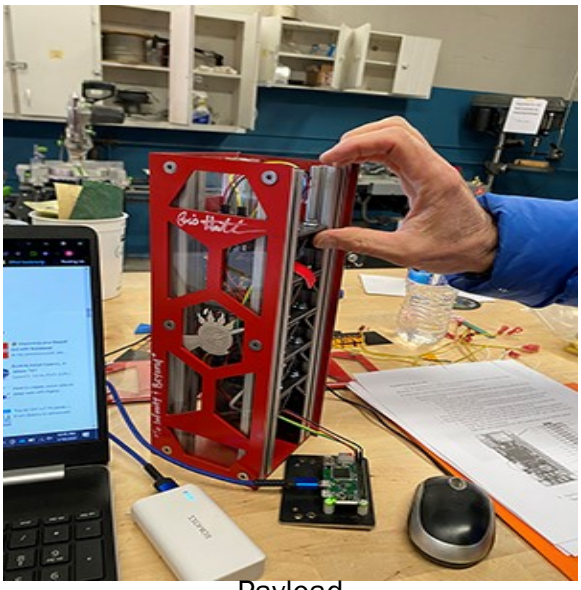
The Caltech Space Challenge is a 5-Day International Student Space Mission Design Competition

The Caltech Space Challenge brings 32 talented and highly-motivated students to the Caltech campus to participate in a week-long space mission design competition. The participants are split into two teams and both teams work under the mentorship of experts from industry, NASA and academia to design their mission concept from scratch to final proposal. The Challenge is a unique opportunity for young and enthusiastic students to build technical and teamwork skills, interact with world-renowned experts in space exploration and connect to like-minded peers from all around the world.
The next edition of the Caltech Space Challenge will take place from March 21 to March 25, 2022.

UNM'S LOBO LAUNCH TEAM PREPARING TO COMPETE IN SPACEPORT AMERICA CUP IN JUNE

By Robert Malseed, Treasurer

After a two-year hiatus due to the COVID-19 pandemic, The University of New Mexico's Lobo Launch rocket team is set to compete in the Spaceport America Cup near Las Cruces this summer.



Payload

Rocket

The competition, scheduled for June 21-25, will feature more than 150 university teams from around the nation and the world, including groups from as far away as Turkey, Greece, Poland and India. Participation is lower than normal this year due to COVID.

Fernando "Doc" Aguilar is the UNM rocket engineering professor and directs the rocket program at UNM. He came to UNM after a long career as a launch controller and space operations officer in Air Force Space Command. He said the 11 mechanical engineering students on the team this year are eager to compete in person and are primed for another success at Spaceport America Cup.

"We are in the final stages of fabrication and will begin test flights at the beginning of February," he said.

The team partners with the Albuquerque Rocket Society, which enables them to launch under the society's FAA flying waiver and to utilize the launch space on the northwest side of the city.

The test launches enable the team to make modifications to the rocket and test them out in plenty of time for the June competition.

In 2019, the team made its debut in the competition, placing No. 5 overall and No. 3 in its rocket class, out of 225 teams from 14 countries. Aguilar said the team made some changes after the results of the 2019 competition, in which the rocket overshot the 10,000-foot target altitude by 600 feet.

"To reduce the apogee, we could either add weight or increase drag," he said. "We cannot add

(Continued on page 13)

(Continued from page 12)

ballast because the rocket would not conform to Spaceport America guidelines for minimum speed leaving the launch rail. So, the students tapped into their knowledge gained during fall semester and determined that an additional fin will bring the apogee down to 10,000 feet."

The 2019 rocket had an unusual five fins (the norm is four) for the same reason, and this year's rocket will fly with six fins.

This year, the Lobo Launch team is building two rockets: one that will compete and the other for an exhibition launch. The exhibition rocket will stand 50 feet tall and has been dubbed BFLR, for Big Fat Lobo Rocket. The competition rocket is a high-performance design that is only 10 feet long, Aguilar said.

