AIAA American Institute of Aeronautics and Astronautics Los Angeles - Las Vegas Section

Newsletter

July 2020

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SPACE PERSPECTIVE TO FLY PEOPLE AND PAYLOADS TO THE EDGE OF SPACE

by Space Perspective (with permission), June 18, 2020

Space Perspective Capsule at High Altitude (Artist's rendering). [Credit Space Perspective]

Kennedy Space Center, Fla.– Space Perspective today announced its plans to fly passengers and research payloads to the edge of space with its Spaceship Neptune, a high-performance balloon and pressurized capsule. The human space flight company plans to launch from the iconic Shuttle Landing Facility at NASA's Kennedy Space Center (KSC) in Florida, with the first un-crewed test flight scheduled in early 2021 that will include a suite of research payloads.

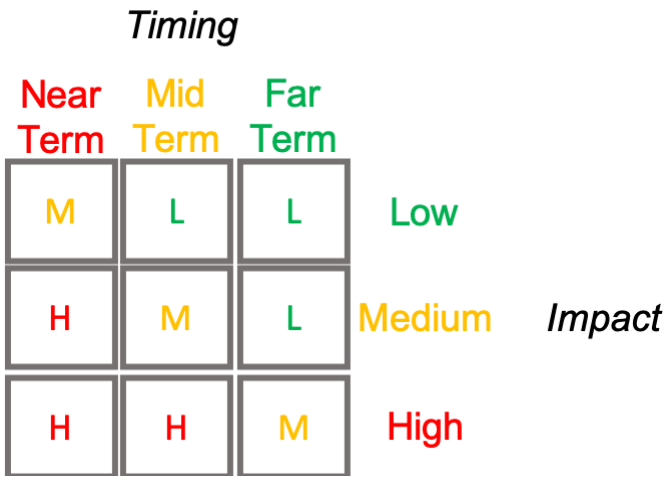
"We're committed to fundamentally changing the way people have access to space – both to perform much-needed research to benefit life on Earth and to affect how we view and connect with our planet," said Space Perspective Founder and Co-CEO Jane Poynter. "Today, it is more crucial than ever to see Earth as a planet, a spaceship for all humanity and our global biosphere."
The company has completed extensive international market research and a new design built on 50+ years of proven technology. Spaceship Neptune was developed from the ground up for maximum safety, accessibility, near zero-emissions and routine operations around the world. The balloon measures the length of a football stadium and the pressurized capsule is comfortable and spacious.

Flown by a pilot, Neptune takes up to eight passengers called "Explorers" on a six-hour journey to the edge of space and safely back, where only 20 people have been before. It will carry people and research payloads on a two-hour gentle ascent above 99% of the Earth's atmosphere to 100,000 feet, where it cruises above the Earth for up to two hours allowing passengers to share their experience via social media and with their fellow Explorers. Neptune then makes a two-hour descent under the balloon and splashes down, where a ship retrieves the passengers, the capsule, and the balloon. Neptune's commercial human spaceflight launches are regulated by the FAA Office of Commercial Spaceflight.

(Continued on Page 11)

What Makes a *Sustainment* Risk Management System Different from all Others?

by Col. Charles Vono (USAF & TRW Retired), AIAA Distinguished Lecturer, AIAA Associate Fellow



Time to Impact matrix. (Courtesy of Charles Vono)

Anyone reading this article has most likely worked within a risk management system. So, let's try to keep this short and discuss the 3 major differences.

Any risk management system takes what you know about your system and translates that information into a "priority list". That is, a list of projects that should be accomplished to mitigate the expected risks. Most likely, managers and their bosses tweak this to create the official list. Somewhere in that process is usually a risk matrix that combines your likelihood and consequence guesses into a number useful for ranking. Three by three matrices are popular for their simplicity. Sometimes higher-level management dictates other sizes such as 5 x 5.

The larger the matrix, the more effort your team will spend debating each risk. Since management expects to re-jigger the resulting priority list anyway, a lot of that effort is wasted. I prefer 3 x 3 matrices as the perfect size for good results without wasted efforts.

In last month's article (this article is third in a series), a definition of sustainment risk was provided:

SUSTAINMENT RISK: A risk that can be shown to impact the mission via the system readiness factors.

Recall from the previous articles that your system readiness factors are 2 to 6 system independent characteristics that, if violated, will affect the system's ability to perform its mission. For instance, here's two: The vast majority of systems must be both reliable when used and available when needed.

Besides the focus on readiness factors, another major difference between sustainment risk systems and all other risk systems is the need to account for schedule time. For instance, in a program's risk system, the program schedules are set. Moving a schedule has significant consequences. In fact, for programs, requirements are often traded for schedule with a firm resolution to deal with those consequences in the sustainment phase. (Or rather have those poor sustainment guys and gals deal with it.)

Once in the sustainment phase, those tight timing constraints do not exist. "Time to impact" becomes an important factor in risks. This is important enough it needs to be built into your sustainment risk management system. See the figure for one example of how to do this.

This figure also can be a great illustration of another key difference in your sustainment risk management system. Monthly sustainment risk meetings serve as a focus for sharing this management model and your philosophy. One part of your philosophy, of course, is to encourage improvements. It is likely that the process this figure illustrates will generate much consternation and suggestions for improvement. Be very open to having some of these kinds of discussions during the meeting, but feel free to issue action items to take long discussions off-line for reporting later.

In the same vein, if you find yourself adjudicating the following kinds of questions, many will be anxious to stifle the discussion, resume the meeting, complete it, and get out of there. Keep that tension going for a bit, it is healthy and useful to you. It helps your build the team's commitment to the warfighter mission and commitment to the sustainment process.

(Continued on Page 12)

The Russian Buran Space Shuttle Revisited

by P.A. Murad, AIAA Associate Fellow

The Russian Buran Space Shuttle. (Courtesy of P.A. Murad)

Even today in retirement, it is hard to tell what directions you will follow during your career.

In the late eighties, I was very concerned about the Russian space shuttle. I earlier worked on the Apollo, an early generation of the shuttle at NASA Houston, the external tank at Martin, and the SRB switches at Bendix amongst other DoD tasks which included the disastrous Challenger accident.

The Russian Shuttle was an enigma. How much of a copy would it be from the American Shuttle? Data was not forthcoming. These are big crafts and the Soviets did whatever they could to prevent our data from observing the Buran. On one satellite image, smoke bombs were used to obfuscate Buran on the ground when a change in the wind blew the smoke away and gave some insights about the Buran's shape.

I met many brave men when I was a paratrooper. The bravest man I knew about was an attaché in Moscow who I have never met. He lived on the third floor of a building where guards were at each elevator or stairs. These guards monitored all of the American attachés. To get away from this, he placed three sheets out of his window in the middle of the night and climbed down to warn his wife, he had no idea what time he would come back.

Dressed in black, he must have done a lot of walking to get into the Soviet classified Ramenskoye airfield, found a bush, and quietly stayed there. Armed only with a camera, he took several pictures of the Soviet guards going by with growling German Shepherds but he did not move. He was there for not one, two, but three days. On the third day, a modified M-50 landed. On its back was a Buran without its vertical stabilizer. There were additional vertical stabilizers on the M-50 for yaw stability while in flight. It looked like a winged snake with a pig on top of it. *(Continued on Page 12)*

Ideas for Sustainable Cities and Urban Farming… on Mars?

by Matthew S Williams, writer for Universe Today and Stardom, science fiction writer
www.universetoday.com/146351/ideas-for-sustainable-cities-and-urban-farming-on-mars/amp/ (with permission)

"Together, we are building the first city on Mars."
[Credit: Mars City Design]

"The core essence of Mars City Design is —not to repeat the same mistakes that we did to our planet. The hope to start a new design for living on Mars, every single thing needs to have a sustainable answer within the big picture, of the regenerative circle of life and of the product itself. All things need an exit plan that allows them to be reusable or repurposed. That can hopefully inspire change on Earth." *-Vera Mulyani (Vera Mars), Founder/CEO Mars City Design*

Once the stuff of science fiction, the possibility that humans could establish a permanent settlement on Mars now appears to be a genuine possibility. While doing so represents a major challenge and there are many hurdles that still need to be overcome, the challenge itself is inspiring some truly creative solutions. But what is especially interesting is how these same solutions can also address problems here on Earth.

This is especially clear where the Mars City Design Challenges are concerned. This annual competition was founded with the purpose of inspiring innovative ideas that could lead to sustainable living on Mars. For this year's challenge, "Urban Farming for Extreme Environment," Mars City Design and its founder (Vera Mulyani) are looking for designs that incorporate urban farming to support a colony of 100 people.

Born in Jakarta, Mulyani began contemplating how humans might live on Mars at a young age. After completing her education as an architect, she eventually moved to California and became inspired by the rise of the NewSpace industry. In particular, it was Elon Musk's vision of making humanity an interplanetary species that captured her imagination and made her want to apply her talents to "going interplanetary".

https://youtu.be/dtq9Sby-AzU

As Mulyani told Universe Today via email, the same dream that inspired her as a child are still what motivates her today:

"It is important to know that sky is not the limit. That we also have no limit to how far we'd like to expand as a human species. That bigger dreams force us to unite as human beings, instead of competing against each other. Because that scarcity may come from a false belief that there is only a limited resource. It is far happier to live by creating value together, uncovering the unlimited resource on Mars or else than spending the same amount of effort to fight against each other on one limited Earth resource."

In 2015, Mulyani founded Mars City Design (MCD), an innovation platform where teams from around the world are able to come together with industry experts and share their ideas. Every year, the challenge has a different theme, but all are focused on the bigger question of how housing and urban designs can allow humans to not only survive on Mars, but thrive!

At the heart of MCD are the design competitions and they have hosted every year since foundation. The focus of these competitions is the creation of field project designs that explore the feasibility of future Martian cities, as well as technologies that will allow for sustainable living on Mars. In addition to engineers and scientists, the competition also attracts artists and visionaries who want to bring a certain flair to off-world living.

The 2020 MCD competition will focus on urban farming. [Credit: Mars City Design]

(Continued on Page 14)

LIFE AT "THE SPACESHIP FACTORY"

by Gerald Blackburn (27 June, 2020), North America Aviation - Retired

www.palosverdespulse.com/blog/2020/6/27/life-at-the-spaceship-factory-by-gerald-blackburn (with permission)

Figure 1: Apollo Block I Command Module No.009 in Building 290, Apollo Final Assembly and Checkout. Courtesy Aerospace Legacy Foundation Archives. (Photo Courtesy of Gerald Blackburn)

WHATEVER ONE MAN IS CAPABLE OF CONCEIVING, OTHER MEN WILL BE ABLE TO ACHIEVE.

JULES VERNE

Like many others in the Aerospace Industry, Jules Verne helped lead me to the worlds of science and technology. To have in one's lifetime the opportunity to not only witness but also contribute to that incredible history is a very fulfilling experience. I am asked many times what it was like to be part of our manned space program. Let me share my story with you.

LIFE AT "THE SPACESHIP FACTORY" - OUR COSMIC CAMELOT

MY ROOTS

As a native Californian, I grew up in the land of the California sunshine. The suns shines differently here on the southwest coast. That's what we believed. Reflecting back on that time, there were problems and challenges but the culture was such that you saw them as something to be solved. This is the same culture you see in most engineers. I went to parochial school which not only focused us on academic learning but ethics, values and faith in ourselves. Science was also a significant part of the curriculum. There was a strong influence in the home on a work ethic that focused your attention toward accomplishment. Whether it was getting chores done, finding a job or just doing together. Until the first TV technology came into our homes we relied on interacting with family and friends. At first the novelty of television just reinforced our belief in the magic of the future and the role that technology would play. The first subtle effects of this technology were noticed when we began to adjust our schedules around the "regularly schedule programs". Had to be home not to miss the next match of Gorgeous George with Dick Lane!

Four years at a state of the art Technology School was my ticket to a job at North American Aviation working on the X15 and XB70 Programs. Things moved fast in this desert by the sea, Los Angeles. I graduated from Tech School at 17, was employed in the Aerospace Industry and was married by 19. My first child was born when I was 20.

My Career at NAA El Segundo was short lived when congress decided to cut the funding on the XB70 Program. But by now President JFK had committed the nation to the Apollo Lunar Program and I transferred to the NAA Space and Information Systems in Downey, Ca. From a Mach 3 Bomber to spaceships to the moon, Southern California what a town, a real Camelot!

THE PLACE

The Spaceship Factory is like most any other factory filled with dreams, designs, machines and people but there is something else special you do not see, you feel it. It is a spirit of direction, goal, challenge, accomplishment. Even after the factory was long closed and the people and machines gone, as I walked through the empty buildings you could sense and feel the spirit of the place and the past histories.

The Downey NASA Site was 160 acres, the same size as Disneyland in Anaheim. It was considered a small city within a city. We had our own Security, Fire Department and Medical facilities. At the peak of the Apollo Program in 1965 there were 25,000 plus employees on site working 24/7. The greatest challenge facing a new

(Continued on Page 15)

You're Never Too Old for Space Camp: My Experience at Educator Space Academy

by David Hitt, ASRC Federal, Author from the Outward Odyssey series of spaceflight history books
(also on ihearthsv.com with permission from the author)

Space Camp education assistant manager April Adcock tests a "heat shield" built by campers. (Courtesy of David Hitt)

Donning a flight suit and mask, just like a real astronaut pre-flight. (Courtesy of David Hitt)

The moment it all clicked, really, was as we were getting ready to drop an egg off a balcony.

I thought I had some idea of what Space Camp was about. I grew up in Huntsville, in the shadow of Space Camp. I'd wanted to go since I was a kid, three decades and change ago. I'd watched Space Camp: The Movie more times than a person should.* I'd entered the scholarship competitions year after year. I've had the chance to do a few of the individual activities. I've even emcee'd Space Camp Hall of Fame.

But I've never been to Space Camp. I even literally had a t-shirt about it. "I've Never Been to Space Camp, But I Bet It Was Rad."

There's a scene in the Will Ferrell movie, Stranger than Fiction, where one character tells another, "You're never too old to go to Space Camp."

It's true, and I'm Exhibit A. Well, OK, Exhibit A is probably cosmonaut Aleksandr Serebrov, who went at age 55, six years after his fourth trip into space. But I'm totally an exhibit.

At age 44, with no spaceflights but 15 or so minutes of zero-g under my belt, I went to Space Camp. Or, more accurately, Space Academy for Educators.

Space Camp, after all, is not just about having a great time. It's also about inspiring and equipping the next generations of explorers, and one of the way it does that is by inspiring and equipping the teachers who inspire and equip that next generation.

After all these years, Space Camp was everything I wanted Space Camp to be.

I went on a space shuttle mission.

I performed science experiments on a base on a Martian moon.

I launched a rocket.

I bounded around in lunar gravity.

I rode a zip line in a simulated launch pad escape.

I drove a tiny robot.

I listened to an astronaut talk about the future of space.

I met an engineer who worked rocket propulsion before NASA existed.

I dropped an egg off a balcony.

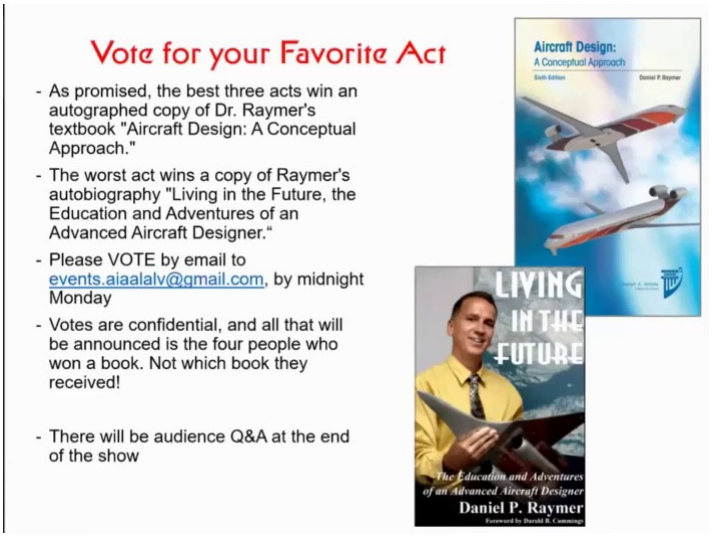
Well, technically, I didn't drop an egg off a balcony. Someone else did. But I was involved in the preparation, which, as I mentioned, was when the whole Space Camp thing really clicked. *(Continued on Page 16)*

First-ever AIAA LA-LV Talent Show ! (Led by Dr. Daniel P. Raymer)

16 May, 2020 *(Screenshots Only)*

aiaa-lalv.org/aiaa-la-lv-talent-show-webinar-may-16-2020/

Dr. Dan Raymer (AIAA Fellow) welcoming the participants and attendees, and introducing the special guest, American Idol Top-10, Ms. Olivia Rox.