The team is also outfitted with some new aerospace ground equipment, thanks to generous donations from mechanical engineering alumnus Roger Koerner. Koerner's donation allowed the team to purchase a large, deployable climate-controlled enclosure that the team can set up on site at the Spaceport America Cup. This will shield the rocket and delicate payload from the triple-digit heat in June. The donation also allowed the team to purchase a "mobile command post" trailer, outfitted with electrical power, drawers, cabinets and tie-downs for equipment, as well as computer hookups. This high-tech trailer will serve as a mobile rocket assembly facility and allow the team to safely transport the rocket and spare parts to competition.

Aguilar said that in addition to testing early and getting the rocket in good shape for competition, he also wants the team to launch first on the first day (as they did in 2019). This will earn the team 200 points that are awarded only to the first team to launch. In addition, he said the team has developed an innovative experiment for the payload. This will put the team an additional 200 points ahead of the competition.

"Our students are most pragmatic and innovative in developing a winning rocket," Aguilar said. "They determined that the modeling and sim software is not accurate for supersonic speeds. Their quandary was how to develop a rocket that could attain 10,000 feet and still remain sub-sonic. Their solution was a low-thrust motor with a very long burn (14 seconds). So our test flight results are very near what the models indicate. All other teams use high-thrust motors with very short burns (4-6 seconds), forcing them to go supersonic to achieve the competition altitude. However, they do not get accurate results from their modeling."

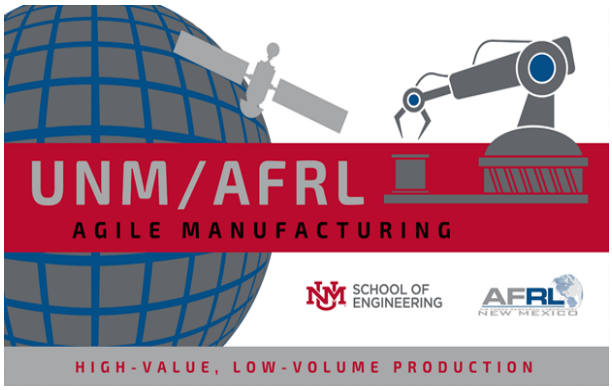
He said that the UNM team has a unique advantage that will always benefit them, and not just because of the proximity to competition.

"We have another advantage over most other university teams because we can test launch at nearly the same altitude as the competition site," he said. "That is not the case for most schools in the U.S. or around the world."

UNM PART OF PROJECT TO DEVELOP TECHNOLOGY TO REPAIR SATELLITES, BUILD STRUCTURES IN ORBIT

By Robert Malseed, Treasurer

Researchers from The University of New Mexico School of Engineering are part of a multi-institutional consortium selected by the Air Force Research Laboratory (AFRL) and the Air Force Office of Scientific Research (AFOSR) to pioneer research into robotic inspection, maintenance and manufacturing of satellites and other structures while in orbit.



AFRL and AFOSR selected the Carnegie Mellon University-led proposal, "Breaking the 'Launch Once, Use Once' Paradigm," as part of the newly established Space University Research Initiative (SURI). Rafael Fierro, a professor in the Department of Electrical and Computer Engineering, is leading the project at UNM.

The main goal of the project involves developing a way to repair, maintain and upgrade the 6,500 satellites that are currently in orbit. It is estimated that about half of those are not functional, which renders them useless, and repairs and refueling are nearly impossible in orbit. This means that satellites are typically good for only one use.

This consortium aims to change that, however. "This is an incredible opportunity to work together toward an ambitious goal," said principal investigator Howie Choset, a professor in the Robotics Institute at Carnegie Mellon's School of Computer Science. "No one knows how to refuel spacecraft such as satellites and telescopes. If we're successful, we will."

The work will require expertise in artificial intelligence, hard and soft robotics, additive manufacturing, astrodynamics, estimation theory, control, and space systems. Researchers intend to further develop existing technologies related to self-deployable construction tools, decentralized autonomy, attaching new components to existing structures while in orbit, and intelligent and interactive inspection.

Fierro's research includes advanced robotic manipulation for space operations. He directs UNM's Agile Manufacturing (AgMan) Lab, a joint effort between the university and AFRL, which provides state-of-the-art robotics and automation equipment aimed at creating on-orbit advanced manufacturing. UNM's part of the project will be conducted at this facility, which is on UNM's South Campus.

Fierro said UNM will be tasked with leveraging the successful AFRL-university-industry cooperative research model currently implemented at AgMan.

"For the last three years, UNM's AgMan has been working with AFRL enabling robotics, artificial intelligence, and additive manufacturing technology to make satellite assembly more efficient and cost-effective," Fierro said. "We are excited to be part of the first SURI program and develop novel solutions to enable on-orbit servicing and manufacturing of spacecraft via advanced robot systems and digital twins."

In addition to Fierro, a postdoctoral researcher and several graduate and undergraduate students will be working on this project.

Additional consortium collaborators are Texas A&M and Northrop Grumman Corporation, which will develop systems for intelligent inspection, dexterous maintenance and agile manufacturing of satellites in space. The University of Buffalo will lead a team from Penn State, Georgia Tech, MIT and Purdue in a second SURI proposal focused on tracking and gathering information on objects in space. Each proposal is eligible for up to $1 million in funding per year for three to five years.

JAN, FEB, MAR IN AIR & SPACE HISTORY

JANUARY 2022

60 Years Ago – 1962

January 3: NASA announced name of two-manned spacecraft, "Gemini."

January 13: Discoverer 37 launched by Thor Agena, 4:41 p.m., EST, Vandenberg AFB.

January 24: Composite 1 (Navy), GREB IV, Lofti III, Injun II, and Surcal launched by Thor Ablestar, 4:30 a.m., EST, Cape Canaveral, Fla.

January 26: Ranger 3 launched by Atlas Agena, 3:30 p.m., EST, Cape Canaveral, Fla, Vandenberg AFB.

55 Years Ago – 1967

January 11: Intelsat II F-2 launched by Delta, 5:55 a.m., EST, Cape Canaveral, Fla. Also known as Pacific 1.

January 26: ESSA 4 launched by Delta, 12:32 p.m., EST, Vandenberg AFB.

January 27: Apollo I/AS 204 fire, 6:31 p.m., EST, Cape Canaveral, Fla, Astronauts Virgil I. “Gus” Grissom, Edward H. White II, and Roger B. Chaffee die in capsule fire.

January 27: Outer Space Law Treaty signed, Washington, D.C.

50 Years Ago – 1972

January 5: President Richard M. Nixon announced decision that U.S. will build

a reusable space shuttle, San Clemente, CA.

January 22: Intelsat IV F-4 launched by Atlas, 7:12 p.m., EST, Cape Canaveral, Fla.

January 31: HEOS A-2 launched by Delta, 12:20 p.m., EST, WSMC.

45 Years Ago -- 1977

January 27: NATO III-B launched by Delta, 7:49 p.m., EST, Cape Canaveral, Fla.

40 Years Ago – 1982

January 15: RCA-IV or Satcom 4 launched by Delta, 8:54 p.m., EST, Cape Canaveral, Fla.

30 Years Ago – 1992

January 22: STS-42 (Space Shuttle Discovery) launched at 9:52 a.m, EST, KSC. Crew: Ronald J. Grabe, Stephen S. Oswald, Norman E. Thagard, David C. Hilmers, William F. Readdy, Roberta L. Bondar (Canada), and Ulf D. Merbold (ESA-Germany). Carried in the cargo bay was the International Microgravity Laboratory 1 (IML-1) a pressurized manned Spacelab module, to explore in depth the complex effects of weightlessness on living organisms and materials processing. Landed January 30, 8:07 a.m., PST, Edwards Air Force Base, CA. Mission Duration: 8 days, 1 hour, 14 minutes.

January 22: First exoplanet discovered (PSR B1257+12 B).