Voting for the favorite act. The results: First Prize: Dr. Robert Zubrin for poetry (President of the Mars Society); Second Prize: Ms. Valerie Lawdensky (singing) (UNLV); Third Prizes: Ms. Michelle Evans (photography)(www.Mach25Media.com), Dr. Jeffrey Puschell (photography)(Raytheon)(AIAA Fellow), and Mr. Aldo Spadoni (aerospace art)(Northrop Grumman – Retired)

Dr. Daniel P. Raymer, the leader of this talent show, explaining the rules and processes, offering the autographed copies of his famous aircraft design textbook as the prize. He is a renowned and highly respected aerospace expert, especially in conceptual aircraft design.

Dr. Dan Raymer playing his guitar and singing.

List of the performers !

Dr. Dan Raymer, with a different guitar, singing another song.

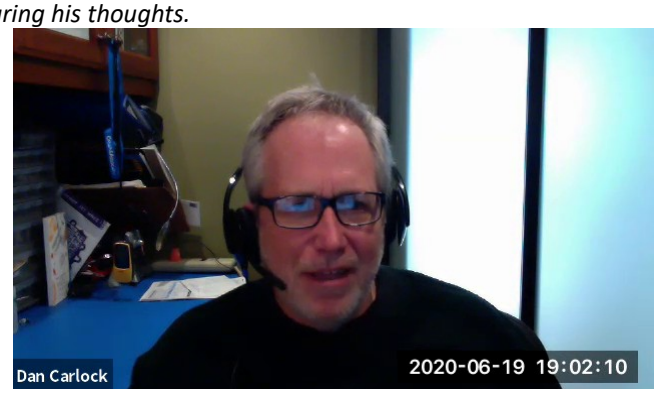
(Continued on Page 17)

AIAA LA LV Celebrates Juneteenth with Tyrone Jacobs Jr. and other Aerospace leaders (19 June, 2020) *(Screenshots Only)*

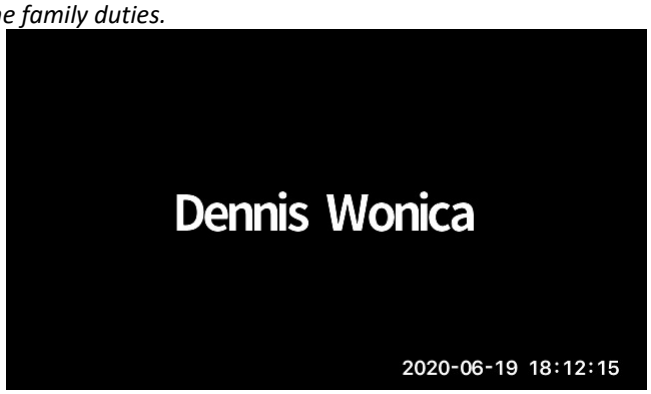
aiaa-lalv.org/june-20-2020-aiaa-la-lv-celebrates-juneteenth-with-tyrone-jacobs-jr-and-other-aerospace-leaders/

Tyrone Jacobs Jr. (Boeing) introducing the history of Juneteenth and sharing his thoughts.

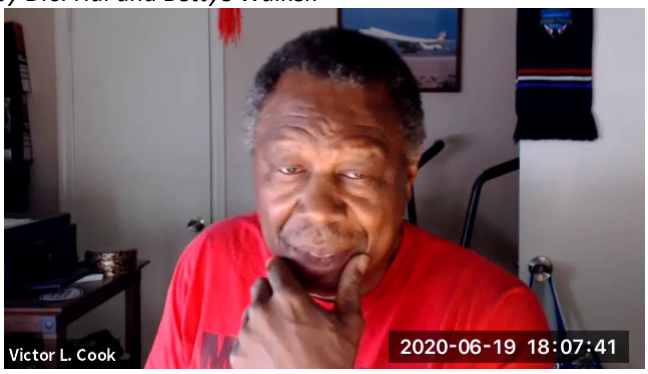
Matthrew Kuhns (Masten) sharing his thoughts, while taking care of some family duties.



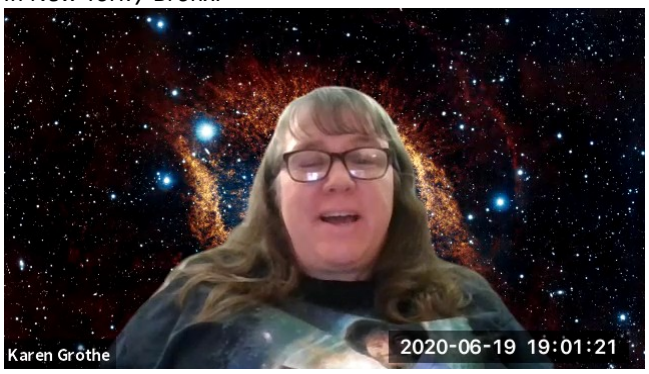
Dan Carlock making excellent comments, and mentioning A-MAN, led by Drs. Hal and Bettye Walker.



Dennis Wonica (Enterprise Chair), sharing his experiences when he was in New York / Bronx.



Victor L. Cook (Lockheed Martin) explaining his experiences from AL and advice on STEM , especially for African American girls/women.



Karen Grothe (HRL Laboratories) sharing her views, pointing out the importance of K-12 STEM education, especially for girl students.

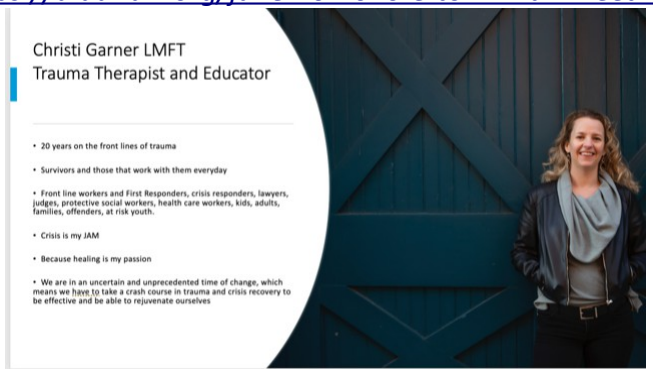
Nicky McLean echoed the important of K-12 STEM education for African American students, and asking Mr. Jacobs Jr. for help.

Emma Chao (UNLV) indicating her interests in seeing what's going on with this topic/event. Emma won the Second Best Presentation with her talk in the AIAA Student Branches mine-Conference 2020.

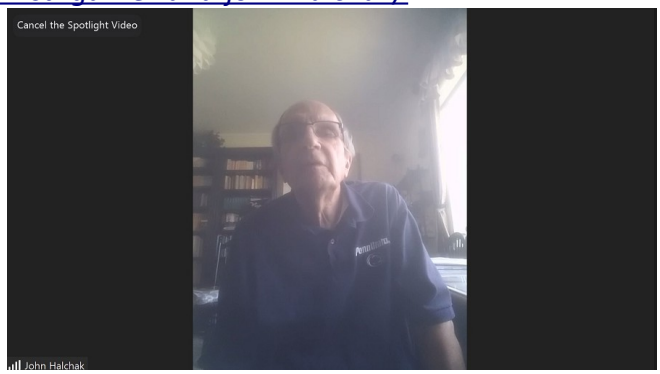
AIAA LA LV e-Town Hall Meeting on 20 June, 2020 *(Screenshots Only)*

(Part I) Building Resilience: How to navigate stress and crisis of COVID-19 (Christi Garner LMFT)
(Part II) A History of Rocketry (John Halchak)

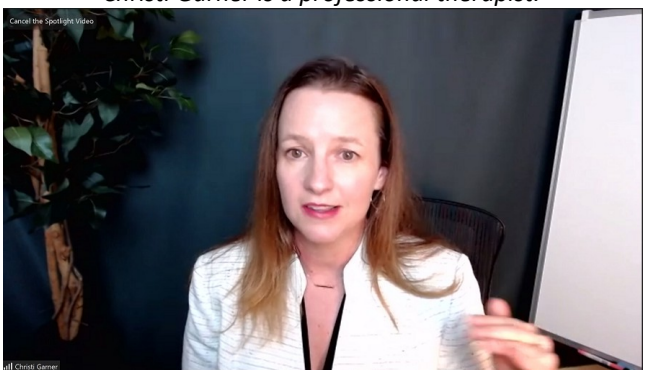
https://aiaa-lalv.org/june-20-2020-e-town-hall-meeting-with-christi-garner-and-john-halchak/



Christi Garner is a professional therapist.

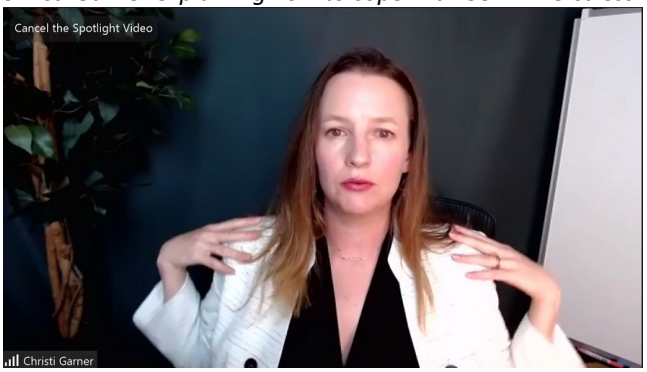


John Halchak sharing his insightful knowledge on rocketry history.

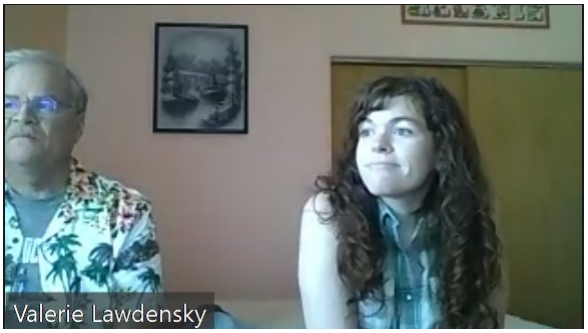


Christi Garner explaining how to cope with COVID-19 stress.

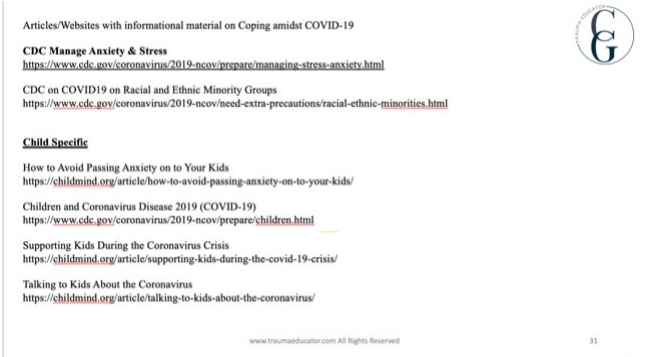
Jim Kowalski asking interesting questions.



The speaker demonstrating her techniques.



Valerie Lawdensky (UNLV) asking questions about the propulsion for the trips to Mars. She gave an excellent talk on nuclear power in the AIAA LA-LV University Student Branches mini-Conference 2018.



Articles/Websites with informational material on Coping amidst COVID-19

CDC Manage Anxiety & Stress
https://www.cdc.gov/coronavirus/2019-ncov/prepare/managing-stress-anxiety.html

CDC on COVID19 on Racial and Ethnic Minority Groups
https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/racial-ethnic-minorities.html

Child Specific

How to Avoid Passing Anxiety on to Your Kids
https://childmind.org/article/how-to-avoid-passing-anxiety-on-to-your-kids/

Children and Coronavirus Disease 2019 (COVID-19)
https://www.cdc.gov/coronavirus/2019-ncov/prepare/children.html

Supporting Kids During the Coronavirus Crisis
https://childmind.org/article/supporting-kids-during-the-covid-19-crisis/

Talking to Kids About the Coronavirus
https://childmind.org/article/talking-to-kids-about-the-coronavirus/

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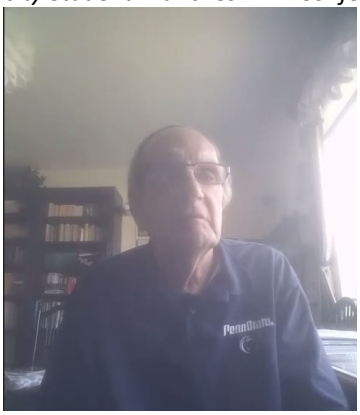
Emergency contacts and resources for trauma or further assistance.



The speaker, delighted by the questions and enthusiasm, sharing more stories and views in the Q&A session.

AIAA LA-LV Planetary Defense and Asteroid Exploration (PDAE) e-mini-Conference (27 June, 2020) *(Screenshots Only)*

aiaa-lalv.org/june-27-2020-planetary-defense-and-asteroid-exploration-e-mini-conference-2020/

AIAA e-membership (Free, 1-year trial)
aiaa.org/emember

AIAA LA-LV Planetary Defene and Asteroid Exploration (PDAE) e-mini-Conference June 27th

Volunteers are needed for all AIAA activities, please contact (cgsonwane@gmail.com)

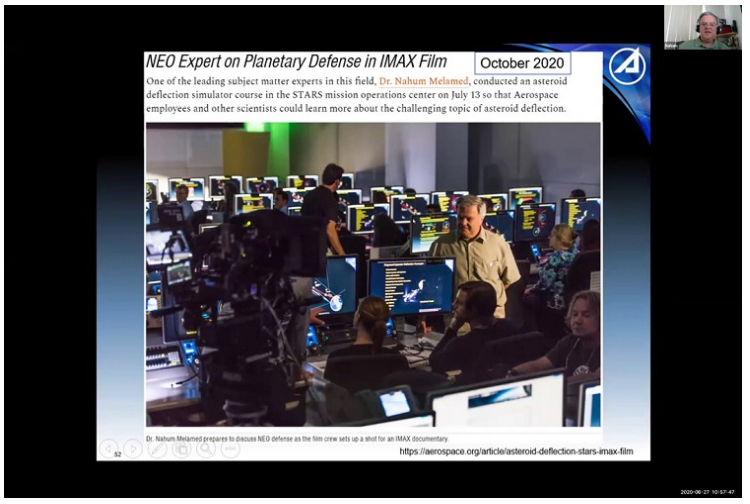
Some parts of the event are / will be recorded and posted.
Please type your question in Q&A or raise hands but Not in the Chat Room.
aiaa-lalv.org/events, aiaa.org/membership

10:05 am (PDT) Dr. Chandrashekhar Sonwane (Welcome)
10:10 am Dr. Nahum Melamed and Dr. Mark Boslough (Introduction)
10:15 am Dr. Nahum Melamed (NEO Deflection App) (also MC/moderator)
10:50 am Dr. Nikola Schmidt (Praque, CZ)
11:05 am Prof. Madhu Thangavelu
11:20 am Dr. Serena Goldstein
12:00 pm Mr. Liam Kennedy (Exhibitor Special talk and Demo)
12:40 pm Mr. Phil Groves
1:10 pm Dr. Nereida Rodriquez-Alvarez
1:50 pm Prof. Kevin McKeegan
2:30 pm Atty. Jennifer S. Perdigao and Atty. Jared Schneider
3:10 pm Dr. Makoto Yoshikawa (Japan)
4:00 pm Conclusion/Summary: Dr. Nahum Melamed
4:10 pm Adjourn

Agenda for the PDAE e-mini-conference on June 27.

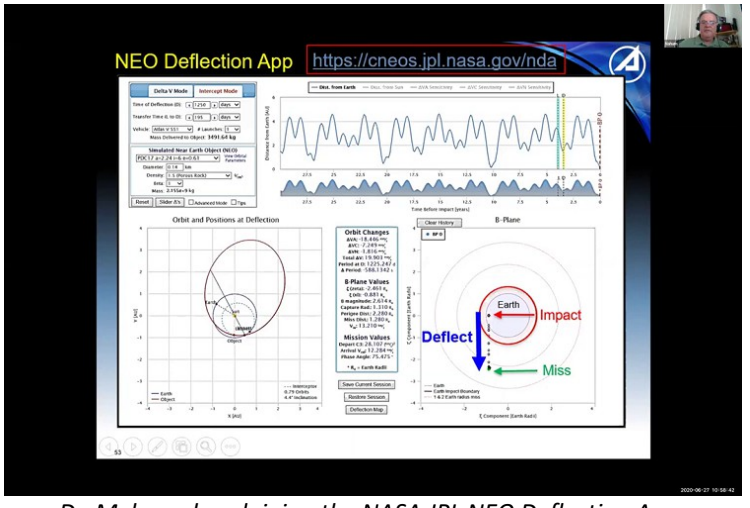
Dr. Melamed compared the sizes of a typical NEO asteroid & LA.

Dr. Nahum Melamed (Aerospace Corp.) making the introduction.



Dr. Melamed is featured in the "Asteroid Hunters" IMAX film.