25 Years Ago – 1997

January 12: STS-81 (Space Shuttle Atlantis) launched at 4:27 a.m. EST, KSC. Crew: Michael A. Baker, Brent W. Jett, Jr., John M. Grunsfeld, Marsha S. Ivins, Peter J. K. Wisoff, and Jerry M. Linenger. Fifth Mir docking. Astronaut John Blaha, who had been on Mir since September 19, 1996, was replaced by astronaut Jerry Linenger. Landed at KSC on January 22, 9:23 a.m., EST. Mission Duration: 10 days, 4 hours, 56 minutes.

15 Years Ago – 2007

(Continued on page 16)

JAN, FEB, MAR IN AIR & SPACE HISTORY

(Continued from page 15)

January 10: SRE 1, India's first recoverable capsule, was launched by a PSLV-C7 rocket from Sriharikota at 03:57. It was a technology demonstrator for the planned 2010 launch of a lunar mission.

FEBRUARY 2022

116 Years Ago – 1902

February 4: Charles Lindbergh's **birthday.**

90 Years Ago – 1932

February 19: Joseph Kerwin's birthday.

60 Years Ago – 1962

February 8: Tiros 4 launched by Thor Delta, 7:43 a.m., EST, Cape Canaveral, Fla.

February 20: Mercury Atlas 6 (MA-6), Friendship 7 launched, with astronaut John H. Glenn, 9:47:39 a.m., first American to orbit the earth, Cape Canaveral, Fla.

February 27: Discoverer 38 (Corona Mission 9030) launched by Thor, Vandenberg AFB. The last Discoverer named Corona mission.

55 Years Ago – 1967

February 4: Lunar Orbiter 3 launched by Atlas Agena, 8:17 p.m., EST, Cape Canaveral, Fla. February 8: Diademe 1 launched by Diamant A, Hammaguir, Algeria, French satellite.

February 15: Diademe 2 launched by Diamant A, Hammaguir, Algeria, French satellite.

50 Years Ago – 1972

February 14: USSR launches Luna 20 (Lunik 20) at 03:27:59 UTC by Proton K from Baikonur which soft lands on the Moon four days later. A rotary-percussion drill retrieved samples from the surface which were returned to Earth by capsule on February 25.

45 Years Ago -1977

February 7: USSR launches Soyuz-24 from Baikonur. Cosmonauts: Viktor V.Gorbatko and Yuri N.Glazkov. Ferry flight to Salyut-5 space station.

February 18: Enterprise, the first space shuttle orbiter, was flight tested at Dryden Flight Research Center.

40 Years Ago – 1982

February 25: Westar IV launched by Delta, 7:04 p.m., EST, Cape Canaveral, Fla.

35 Years Ago – 1987

February 5: Soyuz TM-2 launched from Baikonur, 2138 Moscow time, Yuri V. Romanenko and Aleksandr I. Laveykin docked with space station Mir. Romanenko established world space record of 326 days in space.

February 12: SDS launched by Titan 34D for DOD, l0:40 p.m., PST, Vandenberg AFB. February 26: GOES 7 launched by Delta, 6:05 p.m., EST, Cape Canaveral, Fla.

25 Years Ago – 1997

February 10: Russia launches Soyuz TM-25 aboard a Soyuz-U rocket from Baikonur. Cosmonauts: Vasili

V. Tsibliyev, Aleksandr I. Latuzkin, Reinhold Ewald (Germany). Ferry flight to space station MIR.

(Continued on page 17)

JAN, FEB, MAR IN AIR & SPACE HISTORY

(Continued from page 16)

February 11: STS-82 (Space Shuttle Discovery) launch at 3:55 a.m. EST, KSC. Crew: Kenneth D. Bowersox, Scott J. Horowitz, Mark C. Lee, Steven A. Hawley, Gregory J. Harbaugh, Steven L. Smith, and Joseph R. Tanner. Second in a series of planned servicing missions to the orbiting Hubble Space Telescope (HST). Landed February 21 at 3:32 am EST, KSC. Mission Duration: 9 days, 23 hours, 38 minutes.

February 26: Superbird B1, a Japanese communications satellite, and Arabsat 1C, a Saudi Arabian satellite were launched at 23:58:10 UTC using the Ariane-44L launch vehicle from the

Kourou Space Center, French Guiana.

20 Years Ago – 2002

February 5: HESSI (High Energy Solar Spectroscopic Imager) solar flare observatory launched at 3:58 PM EDT by a Pegasus XL rocket which was released from a L-1011 aircraft flying out of the Cape Canaveral AFS. Renamed Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) on March 29, 2002.

February 23: Launch of Intelsat 904 aboard an Ariane 44L from Kourou, French Guiana at 07:00 UTC.

15 Years Ago – 2007

February 17: THEMIS 1, THEMIS 2, THEMIS 3, THEMIS 4, and THEMIS 5, a fleet of nearly identical NASA magnetospheric satellites were launched by a Delta 2 from Cape Canaveral at 23:01 UTC on 17 February 2007. As part of Time History of Events and Macroscale Interactions during Substorms or THEMIS, they are designed to track the origins of substorms within the Earth's magnetic field, which produce auroras.

MARCH 2022

140 Years Ago -- 1882

March 10: George Lewis born.

110 Years Ago -- 1912

March 23: Dr. Wernher von Braun born, Wirsitz, Germany (now Part of Poland).

95 Years Ago -- 1927

March 6: Gordon L. Cooper Jr. born.

90 Years Ago -- 1932

March 5: Alan Bean born.

March 16: Walter Cunningham born.

85 Years Ago -- 1937

March 6: Valentina Nikolayevna Tereshkova born, Maslennikovo,

Yaroslavl Region, USSR. First woman in space aboard Vostok 6, June 16, 1963.

75 Years Ago -- 1947

March 7: First photograph taken from space from a V2 rocket 100 miles above White Sands, New Mexico.

70 Years Ago – 1952

March 22: Colliers magazine published its first space symposium under title: "Man Will Conquer Space Soon."

(Continued on page 18)

JAN, FEB, MAR IN AIR & SPACE HISTORY

(Continued from page 17)

March 23: Science fiction writer Kim Stanley Robinson born. Known for his “Red Mars”, Blue Mars”, and Green Mars” trilogy.

60 Years Ago – 1962

March 7: OSO 1 launched Thor Delta, 11:06 a.m., EST, Cape Canaveral, Fla.

March 16: Cosmos 1 launched by Cosmos rocket, 1200 UTC, Kapustin Yar, USSR.

March 17: Kalpana Chawla born.

55 Years Ago – 1967

March 8: OSO 3 launched by Delta, 11:12 a.m., EST, Cape Canaveral, Fla.

March 22: Cosmos 150 launched by Voskhod, 1243 UTC, Plesetsk, USSR.

March 23: Intelsat II F-3 launched by Delta, 8:30 p.m., EST, Cape Canaveral, Fla.

50 Years Ago – 1972

March 2: Pioneer 10 launched by Atlas Centaur, 8:49 p.m., EST, Cape Canaveral, Fla.

March 11: TD-1A launched by Delta for ESRO, 8:55 p.m., EST, Vandenberg AFB.

March 27: Venus 8 (Venera 8) launched by Modified SS-6 (Sapwood) or Molniya, 0415 UTC, Baikonur, USSR.

45 Years Ago – 1977

March 10: Uranus rings discovered.

March 10: Palapa 2 launched by Delta, 6:16 p.m., EST, Cape Canaveral, Fla.

40 Years Ago – 1982

March 4: Intelsat V F-4 launched by Atlas Centaur, 7:24 p.m., EST, Cape Canaveral, Fla.

March 22: STS-3 (Space Shuttle *Columbia)* launched, 11:00 a.m., EST, KSC. Crew: Jack R. Lousma and C. Gordon Fullerton. Continued testing of Space Shuttle systems for qualification for operational flights. Landed March 30, 11:05 a.m., EST, White Sands, N.M. Mission Duration: 8 days, 4 minutes.