Dr. Mark Boslough (Sandia National Laboratory, New Mexico University) giving a special note as the special guest of the event.



Dr. Melamed explaining the NASA JPL NEO Deflection App.

(Continued on Page 18)

SPACE PERSPECTIVE TO FLY PEOPLE AND PAYLOADS TO THE EDGE OF SPACE

(Continued from Page 1)

"Following the return of human spaceflight from U.S. soil just a few weeks ago, people have never been more excited about space travel," said Founder and Co-CEO Taber MacCallum. "Few endeavors are more meaningful than enabling people to experience the inspiring perspective of our home planet in space for the betterment of all, and that's what we are accomplishing with Space Perspective."

Opening the first research and education laboratory at the edge of space

Science and education are also core to Space Perspective's mission, and the company is working with researchers, educators and students from academic institutions and organizations. Payloads are already being manifested to fly on the first test flight in 2021. Neptune is suited for research areas of interest including:

•Atmospheric science that could shed light on Earth's climate and air systems
•Astro- and solar-physics to illuminate understanding of the universe
•Astrobiology to explore the limits of life on the planet and beyond

Space for Humanity, a nonprofit, has chosen Space Perspective as a preferred partner for their Citizen Astronaut Program and scientific research.
"Space for Humanity is cultivating a movement to expand access to space for all of humanity, and this partnership represents a big leap in making that happen," said Dylan Taylor, Founder of Space for Humanity and CEO of Voyager Space Holdings. "We are excited about the possibilities this partnership opens up for us, and what it means for all the participants that will be able to view our home planet from the edge of space."

Homebase at KSC

Space Perspective has signed a lease agreement with Space Florida, the state's aerospace and spaceport development authority, to locate its first Operations Center at the Midline Building at the Launch and Landing Facility (LLF), formerly known as the Shuttle Landing Facility (SLF). Space Florida currently operates and manages the LLF and accompanying facilities under a 30-year property agreement with NASA. "Space Perspective is bringing a fundamentally new capability to the Cape, which will enhance the offering we have in Florida for space-related research and tourism," said Space Florida President and CEO Frank DiBello. "Its presence here in Florida creates not just job and supply chain opportunities, but opportunities for civilian astronauts to experience this planet Earth from the Edge of Space, a privilege previously available to only a few. Its selection of our state marks a new era of spaceflight for Florida!"

Space Perspective and NASA have entered into a Space Act Agreement under which NASA may provide uniquely capable services available at KSC to Space Perspective on a reimbursable basis.

In addition to launching from KSC, Space Perspective will launch from Cecil Spaceport in Florida, and is planning to have future launch sites around the world, including Alaska, Hawaii and several international spaceports.

Space Perspective Capsule next to the Kennedy Space Center. (Artist's rendering). [Credit: Space Perspective]

Leadership with decades of high-performance balloon experience

Our leadership and crew members have led, developed or operated all human balloon flights to the edge of space in the past 50 years. The serial entrepreneurs Poynter and MacCallum co-founded World View Enterprises with its innovative balloon-based Stratollite for remote sensing, and Paragon Space Development Corporation, a human spaceflight technology firm. They were also part of the team that designed the air, food and water systems for Biosphere 2 in the early 90s and were on the first two-year mission inside. MacCallum is Chairman of the Commercial Spaceflight Federation and was chief

(Continued on Page 19)

What Makes a *Sustainment* Risk Management System Different from all Others?

(Continued from Page 2)

How is this risk related to reliability? I just don't see it.
But this has nothing to do with the mission.
Why do you think this will impact us that soon? It's just test equipment.
You haven't explained how the "if" leads to the "then".
We already have a risk with that title.
This doesn't seem like a propulsion risk, more like a systems engineering risk.
It is not appropriate for you to say that lack of data is a risk.

This last question illustrates the third biggest difference between sustainment risk systems and other risk systems. Yes, lack of data *is* a risk. It *should* be presented at a sustainment risk meeting.

Visualize an imaginary matrix of all your readiness factor versus the testing and observation you are investing to completely observe your system. Perhaps the area least monitored or tested is survivability against enemy attack? This should tell you to expend more resources in that area. Or someday, you will regret it. (Imagination is best used, because a real matrix with any fidelity would be ridiculously expensive. More on this in the next article.)

To recap: Readiness factors, timing, culture, and data. These are the major differences between a sustainment risk system and any other. You're a smart leader. You'll probably think of more. But if this article tickles your brain, you may want to go to charlesvono.com and read my AIAA SciTech paper on this subject: "First Steps in Implementing Weapon System Sustainment Model".

About the Author:

Please refer to the AIAA LA-LV May Newsletter (p. 31) in the AIAA Member Spotlight for the author' biography.

The Russian Buran Space Shuttle Revisited

(Continued from Page 3)

As it went past, the attaché took many pictures. It turns out that these pictures provided more details then we could obtain from satellite imagery. Once the data was taken, the attaché went home to get the bedsheets thrown down. He climbed up and the next day, the pictures left in an ambassador pouch.

This is part of the mystique and appreciation we had to get information on the Buran during the Eighties. The most highly prized object by the Soviets or Chinese would be acquiring a wind tunnel model of the American Shuttle. The Energiya was like an early external tank version where the major engines were placed at the base. In lieu of solid rocket boosters that could not be controlled once ignited, the Energiya would use liquid propelled rockets. The wings of the Buran itself were slightly further aft and without the heavy engines, this made the craft more aerodynamically stable compared to the American Shuttle.

Finally, the Soviets put together a considerable number of Burans to satisfy their requirements. One was modified for aft located jet engines used initially for testing performance by landing and later used for VIP tours around Moscow. The one that flew performed the mission within 10 seconds of the schedule, an extremely tough achievement.

What was the Soviet direction for this Buran fleet? Did it have other purposes rather than the original objective of dropping nuclear weapons from orbit? Would it be used to colonize the LEO environment for creating a separate Soviet Space station other than the International Space Station?

Well, the Soviets learned that this was a costly option and instead launched Proton payloads at about 1/6th of the cost of a Shuttle. For example, why launch a 180,000-pound taxi to place 20,000 pounds into orbit when you could launch the entire amount of 200,000 pounds into orbit? These are things we as well as the Soviets had to learn. Where was the pathway to use this capability to set humankind into orbit?

And then almost overnight, the Soviet Empire collapsed under the competing pressures created by SDI, computers, and expansive technology achievements in America. What became of these magnificent machines?
A difficult visit to Baikonur while investigating an empty shed was revealed….

(Continued on Page 13)

The Russian Buran Space Shuttle Revisited *(Continued from Page 12)*

The Russian Buran Space Shuttle. (Courtesy of P.A. Murad)

It is hard and emotional to look at these crafts under decades of dust-covered by ghosts which were once to be an achievement beyond your imagination. One wonders what the former engineers and scientists that worked with this would feel after seeing this…

P.A. Murad
AIAA AF

About the Author:

Mr. Murad has a B.S.M.E. from the Polytechnic Institute of Brooklyn and an M.S.A.E. and Astro from New York University School. He has over 44 years of experience to include 30 years of government service to include working for NASA Houston on the Apollo and Space Shuttle programs. He developed DoD a methodology for an advanced technology jet engine effort and developing technology for the National Aerospace Plane (NASP) Program. He has worked 18 years as a contractor with Aerojet working on the NERVA nuclear rocket engine; Martin Marietta on strategic/tactical missile systems and the Shuttle External Tank; General Electric designing ballistic and maneuvering reentry vehicles; Science Application Incorporated (SAI) supporting lethality studies for the Navy s High Energy Laser Project; Bendix Corporation for second-source production for the HARM missile; and AAI Corporation designing both guided and unguided artillery shells.

Mr. Murad was the Chairman of conferences to include: Using Magnetohydrodynamics to enhance Scramjet Propulsion, the 1st International High Frequency Gravity Wave Conference and was conference chairman for 5 years of the New Frontiers and Advanced Space Propulsion Conference of STAIF. He has over 100 publications to include 60 technical papers; 15 of these involved formulating new gravitation laws.

Ideas for Sustainable Cities and Urban Farming… on Mars? *(Continued from P. 4)*

I used an image for the MCD 2020 competition, but there's a video that's even better from the site: https://www.marscitydesign.com/mars-urbanfarming-design-2020

"MCD facilitates access to the space industry," said Mulyani. "We call the people from creative backgrounds, architecture, design, to join the engineering teams. We use our educational platform, annual contest to design the Mars settlements. Governments, corporations, and academics unite to solve common challenging issues for human wellbeing in this extreme environment design."

After every competition, Mulyani and MCD select the teams and individuals that they'd like to work with and invites them to join their efforts. They then have the privilege of building a prototype of their design on the MCD property in the Mojave desert, where the geological conditions are quite similar to those found on the Moon and Mars. In addition, every competition has a general theme that emphasizes a different aspect of life.

For example, the 2016 competition kicked things off with a focus on the general theme of "Urban Design and Architecture." The theme for 2017 was "AI Robotics and Engineering," while 2018 and 2019 were concerned with transportation and sports, respectively. This year, as Mulyani explained, the theme is "Urban Farming," where teams will be tasked with designing buildings that can accommodate agricultural operations:

"Every year we have a different theme. This year specifically we want to focus on the food supply and so the systems that can provide this. Again, we put the importance to not just cover the basics, how long can we really stay, if we only eat potatoes every day?"

Mars Olympia by Sylve and Pierre Jacques Truyman. [Credit: Mars City Design]

Here, Mulyani is referencing not only the well-known thread from Andy Weir's *The Martian*, but also a scene from Netflix's *Space Force*, where astronauts in a simulated lunar habitat are forced to eat nothing but potatoes. As General Naird (Steve Carell) says in the course of inspecting the habitat, "You guys really doubled-down on the potatoes! Ever think of growing some asparagus?"

"We will start with a delicious menu that can stimulate the crew's motivation to continue living with joy, then think backward on how we can supply the ingredients self-sustainably," Mulyani added. "If not? For example, one likes only some "Boeuf Bourguignon" but mom is not with her on Mars? Can we find an alternative way to make this food or do we train to become a vegetarian? Should we grow these animal-based foods? How?"

While a different theme is highlighted every year, the others are still included as part of with each competition. At the end of each competition, awards are assigned for different types of innovations, including architecture, design, transportation, sustainable energy, artificial intelligence, virtual reality/augmented reality applications, and others.

The overall emphasis on sustainability is something Mulyani is no stranger to. After earning her Masters in Architecture, Landscape, and Urban Design from the Ecole d'Architecture de Nantes, she moved to New York. It was here that she divided her time between film-making and designing ways to convert damaged industrial areas into sustainable "Green Zones" by incorporating the natural environment into human living spaces.

Redwood Forest by Redwood Forest Team at MIT. [Credit: Mars City Design]

(Continued on Page 20)

LIFE AT "THE SPACESHIP FACTORY"

(Continued from Page 5)

employee was keeping from getting lost. We had a grid system that allowed you to find your location based on compass coordinates. N10W10 put you at the front door of the rotunda main entrance. It worked fairly well but a phone call and milestones still got you to your destination.

Work was clustered by departments and similar activities; Engineering had offices and drafting rooms, Finance and accounting had offices, Manufacturing had the shop floor. Then there were the support groups, maintenance, cafeteria, mail room, Quality and Inspection and tool cribs and supply centers. An emergency command center provided security and fire control services. As the new computer technology migrated into the work environment Information Technology or "IT" was born.

Because of the vast layout of the plant one could get a full day of exercise just walking from location to location. I measured my distance once at about 5-7 miles per day, good exercise. There were some jobs like the computer encoders and tool crib operators who did not get out much but were tied to their work stations.

Another unique characteristic of this factory was the program art. From even the earliest days of the programs large art panels depicting the designs and dreams of success were hung on the walls in the halls. There was even a special gallery that ran from the west side of the main Building 1 to the east side, about 300+ feet. It was called "Legacy Hall" and depicted a timeline of the companies program history from the early aircraft days to the projected future space concepts. Posters and art were commonplace throughout all areas of the facility many reminding workers of rules and safety items as well as encouraging teamwork. Manned flight awareness was always promoted with employees and became even more prevalent after the Apollo One fire accident. Most of the original art work has been preserved by the Aerospace Legacy Foundation and the Columbia Memorial Space Center.

We tended to forget that the factory in Downey was a government facility and as such was bound by strict DoD rules and regulations. The government would periodically remind us with surprise audits. Because of these security regulations we seemed to forget that the general public was not apprised of what happened on site. The most common comment I get from people when we talk about the site is that they remember walking or driving by and wondered what happened beyond the fences and guard shacks. It wasn't really a mystery; we were just building the spaceships to take men to the moon.

THE PROGRAM

When I first came to the Downey Spaceship Factory I was assigned to the Quality Labs working in Building 4 south of Imperial highway. That Building is now part of the Los Angeles County School District. I was doing fluid analysis on hardware systems to determine if they were clean enough for use on our spacecraft. I was also doing forensic lab analysis on hardware failures. We were contracted to build the second stage of the Saturn V Launch rocket and the Apollo Command and Service Modules The two most interesting aspects of that work was first these were hardware design and development programs, which meant there was no "follow the blueprint/specification", we had to write them. We were inventing the technology as we went along. The second part was the "failure" and mistakes, and we made a lot of them, but we controlled them in the labs and on the test sites. When the final spacecraft was ready to be delivered we knew everything there was about its planned performance and risks.

The challenges of the SII was its huge size, over 20 feet in diameter and almost three stories high. We had to use the Navy facilities in Seal Beach because of these huge components. This meant working from our offices in Downey until we could build a facility near the Navy Station. Learning to work at multiple off-site locations would become a large part of the Spaceship factory routine.

The Apollo Command module and service modules were more manageable and could be handled at Downey, however we still needed a production and test integration facility so we built Building 290 a marvel for its time in 1963. It was the largest cleanroom facility in the world – for 6 months, then the Russians built a bigger one, well it was a space race. Building 290 had four ground stands to accommodate a mated Command and Service Modules. Here we could install systems, test, power them and checkout all functions before shipment to the Kennedy Space Center. The building had a High Bay ceiling that was over 60 feet and a Low Bay at 40 feet. It was larger than a football field in area and it was climate and particulate controlled. It was a remarkable place to work. It looked like a spaceship factory.

(*Continued on Page 21)*

You're Never Too Old for Space Camp: My Experience at Educator Space Academy

(Continued from Page 6)

The shuttle trainer used for the simulated mission is a switch-for-switch replica of Columbia on STS-1. (Courtesy of David Hitt)

One of the more iconic parts of the Space Camp experience – the Multi-Axis Trainer. (Courtesy of David Hitt)

We'd done some cool things already by that point. We'd strapped in to a rig that simulated the gravity of the moon, one-sixth of what we experience here on Earth, and bounced across the room. We'd trained for our Mars mission, learning our assignments supporting the first astronauts on the Red Planet as they launched for home.

But we'd been a group of strangers doing really cool space activities together. Which, you know, is not a bad way to spend your time.

That night, though, as we prepared our eggstronaut's lander and rover to keep it safe as it dropped one story and then rolled down a ramp,** my small group of Andrea and Jennifer and I became a team.

Over the coming days, the rest of my group, Team Harmony, became a team. And, ultimately, that experience was as powerful and meaningful and enjoyable as any experience we had in fake space. Which, trust me, is saying something.

It was a privilege for my first Space Camp experience to be at Space Academy for Educators, a program I've volunteered to support countless times in the past. The activities were interlaced with enrichment on how to take the excitement of Space Camp back into the classroom.

I had my own powerful moment along those lines leaving my laboratory on the Martian moon, where part of my job had been to conduct a science experiment. I realized afterwards that the experiment I did could have been a classroom activity in a middle school or high school, and middle or high school me would have been mildly interested in it back in the day. But I hadn't been doing it a middle or high school, I'd been doing it on A MOON OF MARS, and I did that science like humanity's future in space depended on it. Lesson learned.

When I'd registered for Camp originally back in February, I had no clue what 2020 was to hold – no clue that I would ultimately end up attending Space Camp in the days of coronavirus. The staff did an incredible job reacting to an unimaginable circumstance, providing an experience designed to keep us safe during a pandemic while still being as enjoyable and enriching as any prior camp. I was impressed.

Posing with two rockets before launching the smaller one, built as part of the Camp experience. (Courtesy of David Hitt)

(Continued on Page 22)

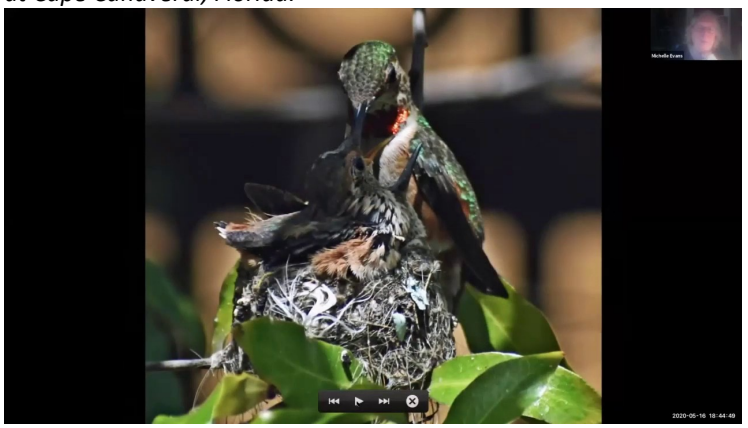
First-ever AIAA LA-LV Talent Show ! (Led by Dr. Daniel P. Raymer)

16 May, 2020 *(Screenshots Only)* *(Continued from Page 7)*

Dr. Charles Jackson (Northrop Grumman) played the recorder very professionally. Nice music! Very enjoyable!

A time exposure of Delta II launch 202 in January 1991. The location was in Coco Beach, approximately 10 miles south of the launch pad at Cape Canaveral, Florida.

Valerie Lawdensky's beautiful voice with a galactic virtual background impressed the audience. Her presentation on nuclear power in AIAA LA-LV Student Branches mini-Conference 2018 was very well-received.



Michelle Evans has been passionate about mother nature. She found the Mamma and Chicks hummingbirds amid the COVID-19 lock-down and worried about them. She took a series of inspiring photos and they were shared among the AIAA LA-LV communities.

Michelle Evans sharing her professional photography happily with the audience. She is the founder and president of Mach 25 Media (www.Mach25Media.com) and is a writer, photographer, and communications specialist in aerospace. She has written the bestselling book "The X-15 Rocket Plane, Flying the First Wings into Space" which was published by the University of Nebraska Press as part of their "Outward Odyssey, People's History of Spaceflight" series.

Space Shuttle Challenger after its arrival at Edwards AFB and mating to the 747, showing the Challenger on the back of the 747 SCA as it took off to head to Kennedy Space Center for the first time on July 4, 1983. The flight took place just a few hours after the landing of Columbia on STS-4. President Reagan and approximately one million spectators were present in and around the base for this event.

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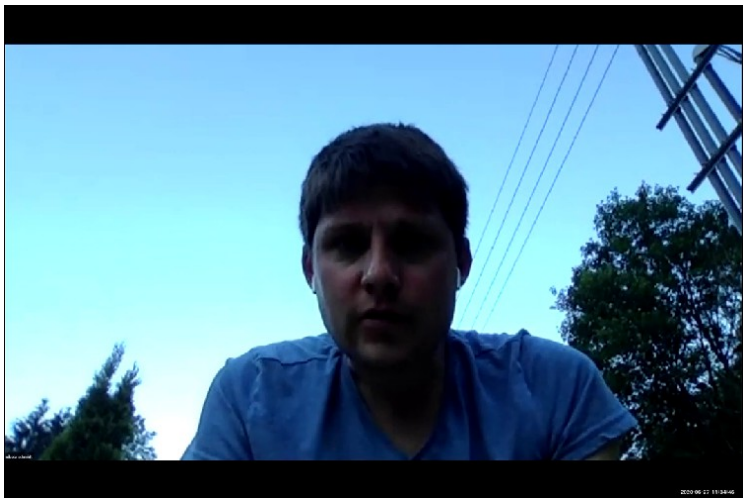
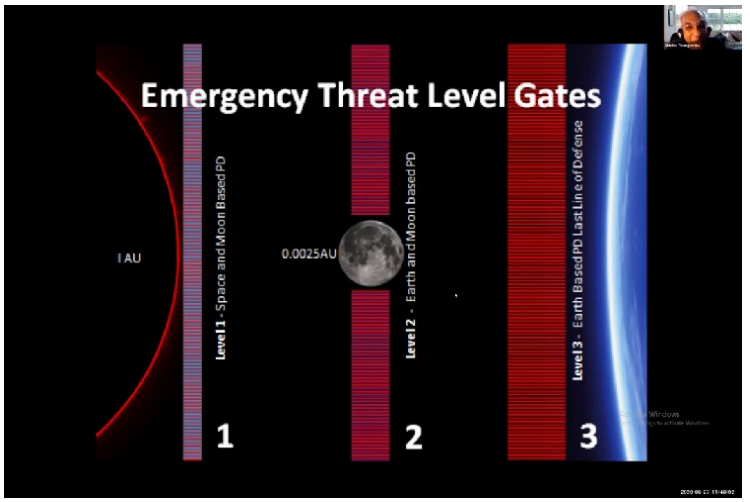
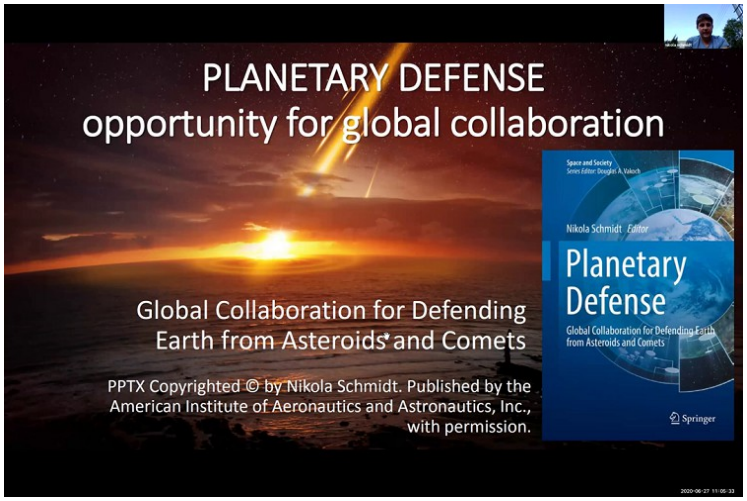
AIAA LA-LV Planetary Defense and Asteroid Exploration (PDAE) e-mini-Conference (27 June, 2020) *(Screenshots Only)* *(Continued from Page 10)*



Dr. Nikola Schmidt (Charles University) from Praque, Czech Republic.



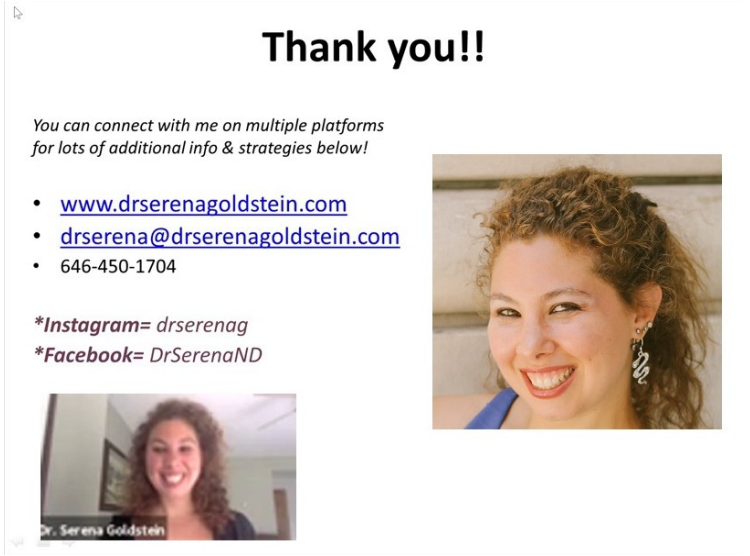
Step-by-Step Defense Levels mentioned by Prof. Madhu Thangavelu.



Dr. Schmidt mentioning the Planetary Defense book he edited.

Dr. Serena Goldstein sharing tips for coping COVID-19 stress & Crisis.

Prof. Madhu Thangavelu (USC) talking about the USC ASTE 527 course instructed by him, and the Moon-Earth Directed Energy NEOs Defense System.



Dr. Serena Goldstein's talk enhanced the scope of PDAE as well.

(Continued on Page 24)

SPACE PERSPECTIVE TO FLY PEOPLE AND PAYLOADS TO THE EDGE OF SPACE

(Continued from Page 11)

Space Perspective Full Balloon at High Altitude (Artist's rendering). [Credit: Space Perspective]

technology and safety officer for StratEx, a project that launched Google Executive Alan Eustace to 136,000 feet under a balloon and returning him safely under parachute to earth, breaking the Stratos Spacedive record in 2014. Eustace is a Space Perspective board member. Kirby Harris with Base Ventures, a Silicon Valley Venture Capital firm and Space Perspective lead investor, also serves on the board. NASA Astronaut Jeff Hoffman will serve as senior technical advisor.

To learn more about Space Perspective, visit TheSpacePerspective.com. Visit this link to view the electronic media kit, including leadership headshots, conceptual imagery and video.

Space Perspective the Capsule (Artist's rendering). [Credit: Space Perspective]

About Space Perspective

Space Perspective is a human space flight company committed to fundamentally changing people's view and perception of Earth. Using a high-performance balloon and pressurized capsule technology that gently travels to and from the edge of space over a six-hour period, the spacecraft offers opportunities for groundbreaking research and life-changing travel experiences for world explorers. Space Perspective is led by a team of professionals that have developed or operated all human balloon flights to the edge of space in the last 50 years. For more information, visit TheSpacePerspective.com.

Space Perspective – At the LaunchPad (Artist's rendering). [Credit: Space Perspective]

Jane Poynter, Co-CEO and CXO. [Credit: Space Perspective]

Taber MacCallum, Co-CEO and Founder. [Credit: Space Perspective]

Ideas for Sustainable Cities and Urban Farming… on Mars? *(Continued from P. 14)*

As for where these habitats and Martian cities will be built once humans get to Mars, that is something these competitions are exploring as well. While many proposals have recommended building Martian settlements underground or in lava tubes (to take advantage of the natural radiation shielding), MCD strongly suggests that designers consider innovations that will allow for safety while preventing feelings of isolation.

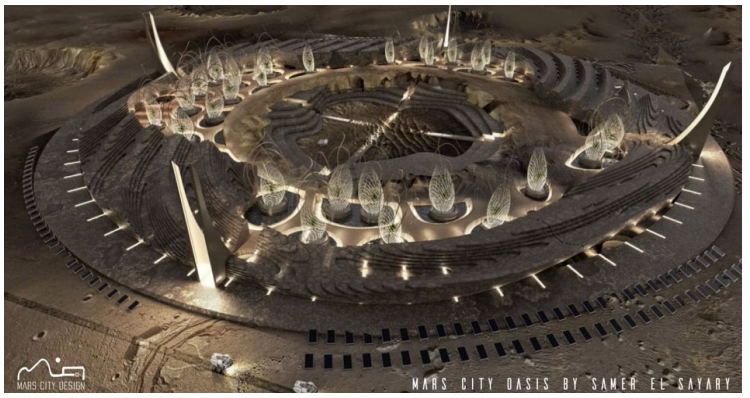
This includes the use of materials that can provide shielding from radiation while also creating transparency - i.e. advanced glass facades. As Mulyani asks, why should anyone go to the Moon or to Mars if they are only going to live underground with no natural light or a view? In this sense, MCD is motivated to find innovative solutions rather than "reactionary problem solving."

A popular idea is to build within Valles Marineris, a natural system of canyons that run east-west near the Tharsis volcanic region. In the past, proponents of Martian settlement have advocated for this location because natural depressions on Mars are where atmospheric pressure is highest. Compared to the planetary average of 6 mbar (0.6% of Earth), atmospheric pressure in Valles Marineris gets up to 11 mbar (1% that of Earth).

Similarly, in the massive southern crater of Hellas Planitia, air pressure can get as high as 12.4 mbar - still very thin, but twice the planetary average. Once again, the purpose here is to look beyond mere survival and create conditions that are liveable. Said Mulyani:

"We are studying a few different places that have the safety characteristics on Mars that can also provide scientific interests for the trip's missions. We believe - again - we are not limited to the past vision of 'living underground.' There are not enough favorable configurations in the characters of the lava tubes or underground in question, other than to be safe. We want to expand the vision from surviving to thriving."

To raise awareness about Martian exploration and sustainable living, MCD also participates in competitions and events with other organizations. For example, last year they took part in the NASA 3D-Printing Habitat Challenge. Their entry, Alpha 3.0, was inspired by the dark, naturally-occurring dunes that are found in a crater located in the larger Syrtis Major Planum formation.



Mars City Oasis by Samer El Sayart (Credit: Mars City Design)

This area is rich in ice water and mineral resources, which the Alpha Team would leverage to create their habitats within the walls of the local dunes. This would provide natural insulation and shielding from radiation and micrometeoroids while still allowing for access to (and views of) the surface, ensuring that the inhabitants feel connected to the surrounding environment.

Their concept was part of Phase 3 of the competition - aka. the On-Site Habitat Competition - where teams were tasked with fabricating sub-scale models of their habitats. Their entry was one of the top 10 winners of the 2019 competition, and the prototype will be assembled by MCD in the Mojave desert.

There's also the Martian Feast Gala, a non-profit fundraiser that MCD has been hosting for the past eight years. Last year's event, the Martian Feast 1010 (held on Oct. 10th, 2019 in Culver City, California) featured guest speakers, musicians, artists, luminaries, and members of the NewSpace industry. It also featured examples of "Martian cuisine," which consisted of superfoods grown using a zero-waste process.

https://youtu.be/bqEve6G3Ldo

This past March, Mulyani also collaborated with Photo Zurich last year to create the Micro-Macro Universe project. This photo exhibition showcased original images of Earth, space, and human beings (taken by Mulyani and colleagues) for the purpose of showing how everything in the Universe is a matter of scale. This, said Mulyania, is crucial to her understanding of nature as well as her architectural design process.

(Continued on Page 25)

LIFE AT "THE SPACESHIP FACTORY"

(Continued from Page 15)

We built over 27 Boilerplate vehicles several mockups and 18 spacecraft for the Apollo Program. The anticipated follow on production for the program was never realized so after the last mission and a detente mission with the Russians the future of the factory was in the hands of our proposal team for the new "Reusable Space Transportation System" the "Space Shuttle". In early 1972 North American Rockwell was awarded the Prime Integration and Orbiter contract. The Spaceship Factory would move on to a new generation of spaceships.

The contract award celebration is a story of legend. After the announcement of our win came, the proposal team and anyone else around rendezvoused at the Tahitian Village in Downey to celebrate. A proposal manger filled a pickup truck with ice and champagne and parked it outside the hotel. The rest of the stories of that day and night are told after hours at shared reunions.

The Space Shuttle was even more challenging than the Apollo. It was technologically more complex and while it did not have to travel as far to the moon, it had a 100 mission or ten-year reusable service life. Much of what we had learned on Apollo and Saturn would be invaluable but in many cases we were starting from scratch. The most significant of the design challenges was the thermal protection system. NASA and Lockheed had developed a new "glass" tile they wanted to use. This TPS was a remarkable material but a fabrication/operation challenge.

The other issue was that 80 percent of this contract needed to be subcontracted which made management and communication a nightmare. We also could no longer consider the Downey site for assembly and integration once again because of the vehicle size. So Palmdale became the assembly and integration site some 50 miles north of Los Angeles in the high desert.

When you look at the major contributions made by the Downey Spaceship Factory, high on the list is are the integration tools created to develop and manage such a complex program as the Space Shuttle. Customers spread between Texas and Florida, over 2500 subcontractors across the US. And working staff spread over the same areas. Then there was also the "tons" of documents and paper supporting the program. The computer technology had been developed during the Apollo Program but was still a work in progress at the start of the Shuttle Program The first production vehicles of the Orbiter Program were still utilizing the earlier Apollo technology tools and paper intensive data processing. The good news was we were learning faster.

The Downey site still had production obligations; the Orbiter forward crew module section and the Aft Main engine compartments would be built and integrated a Downey. They were then transported by truck to Palmdale for final installation and integration. There would be a constant stream of workers between LA and the desert, we even had our own regularly schedule airline between the sites. By the time we were into the middle of Orbiter production everyone began to understand the scale of this work and its technical complexity. All focus became mission success and safety. With the Challenger accident we were reminded of the risks of mistakes and short cuts. The Space Shuttle was a development vehicle not an operational production hardware item. The Spaceship Factory was a custom tailored build shop creating one-of –a –kind spaceships. Each of our seven orbiters are distinctively different from each other. The atmosphere at Downey was one of perceived craftsmanship. Everyone was committed and dedicated to doing their best work. A system of checks and balances helped us achieve these craftsman goals.

In the mid 90's the factory environment began to change with the Boeing acquisitions. We now confronted first the culture shock of combining our resources and philosophies with a previous competitor's culture. Every attempt was made to assure a smooth transition to the new combined corporate environment. The transition would take over 5 years and none of the organizations would be the same again.

The Shuttle Program continued to survive for a number of years with a split management between JSC Houston and Boeing HB.but it was the crisis of leadership in Washington and NASA that would doom the program to cancellation. Once again as with Apollo a new strategic direction was deemed necessary at NASA and the Orion and Mars initiatives were targeted for the future.