35 Years Ago – 1987

March 20: Palapa B 2P Comsat launched by Delta, 5:22 p.m., EST, Cape Canaveral, Fla. Owned by Republic of Indonesia.

March 31: USSR launches space station module Kvant-1 (Quantum) aboard a Proton K rocket from Baikonur. Docked with space station Mir on April 9.

30 Years Ago – 1992

March 14: Galaxy 5, a commercial communications spacecraft, was launched from Cape Canaveral by an Atlas 1 rocket.

March 17: Russia launches Soyuz TM-14 to space station Mir from Baikonur. Cosmonauts: Aleksandr S. Viktorenko; Aleksandr Y. Kaleri and Klaus-Dietrich Flade (Germany).

March 24: STS-45 (Space Shuttle *Atlantis)* launched March 24 at 8:13 a.m. EST, KSC. Crew: Charles F. Bolden, Brian Duffy,Kathryn D. Sullivan, David C. Leestma, C. Michael Foale, Byron K. Lichtenberg, and Dirk D. Frimout (Belgium). Carried first Atmospheric Laboratory for Applications and Science (ATLAS-1) on Spacelab pallets mounted in orbiter's cargo bay. Landed April 2, 6:23 a.m., EST, KSC. Mission Duration: 8 days, 22 hours, 9 minutes.

(Continued on page 19)

JAN, FEB, MAR IN AIR & SPACE HISTORY

(Continued from page 18)

20 Years Ago – 2002

March 1: STS-109 (Space Shuttle Columbia) launched at 6:22 a.m. EST, KSC. Crew: Scott D. Altman, Duane G. Carey, John M. Grunsfeld, Nancy J. Currie, James H. Newman, Richard M. Linnehan, and Michael J. Massimino. This is the fourth servicing mission to the Hubble Space Telescope. Landed March 12, 2002, 4:32 a.m., EST at KSC. Mission Duration: 10 days, 22 hours, 11 minutes.

March 1: ENVISAT 1, a European Space Agency (ESA) environmental remote-sensing spacecraft was launched by an Ariane 5 rocket from Kourou, French Guiana at 01:07 UTC. Reported to be the most massive and expensive of the European satellites, it carried ten sensors to monitor global warming, the ozone hole and desertification.

March 17: GRACE 1 and GRACE 2 (Gravity Recovery And Climate Experiment nick-named Tom and Jerry) are a pair of American -German, identical, satellites that were launched by a Rockot booster from Plesetsk at 09:21 UTC. They aim to map the local gravitational mini-variations caused by sea-level changes, glacial motions, and seasonal melting/freezing of ice sheets.

March 25: Shenzhou 3 (Divine Vessel 3), a Chinese (PRC) "unmanned spaceship, launched by a Long March 2F rocket from Jiquan Space Launch Center in the northwestern Gobi desert at 14:00 UTC. It consisted of three modules: a propulsion section, a conical re-entry capsule, and an orbiter. The capsule was equipped with all that would be needed for a manned flight.

15 Years Ago – 2007

March 9: FalconSat 3, an American military (DARPA) picosatellite, was one of six DARPA military satellites launched by an Atlas 5 rocket from Cape Canaveral at 03:10 UTC. Built by USAF Academy cadets, it monitored the ambient plasma, and tested a micro-propulsion attitude control system.