THE PEOPLE

Any reflection on the people history of the Spaceship Factory must logically begin with "Stormy", Harrison Storms, the leader of the "Storm Troopers" his in house team which successfully captured the Apollo contract for Downey.in 1962. After winning the contract from NASA,

(*Continued on Page 26)*

You're Never Too Old for Space Camp: My Experience at Educator Space Academy

(Continued from Page 16)

The lander and rover built to carry an egg safely through a one-story drop. (The eggstronaut survived intact!) (Courtesy of David Hitt)

The 1/6th-G chair lets a Camper experience what it would be like to walk in lunar gravity. (Courtesy of David Hitt)

On the last full day, I found myself where I'd long dreamed of being – in the cockpit of the space shuttle, a switch-for-switch replica of what the crew flew on the first shuttle launch, tasked with piloting the orbiter from Earth's surface to the International Space Station.

My crewmate on the orbiter had a story with beats similar to my own. She'd watched Space Camp: The Movie back when it first came out, and wanted to go, but it was a dream too big back then. And now, decades after the movie came out, here we both were, about to fly the space shuttle.

We'd made it.

You're never too old for Space Camp.

Information about booking your own Space Camp experience, including Adult Space Academy and Space Academy for Educators can be found at SpaceCamp.com.

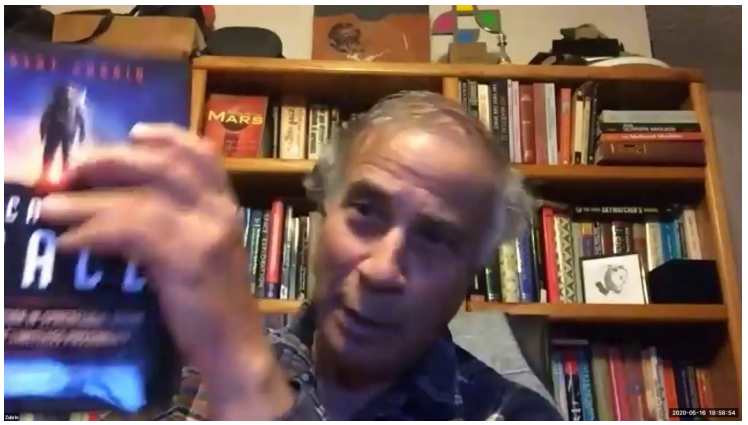
*Number of times a person should watch it: Twice. No more, no less.

**That egg survived intact. Our second egg, for the activity where we built a heat shield to protect an egg from a blowtorch, came through the experience neither intact nor even edible.

First-ever AIAA LA-LV Talent Show ! (Led by Dr. Daniel P. Raymer)

16 May, 2020 *(Screenshots Only)* *(Continued from Page 17)*

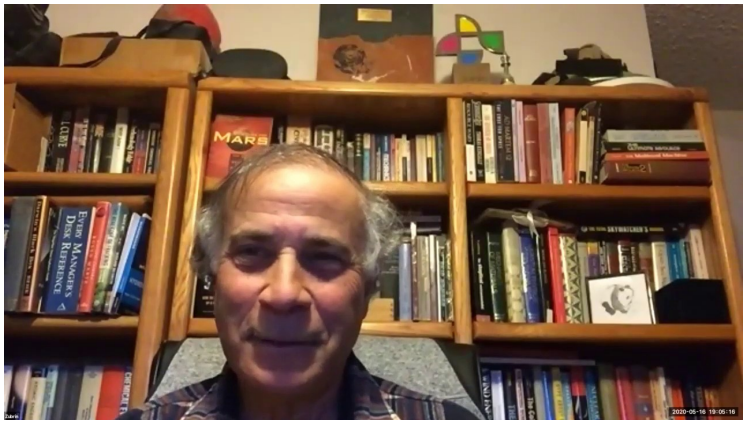
Kurt Kloesel (NASA Dryden) putting his heart into the show and dressed up in the timely costume of COVID-19 PPE, bringing the fun theatrical effect to the show.



Dr. Robert Zubrin being very humorous and blending his recent best-seller "The Case of Space" into his poetry / reading of the night, which was fun and entertaining.

Kurt Kloesel immersed in his performance while mixing the real-life situation into his humorous song lyrics and performance.

Aldo Spadoni (AIAA member, former Northrop Grumman aerospace engineer), a renowned aerospace artist, sharing his artwork and experiences with the attendees.



Dr. Robert Zubrin (President of the Mars Society), a world-renowned leader in Mars Colonization and related astronautics, has some very exciting hidden talents, including poetry and poetry chanting.

Some examples of Aldo Spadoni's master pieces, including the Saturn-V art that was adopted by Estes for their Apollo 11 50th Anniversary Saturn-V rocket model. (AIAA LA-LV received one as donation from Estes, and gave it away in the raffle drawing during the AIAA LA-LV Apollo 11 50th Anniversary event in Santa Monica, CA.)

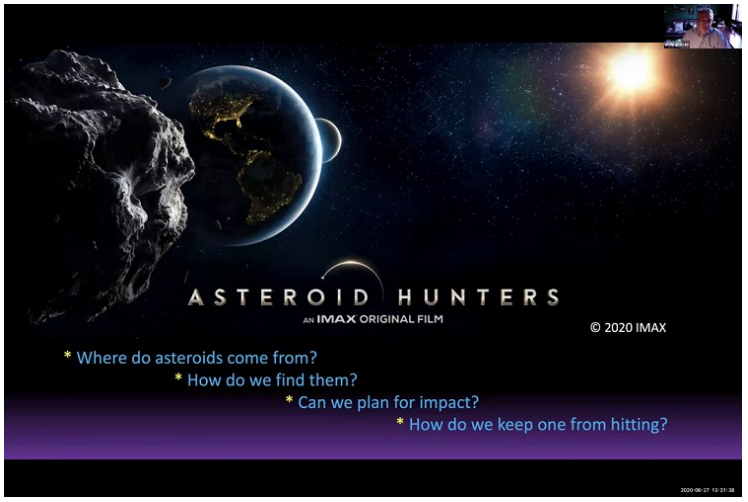
(Continued on Page 28)

AIAA LA-LV Planetary Defense and Asteroid Exploration (PDAE) e-mini-Conference (27 June, 2020) *(Screenshots Only)* *(Continued from Page 18)*

Mr. Liam Kennedy enthusiastically showing the ISS-Above gizmo he invented and making the demo about it.

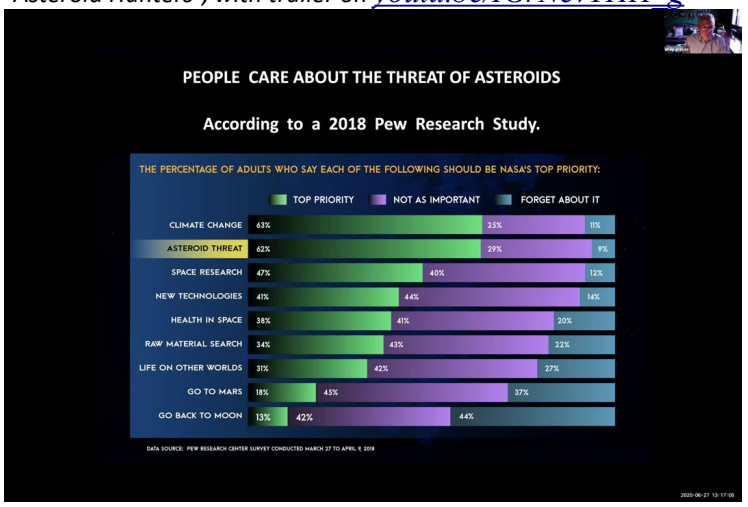
Mr. Philip Groves talking about the importance of media in Planetary Defense and Asteroid Exploration, and STEM Education.

Mr. Kennedy showing a video from the ISS camera capturing the trace of a meteorite.



Mr. Groves introducing the IMAX documentary film he produced, "Asteroid Hunters", with trailer on youtu.be/IGrNevYHH_g

Mr. Kennedy demonstrating the ISS-Above showing the image of the ISS components with South Pacific Ocean in the backgrounds.



Asteroid Threat ranked #2 in an 2018 poll for NASA priorities.

(Continued on Page 29)

Ideas for Sustainable Cities and Urban Farming… on Mars? *(Continued from P. 20)*

In the meantime, MCD is working on the creation of the Mars City Research Center, a small urban infrastructure concept that is being built in the Mojave Desert. Dubbed "A Space Oasis," this location will consist of self-sustaining human habitats run on clean energy, and will include housing and laboratories that will be available for space startups and space organizations.

Once complete, Mars City will also host science retreats, an aerospace kindergarten (educating the young about how space exploration benefits life on Earth), and Martian farming experiments - where scientists will attempt to find optimal solutions for growing crops in Martian soil simulants, paralleling research conducted by NASA and various research labs.

In short, Mars City is a prototype of what MCD hopes to one day build on the surface of Mars. When that happens, all of the concepts, prototypes, innovations, and ideas that Mulyani and her organization have inspired over the years will be applied and leveraged to create the first sustainable human city ever built on another planet.

Alpha 3.0 habitat interior. [Credit: Mars City Design/Séries&Séries]

For this year's competition, Mulyani also emphasized how recent events (the COVID-19 pandemic) have helped to raise awareness about "living in isolation." This, as she indicated, provides valuable lessons when it comes to the prospect of living on Mars:

"Our point of view in this is still based on our belief about "living beyond survival" and thriving. It is crucial to create an indoor living space that gives us outdoor comfort. Incorporating all aspects of our activities into the living place. We may eliminate the torture of constant traffic jams and pollution in the long run. Building self-reliability and teaching that to the next generation. All can be done in house and locally."

This year's competition promises to be an inspiring one. The entries will be judged by a panel that includes NASA astronaut Col. Terry Virts, ecology expert Mackenzie McAller (CEO of Geonauts), and architectural professor Samer El Sayary. The winning submission will receive The Mars City Design Award, international recognition, and will see their design added to the MCD "hall of fame" in the Mojave desert.

Those interesting should check out the Mars City Design competition page, and their registration page on Eventbrite. Registration will remain open until August 30th, 2020, and the window for submissions closes at 11:59 p.m. PDT on Sept. 15th, 2020 (02:59 a.m., Sept. 16th, EDT). The winner of this year's competition will be announced on October 1st.

Be sure to check out this recent interview with Guide Force, where Mulyani shares the lessons she has learned regarding how one takes a dream from the conceptual stage to reality. And be sure to check out this MCD video that describes the purpose and vision of their organization and features commentary by Andy Weir, Slade Gardner (founder of Big Metal Additives) and NASA scientist Kip Thorne:

https://youtu.be/NEzHHaHzldg

Further Reading: Mars City Design

Aboout the Author:

Matthew S Williams is a writer for *Universe Today* and *Stardom* and a science fiction writer. His articles have appeared in such publications as *Phys.org, HeroX, Popular Mechanics, Business Insider, Gizmodo/IO9, Science Alert, Knowridge Science Report,* and *Real Clear Science.* His areas of specialty include astronomy, Earth science, the history of space exploration, and the future of humanity in space. He lives in Esquimalt, British Columbia, with his wife and family.

LIFE AT "THE SPACESHIP FACTORY" *(Continued from Page 21)*

the Downey site doubled in size, from 7000 to 14000 employees. It was a gathering of the best and brightest from around the country. That was the easy part they now had to meet an arduous schedule and performance demand from their new customer NASA.

Besides dealing with all the operational challenges of a rapidly expanding factory site and new technology demands, there was a continuing lack of customer design definition. The NASA was also learning about this new manned spacecraft stuff. The single biggest problem was the constant design change request that kept flowing in to the factory. It was not unusual for a single spacecraft part to have hundreds of design changes before it got to the shop floor, if you were lucky they came in before the part had been made. This created a waterfall effect on schedule and costs. The frustrations of these conditions caused serious friction between Downey and Houston. In retrospect the two principals Stormy and Joe Shea became the victims of the fallout.

In spite of this leadership challenge at the top the Factory survived because of the tenacity and growing team building going on throughout the design centers and shop floor. The people working on this program "got it!" They knew no one could possible do this alone and success would only come from a team effort. Meetings would be heated and loud but it was out of concern and commitment to success.

As with any large organization there was a stratification of roles and responsibilities. It started with the payrolls. There was the hourly, who punched the clock, then exempt who filled in their time, then the salaried. The other layers were management, professional staff (engineers), then there was the administrative and clerical. The system worked. You knew where you fit in and you had opportunities to move over and up. This contributed to a functional working environment. Most management had some idea as to what their role was and subscribed to the teamwork strategies.

The Spaceship Factory was a pleasant, almost fun place to work. You would look forward to going to work and the new challenges that might lay ahead. There was a higher than average divorce and health failure rate among the personnel mostly due to the long hours and job stresses. Extensive travel always took a toll among the staff.

There was a self-correcting effect from this working environment. Because of the program and job complexities sharing skills and resources was an imperative. Those who did not share while meeting with some short term success, would end up creating a dead end for themselves that would eventual remove them from the team.

You always felt like you were part of this very important project that was going to be successful. We wanted it to be successful, and we would make it happen

EPILOG

As with Camelot,

EACH EVENING, FROM DECEMBER TO DECEMBER, BEFORE YOU DRIFT TO SLEEP UPON YOUR COT, THINK BACK ON ALL THE TALES THAT YOU REMEMBER OF CAMELOT.

Ask ev'ry person if he's heard the story, And tell it strong and clear if he has not, That once there was a fleeting wisp of glory Called Camelot.

Camelot! Camelot!

Now say it out with pride and joy!

Yes, Camelot, my boy!

Where once it never rained till after sundown, By eight a.m. the morning fog had flown… Don't let it be forgot

That once there was a spot

For one brief shining moment that was known As Camelot.

Alan J. Lerner – Camelot, Musical 196

From 1962 to 2000, There was a Spaceship Factory in Downey California that served as America's Cradle for the Cosmic Age.This was our "Cosmic Camelot". People from all over this nation came together to explore beyond our world, not to make weapons of war but the tools of learning and discovery. Spacecraft, to take us to new worlds and new possibilities. A great team was formed that rallied around our nation's leader and his vision of what we could do with our resolve. We met that goal and went beyond with even greater dreams. Dreams that have been forgotten and replaced with visions of new priorities. The stories remain with those who know the tale and made that history not so long ago. But for one brief shining moment we were a global nation of one sharing in that magnificent accomplishment that came from the "Spaceship Factory". (*Continued on Page 27)*

Gerald Blackburn Spaceship Factory Engineer 1962 – 2003

LIFE AT "THE SPACESHIP FACTORY" *(Continued from Page 26)*

Gerald Blackburn

North American Rockwell Engineer

About The Author:

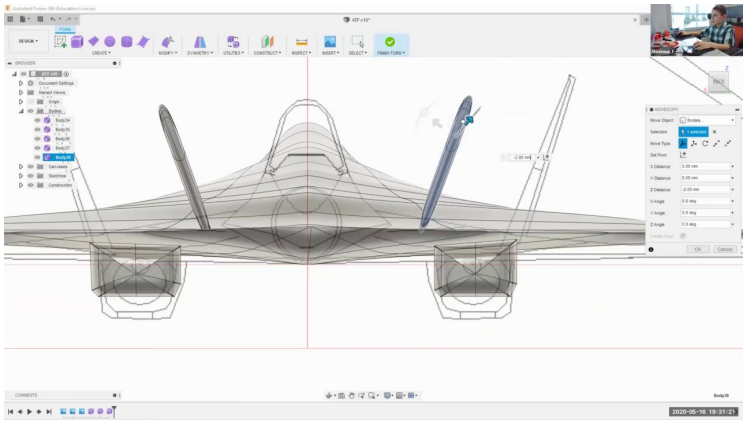
Gerald is a native southern Californian who had a forty year plus career in Aerospace Engineering. He began at North American Aviation in 1962 and has worked on the X-15, the XB-70 Valkyrie, Apollo, Saturn SII, Apollo ASTP and Space Shuttle Programs. He has also participated in the public education community as a local school board member, teacher, and STEM curriculum designer. After retirement in 2003, he helped create the Aerospace Legacy Foundation and presided as president for several years. He has published the recent book, "Downey's Aerospace History" by Arcadia Publishing. He is Founder and CEO of Tinkers Corner LLC and a member of the Columbia Memorial Space Center Foundation Board of Directors. You might have seen him or heard him in some of the recent documentaries celebrating Apollo's 50th anniversary on CBS, NBC, Discover, History, Science, PBS American Experience, PBS https://www.kcet.org/shows/blue-sky-metropolis or the Apollo Chronicles. You also might have heard him as commentator during the long slow ride of the Endeavour shuttle to her new home in California. You can see his interview on YouTube: https://youtu.be/XXSgOtYOV6Q Images and Some editorial material courtesy of NASA. Article Copyright G.A. Blackburn April 2020

First-ever AIAA LA-LV Talent Show ! (Led by Dr. Daniel P. Raymer)

16 May, 2020 *(Screenshots Only)* *(Continued from Page 20)*

Maximus Trest, a child prodigy in Canada, performing live CAD design in front of the audience online.

Dr. Jeffrey Puschell (AIAA Fellow, Raytheon), a renowned astrophysicist and leader in aerospace, sharing his hidden talent in professional quality photography.



Maximus Trest demonstrating his skills with a case of an advanced aircraft design, through fluent CAD usage.

An impressive photo of the solar flares by Dr. Jeffrey Puschell, demonstrating the combination of the skills and passions in photography and astrophysics.

(Continued on Page 25)

First-ever AIAA LA-LV Talent Show ! (Led by Dr. Daniel P. Raymer)

16 May, 2020 *(Screenshots Only)* *(Continued from Page 23)*

"Doe with Fawns.," Artistic Photography by Dr. Jeffrey Puschell (Raytheon), AIAA Fellow, former AIAA Region VI Director, former AIAA LA & LA-LV Section.

Ms. Olivia Rox, a professional singer and an American Idol Top-10, joining this event as a special guest, listening to the introduction by Dr. Raymer and saying a few words to the audience.

"Rose in the Garden," Artistic Photography by Dr. Jeffrey Puschell (Raytheon), AIAA Fellow, former AIAA Region VI Director, former AIAA LA & LA-LV Section.

Ms. Olivia Rox singing the first song while playing her guitar in her studio, impressing the audience very much with her professionalism and beautiful voice.

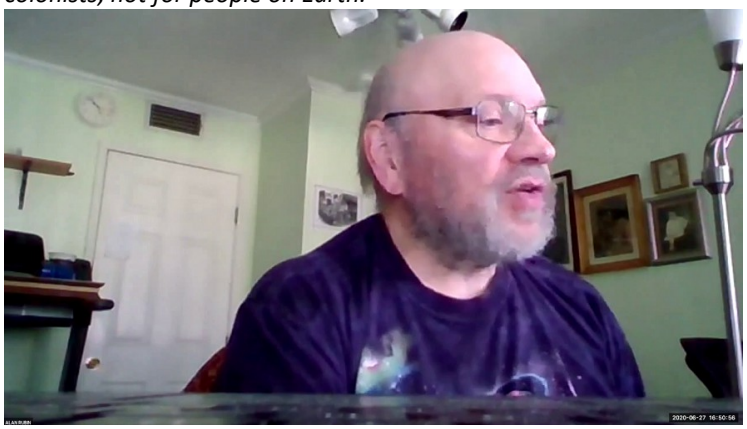
Dr. Jeff Puschell concluded this photo/talent show for the night with a photo of him and his wife, Ms. Dana Puschell (also an AIAA member, and former AIAA LA-LV Events/Program Chair), riding on horses.

Ms. Olivia Rox singing the second part of the second song in the evening without her guitar, with Galileo and other aerospace elements in the lyrics, inspired by Dr. Dan Raymer and AIAA.

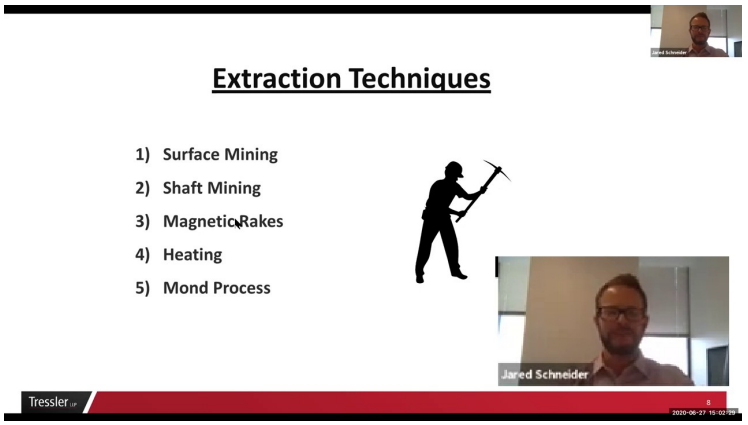
AIAA LA-LV Planetary Defense and Asteroid Exploration (PDAE) e-mini-Conference (27 June, 2020) *(Screenshots Only)* *(Continued from Page 24)*

Dr. Nereida Rodqiguez-Alvarez (NASA JPL) giving a fun talk about the NEO Radar Tracking Program, and putting devices on asteroids for verification and solar systems exploration.

Distinguished Professor Kevin McKeegan (UCLA) giving a very informative talk about the asteroids, comets, meteorites, materials, and their solar systems and interstellar origins; Also answering questions that the asteroid mining would be most useful for space colonists, not for people on Earth.



Dr. Alan Rubin (UCLA) making comments and also introducing the UCLA Meteorites Gallery.



Atty. Jared Schneider introducing different ways of asteroid mining,and also types of asteroids etc., paving the ways to the related space laws.

Atty. Jennifer Perdigao in a sky virtual back as if piloting an airplane (she is a pilot, too!), discussing the international laws, cases, and treaties, and the related space laws & mitigation, including the space debris, pointing out the difficulties of providing proof in cases.

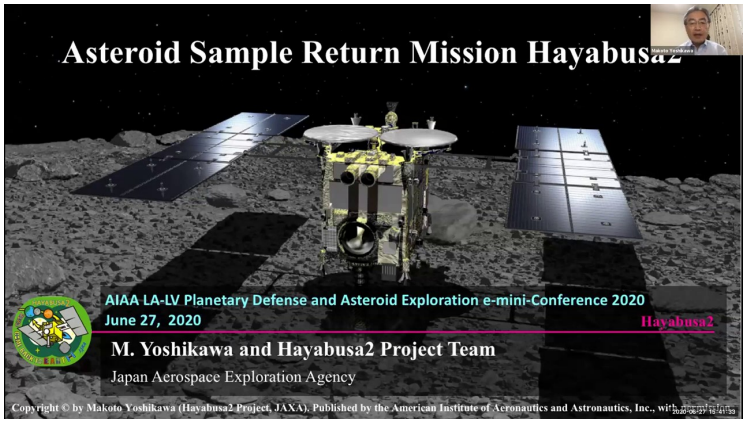
Atty. Jennifer Perdigao and Atty. Jared Schneider are very knowledgeable in aviation and space laws, which is a fast growing field and very important.

(Continued on Page 30)

AIAA LA-LV Planetary Defense and Asteroid Exploration (PDAE) e-mini-Conference (27 June, 2020) *(Screenshots Only)* *(Continued from Page 29)*

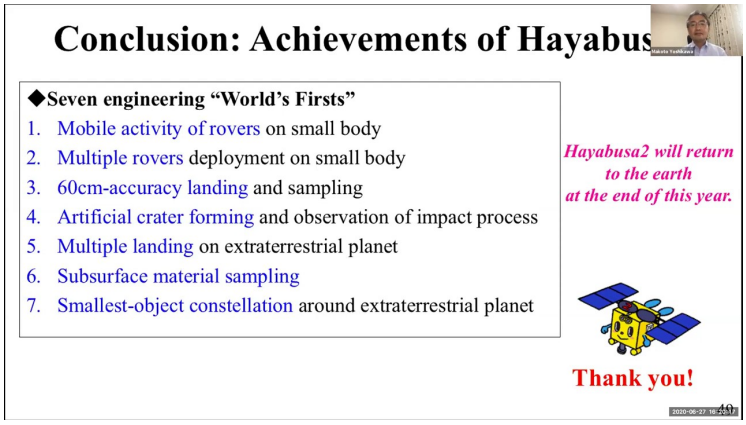
Dr. Makoto Yoshikawa, Program & Mission Manager of JAXA's Hayabusa2 Mission to Ryugu, giving an exciting, detailed, and marvelous talk about the mission and spacecraft, from Japan.

Mr. Tom Treffner (Boeing-Retired) praising the the Hayabusa2 mission, its AI and systems engineering, and asking questions.



Dr. Makoto Yoshikawa is an internationally well-known expert in asteroid explorations and planetary defense. His talk gave a very insightful review of the Hayabusa2 mission.

Dr. Glen Wurden making comments about using nuclear power in the Planetary Defense and Asteroid Explorations.



Dr.Makoto Yoshikawa summarizing this talks with the achievements of Hayabusa2 and the Seven engineering "World's Firsts".

Dr. Seth Potter (Consultant) asking a question.

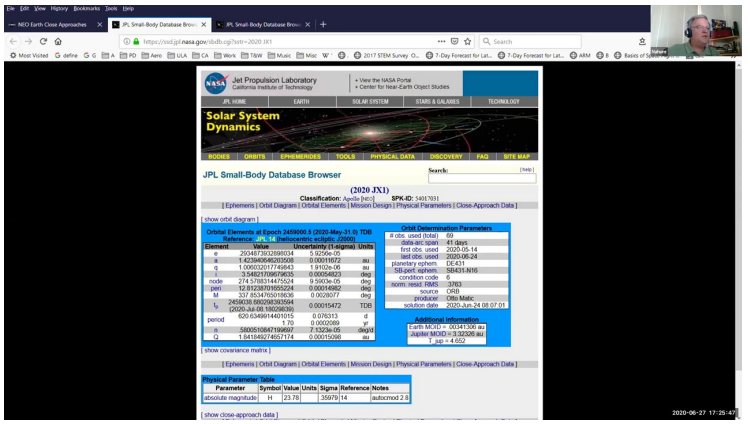
(Continued on Page 31)

AIAA LA-LV Planetary Defense and Asteroid Exploration (PDAE) e-mini-Conference (27 June, 2020) *(Screenshots Only)* *(Continued from Page 30)*

John Furber asking several questions about defense approaches.

Prof. Madhu Thangavelu happily answering questions about his talk & the subject in general, especially on the directed energy defense.

Atty. Jennifer Perdigao answering questions in Q&A, especially on the Moon Treaty and the implications on the ownership/legal issues for the returned asteroid samples or mining products.



JPL NEOs database website usage demo by Dr. Nahum Melamed.

Dr. Makoto Yoshikawa (JAXA) answering questions in Q&A about AI in Hayabusa2's Ryugu Mission, and also answering a question about his next mission, "In Japan, we are planing MMX mission, which is Mars moon sample return. And we are discussing DESTINY+ mission, which is Phaethon flyby mission."

Dr.Nahum Melamed (Aerospace Corp.) summarizing the presentations, and concluding this exciting PDAE e-mini-Conference 2020 event. "Thank you, everyone! See you next time!"

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

AIAA LA-LV Aero Alunmi Meeting

Online Zoom meeting "luncheon" Aero Alumni meeting

Wednesday, July 15, 2020, 11 AM (Add to Calendar)

RSVP and Information: conta.cc/2OhFbzw

Hello Aero Alumni,

This reminder relies on your planning for the 3rd Wednesday of each month. Hope you can make it!

Our monthly meeting will be Wednesday, THIS WEEK - July 15, starting at 11 am on Zoom. Here's hoping you can come join the study, conversations, and we'll all make our own lunch!

Please find the Zoom connection information below.

This Aero Alumni meeting doesn't have a fixed agenda. We will discuss recent developments including our experience with optimization within our own careers. Gary will have some details engineers' propensity to maximize some parameter (strength) while minimizing others (weight, cost, etc.) from working on structural optimization programs.

Attendees, please bring any discussion material you may have on these topics or your own breaking news.

Gary Moir
310-378-7076 office
For questions, comments, and special requests email: gary.moir@ingenuir.com

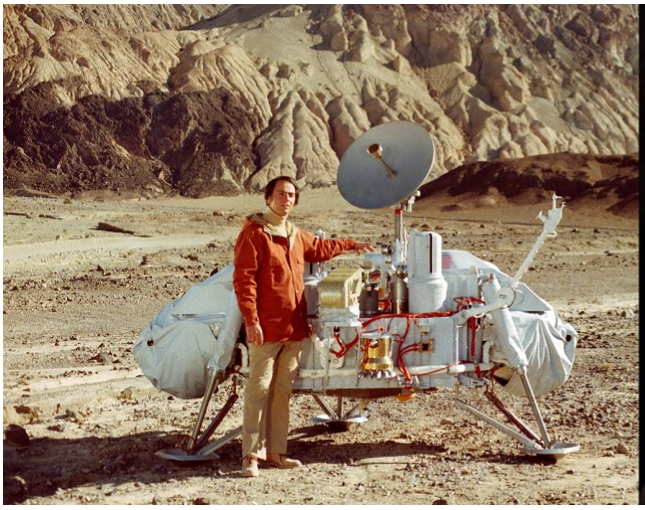
AIAA LA-LV Aero Alumni Wednesday 7/15
July 15, 2020 11:00 AM Pacific Time (US and Canada)
Join Zoom Meeting
https://aiaa.zoom.us/j/93099539209?pwd=Q3BiRUY3Z3lqZHpJYTJlNzRUZkg1Zz09
Meeting ID: 930 9953 9209
Password: 608591
One tap mobile
+16699009128,,93099539209#,,,,0#,,608591# US (San Jose)
+13462487799,,93099539209#,,,,0#,,608591# US (Houston)
Dial by your location
+1 669 900 9128 US (San Jose)
+1 346 248 7799 US (Houston)
+1 253 215 8782 US (Tacoma)
+1 646 558 8656 US (New York)
+1 301 715 8592 US (Germantown)
+1 312 626 6799 US (Chicago)
888 475 4499 US Toll-free
877 853 5257 US Toll-free
Meeting ID: 930 9953 9209
Password: 608591
Find your local number: https://aiaa.zoom.us/u/abwSEVUhE2

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

(Online) July 18, 2020, 10 AM (Add to Calendar)

Apollo 11 (51st) and Vikings (44th) Anniversary 2020 (Neil's Day)

RSVP and Information: *conta.cc/2SMuHLl*



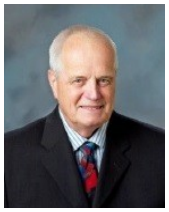
James R. French, JRF Consulting, AIAA Fellow

"Gone But Not Forgotten, The Test Stands for the Rocket Engines of Apollo"

Before they lofted the Saturn launch vehicles into space and landed the Lunar Module on the Moon, the rocket engines in these vehicles had to be tested on the ground. This was first done on test stands at Santa Susanna, Inglewood, and San Juan Capistrano California before moving on to Edwards Rocket Base and NASA facilities. These original stands are mostly gone now but they appear again in the pictures of this presentation. Jim French worked on these engines and test stands and shares his memories of those days.

Prof. David Barnhart, Director, USC ISI / SERC, Faculty Liason to RPL/LPL

"Moving Past Apollo: This generation's tools to build the 2nd major step for Mankind in Space"



Carl Stechman, Aerospace Propulsion Systems Consultant, Aerojet-Rocketdyne / Marquardt Retired, Apollo, Space Shuttle, Orion Engineer

"Evolution of the Apollo SM/LM RCS rocket engine into Cassini and Orion"

Gerald Blackburn, North America Rockwell - Retired

(Presentation title TBD)

Questions about Events/Program: events.aiaalalv@gmail.com

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

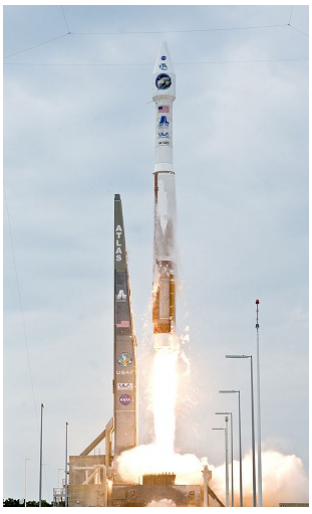
AIAA LA-LV Young Professionals Meeting
Mars Rover Rocket Launch Watch Party

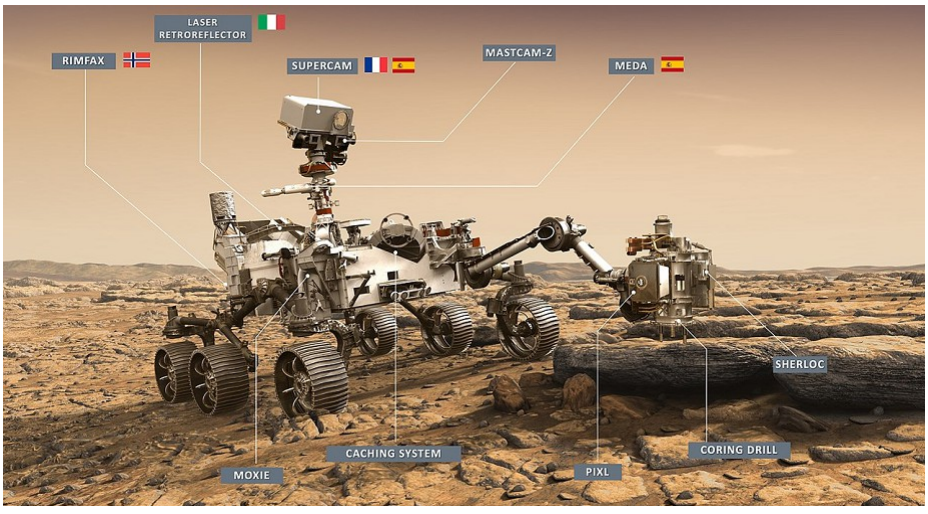
NET July 30th, 2020 (Add to Calendar)

***Note: date and time are subject to change if the launch date changes.**
For any questions about the event, please contact
the LA/LV Young Professionals Chair, Brett Cornick, at brettcornick@gmail.com

Join us for an early morning launch watch party on July 30th to watch as NASA's Mars 2020 rover launches to the Red Planet on a ULA Atlas V rocket from Cape Canaveral. The Young Professionals of AIAA will be hosting a web meeting where we can converse, drink coffee, and watch the launch together! All are welcome to attend!