5 Years Ago – 2017

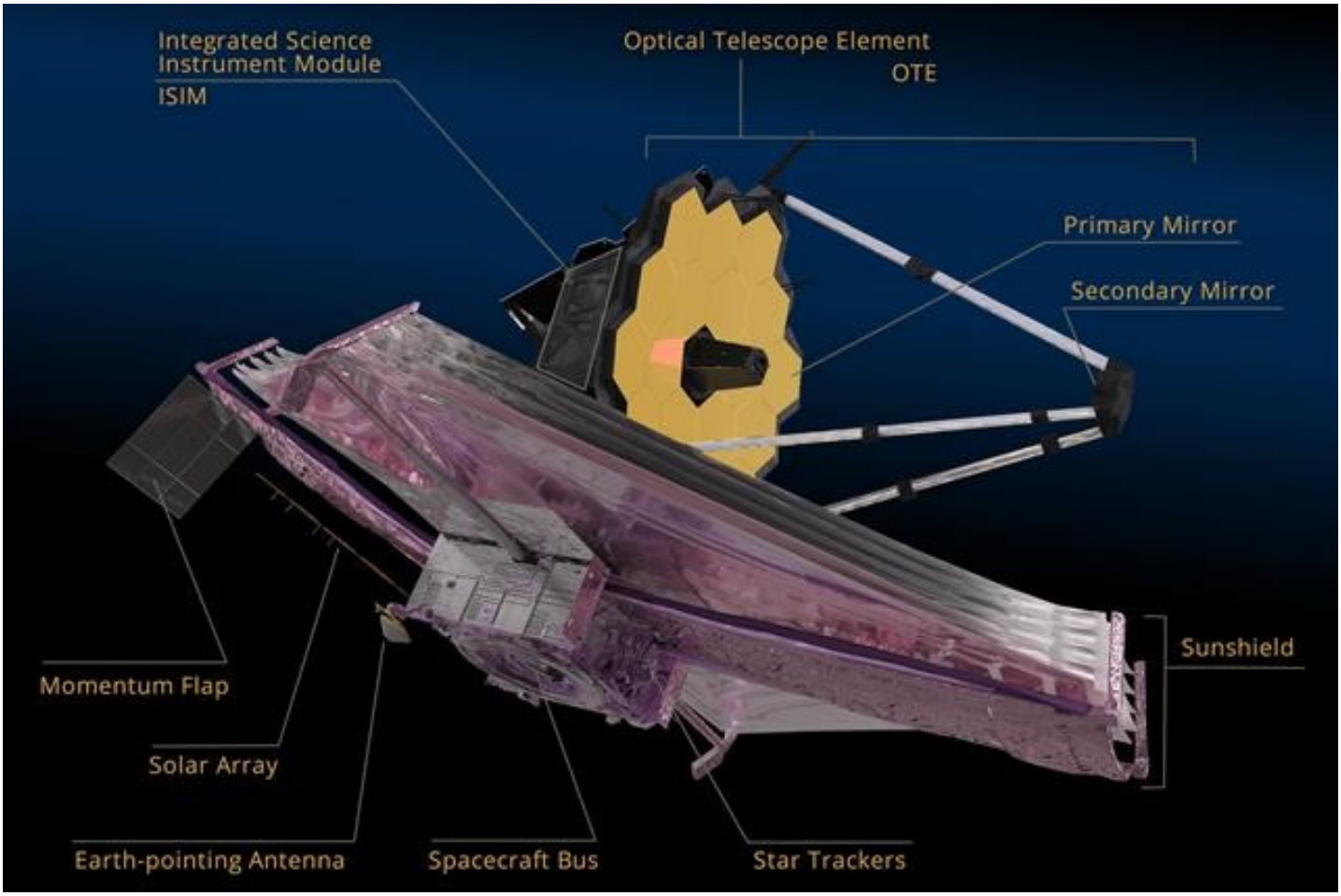
March 21: President Donald Trump signed the NASA Transition Authorization Act of 2017.

NEW FREE AIAA HIGH SCHOOL MEMBERSHIP NEW

By Robert Malseed—Treasurer

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

IMAGE OF THE QUARTER



James Webb Space telescope deployed at L2.

Since the last newsletter when we showed the James Webb Space telescope prepared for launch, it ha now arrived at the second Sun-Earth Lagrange point (L2), unfolded all of its structural elements ,and is now in the process of aligning its optical system.

PARTING THOUGHTS

"Not only is the Universe stranger than we think, it is stranger than we can think."
- Werner Heisenberg -

I wonder if he was certain of that!! - editor

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AIAA's mission is to inspire and advance the future of aerospace for the benefit of humanity. AIAA's vision is to be the voice of the aerospace profession through innovation, technical excellence, and global leadership.