RSVP and Information: conta.cc/2YAD53T





Volunteers are needed for all AAIAA activities, please contact: cgsonwane@gmail.com

e-Town Hall Meeting by AIAA & SCALACS

AIAA LA LV, AIAA OC, and SCALACS joint

August 1, 2020, 10 AM (Add to Calendar)

"The No-Cost Solution to Climate Change"

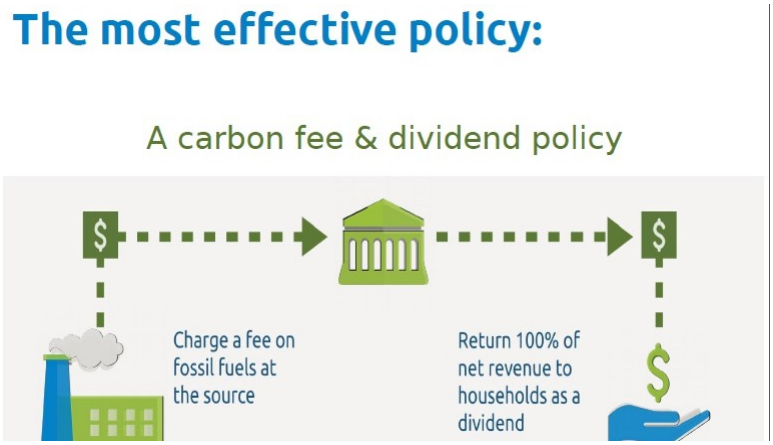
by

Dr. James A. Martin

Boeing - retired

AIAA Space Propulsion Steering Committee

RSVP and Information: conta.cc/3deyFnT



Dr. Martin holds degrees from West Virginia University, Massachusetts Institute of Technology, and George Washington University. He has worked at the NASA Langley Research Center, The University of Alabama, and Boeing. His work has mostly involved the design and evaluation of reusable launch vehicles and in-space propulsion.

Dr. Martin retired from Boeing when the launch vehicle business was sold. He served as an Associate Editor for AIAA J. Spacecraft and Rockets for 30 years. He continues to be active in aerospace doing consulting, on the Space Propulsion Steering Committee, and in the local AIAA Orange County Section Council. He is active with the Citizen's Climate Lobby.

"The No-Cost Solution to Climate Change"

The presentation will show the early history of temperature and carbon dioxide on Earth. It will show the real cause of climate change and how the nation can reduce climate change while stimulating the economy, protecting the poor, and pushing other nations to do the same.

[**events.aiaalalv@gmail.com**] [**http://aiaa-lalv.org/**]

Volunteers are needed for all AAIAA activities, please contact: cgsonwane@gmail.com

(Online) Saturday, August 8, 2020, 10 AM (Add to Calendar)

RSVP and Information: conta.cc/2WdBwYF

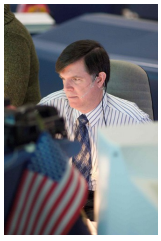
In-flight Refueling the SR-71 During the Cold War

by
Col. Charlie Vono
AIAA Distinguished Lecturer
AIAA Associate Fellow
USAF & TRW - Retired

This presentation is for any audience looking for a few good stories featuring our high tech Cold War weapon systems. As a KC-135Q aircraft commander, Charlie can relate firsthand what it meant to be a Cold Warrior, how the technology worked, and what he did when it didn't work. These were the days when we used sextants to cross the Pacific, engines blew up routinely, and no mission went entirely as planned. With most of this highly classified mission now de-classified, Charlie can spice up this Cold War stories with facts about the technologies and mission. A real crowd-pleaser, he always finds a few audience members who supported this mission and speak up with their own stories.

Questioning the Surface of Mars as the 21st Century's Ultimate Pioneering Destination in Space

by
Daniel R. Adamo
AIAA Distinguished Lecturer
AIAA Associate Fellow
Aerodynamics Consultant, NASA JSC - Retired



This 1.5-hour lecture reviews historic Earthly distinctions between exploring and pioneering before applying these distinctions to destinations in space. Although a case can be made for human and robotic exploration in space, there is as yet no compelling rationale for "putting down roots" to pioneer anywhere off Earth. Why then is the surface of Mars widely accepted as humanity's future "home away from home" to the extent some 200,000 people are willing to attempt forming a permanent colony there? There is no evidence suggesting humans can survive on the surface of Mars long term, let alone thrive there to produce viable offspring. A variety of evidence is presented to affirm the surface of Mars is a "socio-cultural" destination whose suitability for human pioneering is based on more than a century of fictional literature and poorly informed research as the Space Age dawned.

More current knowledge of the "unexplored country" in our Solar System suggests small bodies such as asteroids and the moons of Mars are humanity's best hope for pioneering off Earth this century.

[events.aiaalalv@gmail.com] [http://aiaa-lalv.org/]

Volunteers are needed for all AAIAA activities, please contact: cgsonwane@gmail.com

Saturday, August 15, 2020, 10 AM (Add to Calendar)

Aerospace Women's Career Day Event

Recognizing the 100th anniversary of the passage of the 19th Amendment and Women's Contributions to STEM!

(Please check this link for more history on it: www.history.com/topics/womens-history/the-fight-for-womens-suffrage)

Please join AIAA LA LV to celebrate the auspicious month of August for Aerospace Women / Women's Career !

Both / All genders are welcome !

RSVP and Information: conta.cc/36EbzVD

Overall Chair / Moderator of this Event: Marilee Wheaton (Aerospace Corp., AIAA Fellow)

***Keynote Speaker: Marilee Wheaton (Aerospace Corporation, AIAA Fellow)**
***Main Women's (Career) Panel:**
Marilee Wheaton (Moderator/Panelist) (Aerospace Corporation, AIAA Fellow)
Michelle Rouch (Raytheon, Renowned Aerospace Artist)
Kris Acosta (Northrop Grumman, SWE-LA)
Janet Grondin (Stellar Solutions, Women in Defense (WID-LA) - President)
Dr. Claire Leon (Professor, Loyola Marymount University (LMU))
Courtney Best (Boeing, YP)

***Second Panel Women/YP Career Panel:**
Courtney Best (Boeing)(Moderator/Panelist)
Brett Cornick (Contractor)(AIAA LA-LV YP Chair)
Amanda Ireland (Boeing)
Jennifer S. Perdigao (Attorney, Pilot)
Dr. Anita Sengupta (Research Professor Astronautics, University of Southern California, Pilot)
Monica Maynard (LA School District STEM Director)
Kathleen Fredette (Director of STEAM Initiatives)
Sherry Stukes (NASA JPL)
Marilyn McPoland (CSUDH, AIAA LA-LV Council Member)
Ann Devereaux (NASA JPL)
(More TBA)

***Resume Workshop and Interview Tips** (Fred Lawler, Raytheon)
***Why do girls/boys/general public want to go into / stay in Aerospace (and STEM) Career** (Bill Kelly, Aerojet-Rocketdyne-Retired)
***(Talk topic TBD)** Ann Devereaux (NASA JPL)
More TBD.

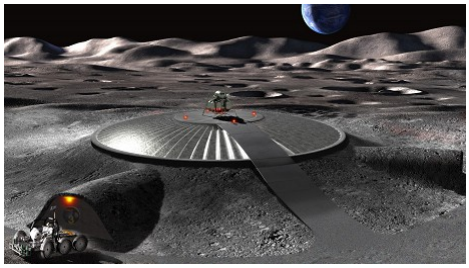
[**events.aiaalalv@gmail.com**] [**http://aiaa-lalv.org/**]

Volunteers are needed for all AAIAA activities, please contact: cgsonwane@gmail.com

AIAA Los Angeles-Las Vegas

Space Architecture Gathering

August 22, 2020, 10 AM (Add to Calendar)



RSVP and Information: conta.cc/3f9jJYT

Dr. Olga Bannova
Director, SICSA, College of Engineering, University of Houston
Chair, AIAA Space Architecture Technical Committee (SATC)

Barbara Belvisi
Founder and CEO of Interstellar Lab

Dr. Marc Cohen
Mission Architecture Lead at
Space Cooperative

Brand Griffin
Program Manager
Genesis Engineering Solutions
Member of AIAA Space Architecture Technical Committee (SATC)

A. Scott Howe, Ph.D.
Senior Systems Engineer, N3ASH
Jet Propulsion Laboratory (NASA / Caltech)

Dr. Barbara Imhof
Researcher, Univ. of Applied Arts Vienna
Professor, Universität Kassel

Kriss J. Kennedy
Architect, Space Architect
TECHNE‘ Architects, LLC
Adjunct Assistant Professor, University of Houston-SICSA

Mr. John Mankins
Vice President, Moon Village Association
Founder and President
Mankins Space Technology, Inc.

Jeffrey Montes
Senior Space Architect
BLUE ORIGIN

Anastasia Prosina
Founder & CEO at Stellar Amenities
Award-winning aspirational futurist and practitioner in Space Architecture

Mr. John Spencer
Outer Space Architect
Founder, President, Space Tourism Society (STS)
Co-Founder and Chief Designer: Mars World Enterprises, Inc. (MWE)
Co-Founder and President: Red Planet Ventures, Inc. (RPV)

Prof. Madhu Thangavelu
(Chair/Moderator of the Panel/Event)
Faculty Member, USC / ISU
Chair / Moderator of this Event

Melodie Yashar
Design Architect, Researcher and
co-founder of Space Exploration Architecture (SEArch+)

[**events.aiaalalv@gmail.com**] [**http://aiaa-lalv.org/**]

Volunteers are needed for all AAIAA activities, please contact: cgsonwane@gmail.com

AIAA LA LV STEM K-12 Meeting
with Alan Chan, and Cornelius Neil Cosentino
Saturday, August 29, 2020, 10 AM (Add to Calendar)
RSVP and Information: conta.cc/2YcZEKL

Red Rover Planetary Driving Simulator

by

Alan Chan

A twenty-year visual effects veteran,

A screenwriter and director

Explore Martian terrain from the driver's seat of a futuristic Martian rover! RED ROVER uses real NASA HiRISE satellite data and images in a game engine to create a simulator that lets you drive around and explore! It's a great opportunity for K-12 kids or students to see Mars up close and personal as guest speaker Alan Chan, the developer of Red Rover, takes us through each of the different areas of Mars available in this simulator

www.youtube.com/watch?v=1QAwRH1wrZ0

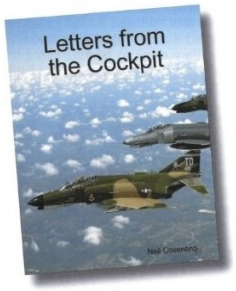
www.digitaltrends.com/cool-tech/red-rover-exploring-mars/

Letters from the Cockpit

by

Maj. Cornelius Neil Cosentino

Experienced Pilot, USAF-Retired



This inspiring talk is for those who wish they were born with wings, and/or enjoy short stories. Come fly with the speaker (Neil) as he relives his experiences as a high-time pilot with a knowledge of flight we all envy. Strap on the shoulder harness, tighten the seat belt-"CLEAR, Contact, "we can hear the roar of the engine as we taxi out -each story a new new exciting true adventure by a pilot who has been there !

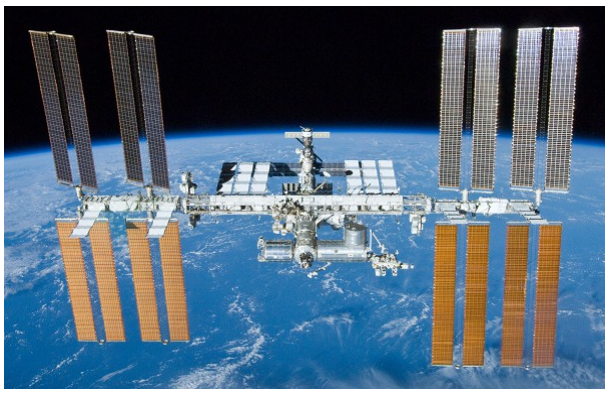
Neil will talk about why he wrote the short story book. He will also talk about writing a second short story book and why he categorized them as " Familographies " - the purpose is to encourage students to start writing their true stories.

[AIAA LA-LV K-12 STEM Chair: Casey Moninghoff cmoning@g.clemson.edu] [http://aiaa-lalv.org/]

Volunteers are needed for all AIAA activities, please contact cgsonwane@gmail.com

Saturday, September 5, 2020 (Add to Calendar)

RSVP and Information: conta.cc/3eMyMrp



International Space Station's critical role in enabling human exploration beyond low Earth orbit

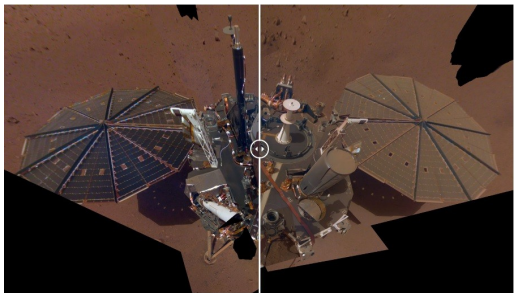
by

Dr. William H. Gerstenmaier

SpaceX, AIAA Honorary Fellow

Former Associate Administrator for the Human Exploration and Operations Mission Directorate (NASA HQ)

and



The InSight Mission to Mars

by

JPL Mission Principal Investigator

Dr. Bruce Banerdt

Jet Propulsion Laboratory

(Landed at Elysium Planitia on November 26, 2018)

Introduction to GPS and Pre-History of GPS

by

Frank Czopek

- Has worked Space and armor systems for all his career
- 35 years on GPS
- Hired at the start of the GPS operational era
- Held numerous jobs on GPS from Responsible Engineer to Program Manager
- Unofficial GPS Space historian

[events.aiaalalv@gmail.com] [http://aiaa-lalv.org/]

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

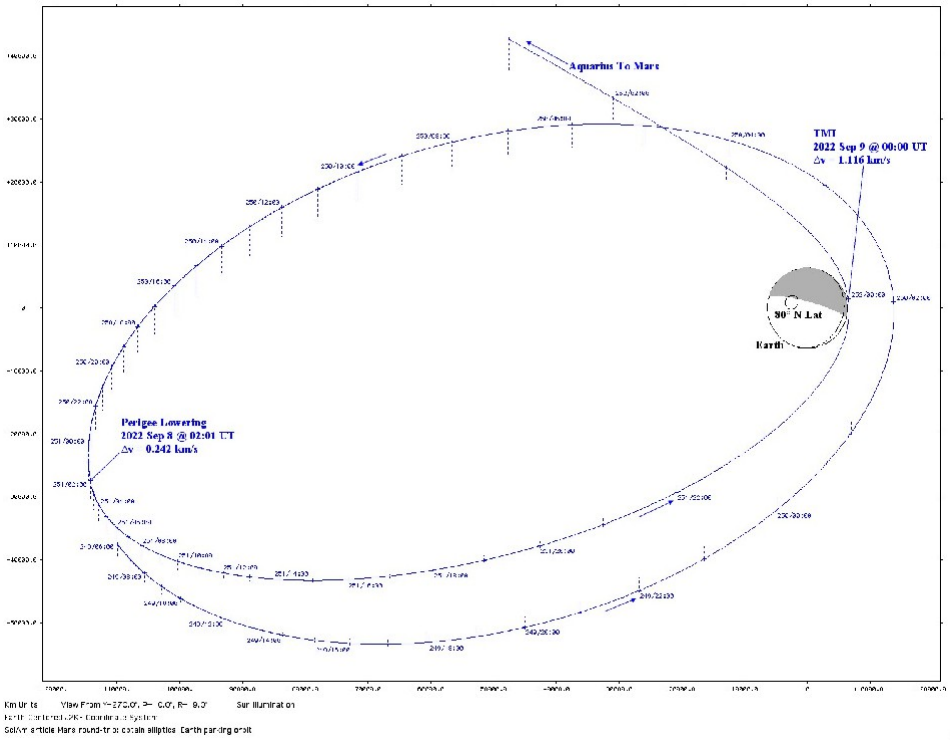
Saturday, September 26, 2020, 10 AM (Add to Calendar)

Aquarius, a Reusable Water-Based Interplanetary Human Spaceflight Transport

by

Daniel R. Adamo

AIAA Distinguished Lecturer
AIAA Associate Fellow
Independent Astrodynamics Consultant
NASA JSC - Retired



This 1.5-hour lecture reviews major challenges to interplanetary human spaceflight and suggests strategies by which they may be addressed. These strategies include pre-emplaced Earth return consumables at the interplanetary destination, water used as a high-efficiency/high-thrust propellant also serving as crew radiation shielding, and transport servicing in a distant retrograde orbit about the Moon. Applied to a hypothetical transport christened Aquarius, the strategies are shown to enable routine and sustainable roundtrips between Earth and Deimos, the outer moon of Mars. Knowledge gaps pertaining to Aquarius are identified with the intent of motivating changes in current technology roadmaps. After listening to this lecture, anyone with interplanetary human spaceflight interests will be conversant with associated technology issues and plausible means by which they might be resolved.

(More Participants TBD)

RSVP and Information: conta.cc/2BwZaaJ

Questions about Events/Program: events.aiaalalv@gmail.com

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

Saturday, October 3, 2020, 10 AM (Add to Calendar)

e-Town Hall Meeting

Mission to Pluto and Beyond

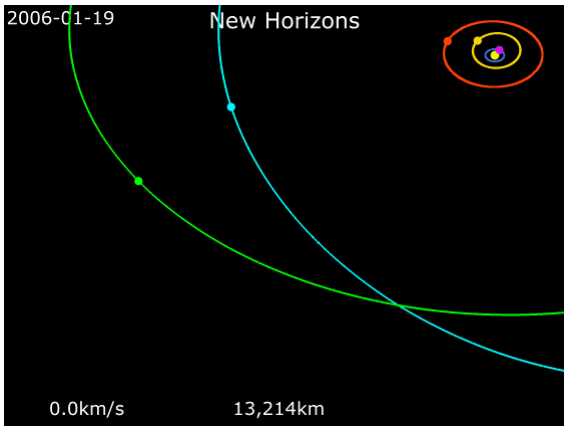
by

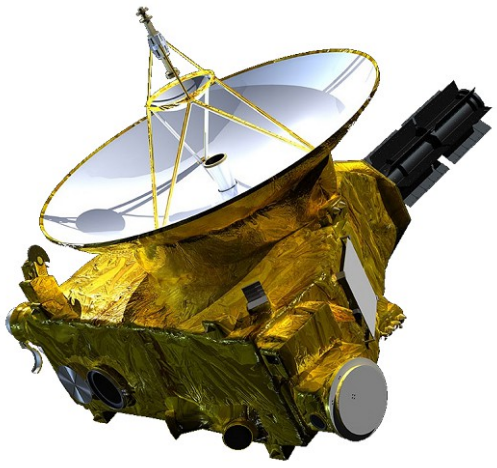
Alice Bowman

AIAA Distinguished Lecturer
AIAA Associate Fellow

NASA New Horizons Mission Operations Manager (MOM),
Space Mission Operations Group supervisor,
Principal Professional Staff at the
Johns Hopkins Applied Physics Laboratory (APL)

RSVP and Information: *conta.cc/38P1UfW*





(More Speakers TBD)

Questions about Events/Program: events.aiaalalv@gmail.com

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

Saturday, October 10, 2020, 10 AM (Add to Calendar)

e-Town Hall Meeting

Inventing the Joint Strike Fighter

by

Dr. Paul Bevilaqua

AIAA Fellow

AIAA Distinguished Lecturer

Chief Engineer of the Skunk Works
Lockheed Martin Corporation

RSVP and Information: conta.cc/3ep6vqa

(More Speakers TBD)

Questions about Events/Program: events.aiaalalv@gmail.com

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

Saturday, October 31, 2020, 10 AM (Add to Calendar)

Special Event

AIAA LA LV Celebrates the 20th Anniversary of the International Space Station

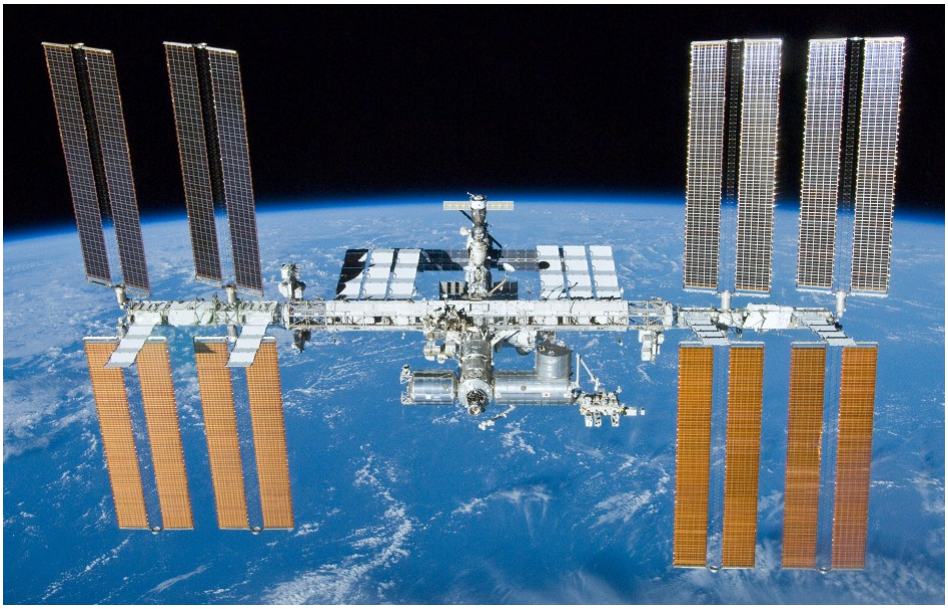
with

authors from the Outward Odyssey series of spaceflight history books:
David Hitt (Moderator), Francis French, Emeline Paat-Dahlstrom, Jay Chladek
(ISS and Beyond: A Historical Perspective on Life in Space)

Larry A. Trager and Dr. Cheng-Yi Lu
Aerojet-Rocketdyne
(Aerojet-Rocketdyne Space Station Power Systems)

Mr. Liam Kennedy
Inventor of the ISS-Above
Former President, Orange County Astronomers
Former Griffith Observatory Planetarium Lecturer
Former NASA/JPL Solar System Ambassador
(ISS-Above, a Raspberry Pi gizmo that presents a rich set of live information about the ISS including live video views of the earth)

RSVP and Information: conta.cc/2OlAaGu



(More Speakers TBD)

Questions about Events/Program: events.aiaalalv@gmail.com

Volunteers are needed for all AIAA activities, please contact: cgsonwane@gmail.com

Saturday, November 14, 2020, 10 AM (Add to Calendar)

e-Town Hall Meeting

43rd Anniversary of the Voyagers 1 & 2

Voyager 1 & 2: Humanity's Most Distant Explorers

with Special Notes on Uranus and Neptune

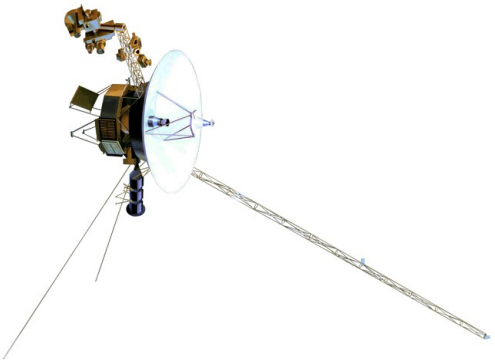
by

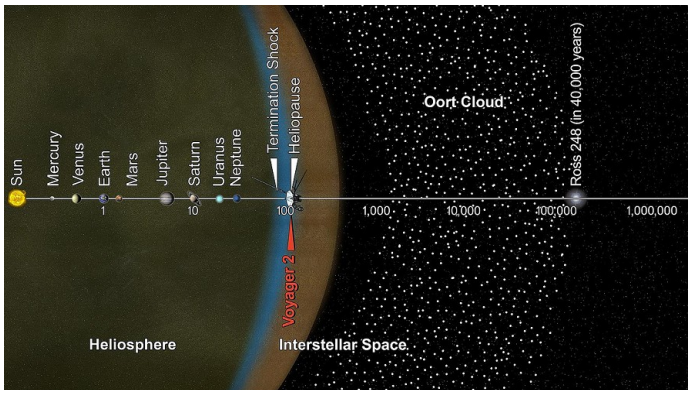
Todd Barber

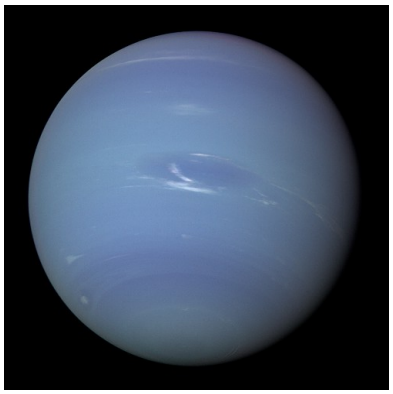
AIAA Distinguished Lecturer

Senior Propulsion Engineer
NASA Jet Propulsion Laboratory

RSVP and Information: conta.cc/2OkJqe0







(More Speakers TBD)

Questions about Events/Program: events.aiaalalv@gmail.com

AIAA LA-LV Young Professionals Meetings

Mars Rover Rocket Launch Watch Party (4:30-5:30 am PDT, NET July 30th, 2020)
Join us for an early morning launch watch party before work on (NET) July 30th to watch as NASA's Mars 2020 rover launches to the Red Planet on a ULA Atlas V rocket from Cape Canaveral. The Young Professionals of AIAA will be hosting a web meeting where we can converse, drink coffee, and watch the launch together! All are welcome to attend!

*Note: date and time are subject to change if the launch date changes.
For any questions about the event, please contact the LA/LV Young Professionals Chair, Brett Cornick, at brettcornick@gmail.com.

Young Professionals Virtual Trivia Night (6:30-8pm July 27th, 2020)
The AIAA LA/LV Young Professionals are hosting an online trivia night on July 27th with prizes available for first place! Come prepared for a battle of brains with all of your knowledge about aerospace, AIAA, and beyond! If you would like to submit your own trivia questions to be asked during the event, send them to the contact information below. Hope to see you there!

For any questions about the event, or to submit your own trivia questions, please contact the LA/LV Young Professionals Chair, Brett Cornick, at brettcornick@gmail.com.

Young Professionals Happy Hour Event (6:30-8pm Aug. 14th, 2020)
The AIAA LA/LV Young Professionals are hosting a new format of their popular online Happy Hour event at 6:30pm on August 14th. This event will group attendees into smaller, more focused groups of 4-6 individuals based on their career paths, research interests, and hobbies to help with networking and to facilitate meaningful connections and conversations between members. We encourage all AIAA members, including both young and seasoned professionals, to participate. If you are interested in attending, please RSVP by completing the survey at the link below. This event will be limited to 40 participants so please only fill out the form if you are serious about attending!

AIAA Focused Happy Hour Event Survey

For any questions about the event, or to cancel your RSVP, please contact the LA/LV Young Professionals Chair, Brett Cornick, at brettcornick@gmail.com.

SpaceX Crew Dragon Rocket Launch Watch Party (Time TBA Aug. 30th, 2020)
Join us on July 30th as we watch SpaceX launch its first operational Crew Dragon mission to the ISS with NASA astronauts Michael Hopkins, Victor Glover, and Shannon Walker and Japan's Soichi Noguchi. The mission will launch from NASA's Kennedy Space Center on a SpaceX Falcon 9 rocket. The Young Professionals of AIAA will be hosting a web meeting where we can converse, tell stories, and watch the launch together! All are welcome to attend!

*Note: date and time are subject to change if the launch date changes.
For any questions about the event, please contact the LA/LV Young Professionals Chair, Brett Cornick, at brettcornick@gmail.com.

AIAA National Forums & Events (July-November 2020)

(All remaining AIAA National Forums and Events in 2020 will go virtual / be online.)

*5-28 August, 2020, Introduction to Multiscale Modeling of Composite Structures and Materials with MSG/SwiftComp – Online Short Course (20 Hours) (with AIAA Certificate)(Registration)
*18 August, 2020 1330 - 1430 (EDT), Aerospace Career Pathways – Entrepreneurship (Member Exclusive Webinar) (Link)
**24-26 August, 2020, AIAA Prpulsion and Energy Forum, https://www.aiaa.org/propulsionenergy*

•Introduction to Multiscale Modeling of Composite Structures and Materials with MSG/SwiftComp – Online Short Course (Starts 5 Aug, 2020)
•Hypersonic Flight Vehicle Design and Performance Analysis – Online Short Course (Starts 9 Sept 2020)
•Fundamentals of Python Programming with Libraries for Aerospace Engineers – Online Short Course (Starts 12 Sept 2020)
•Liquid Rocket Engines: Emerging Technologies in Liquid Propulsion – Online Short Course (Starts 15 Sept, 2020)
•Design and Operation of Composite Overwrapped Pressure Vessels (COPV) – Online Short Course (Starts Sept 24, 2020)
•Taking the Next Steps in Your Aerospace Career - Online Short Course (Starts 20 Oct 2020)
**16-18 November, 2020, AIAA ASCEND 2020 (Online)* https://www.ascend.events/

Some Local 3rd Party Non-AIAA Events (July-August, 2020)

*15 July, 2020, 12 PM: AGI's Overview & Demo of STK-12's "Mega-Constellations"
*16 July, 2020, 7:45 PM (PDT) (Online)(Adventures Club) Troy Johnson, Northrop Grumman (Link)
*16 July, 2020, 10:00 am - 11:00 am Pacific Time (Online) (Aerospace Corporation): Space Policy Show: Nuclear Technology in Space (Lnk)
*16 July, 2020: (A&D Forum)"Set Up to Fail? Cybersecurity Compliance in the Last Mile of the DoD Supply Chain", Jacob Horne, Sr. Cybersecurity Consultant, California Manufacturing Technology Consulting, (Santa Clarita Valley Chapte)
*16 July, 2020 (Online) (National Space Society) A Day in Space (Watch)
*17 July, 2020: (A&D Forum) "Frequent & Reliable Small Launch is Here", Shane Fleming, VP Global Commercial Launch Services, Rocket Lab (joint meeting of Los Angeles and San Fernando Chapters)
*22 July, 2020: (A&D Forum) "Space as a New Market", Randa Milliron *CEO/Founder, Interorbital Systems), Dave Strobel (CEO, Space Micro), Robert Jacobson (author, "Space is Open for Business") and Moderator Ivan Rosenberg (Executive Director, A&D Forum)
*23 July, 2020, 10:00 am Pacific Time (Online) (Aerospace Corporation): What is Planetary Protection and Why Should we Care? (Link)
*23 July, 2020, 6 PM: AITP's Annual Peter Coffee "State of IT" Talk
*23 July, 2020, 17:00 PDT (Online) (FAA Safety): "FAA Safety Briefing LIVE! - July/August 2020 Issue" (RSVP)

25 July, 2020 (Online) (Starting 9 AM Pacific Time), Satellites and Education Conference XXXIII (Registration)

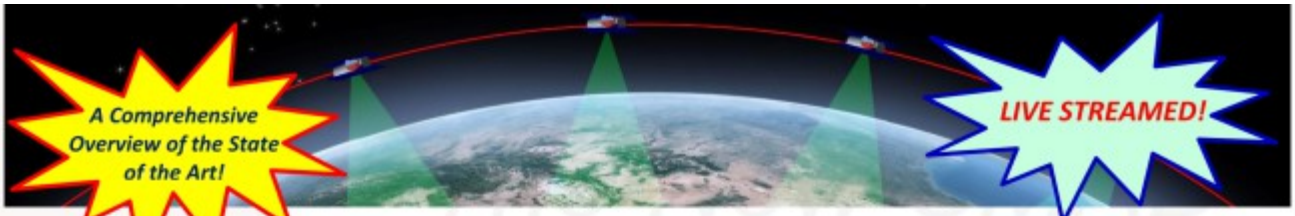
(AIAA LA-LV Section Exhibition in this online event)

*19 August, 2020: (A&D Forum) "An Analysis of Commercial Space", Marco Caceres, Team Group

See what's happening on our social sites: Please join us, take a look, and invite others!volunteers are needed for social media, please contact cgsonwane@gmail.com

Engage @ AIAA LA LV AIAA LA-LV Website : AIAA-LALV.org

Please check out the new website features, comment/like for blogs and provide feedback. Also, if you are interested in writing blog or newsletter articles, please contact us. Please also follow, join, share, and/or like our social media pages, groups or pin boards.



REGISTER NOW!

Space Mission Engineering: The New SMAD

Taught by Dr. James Wertz

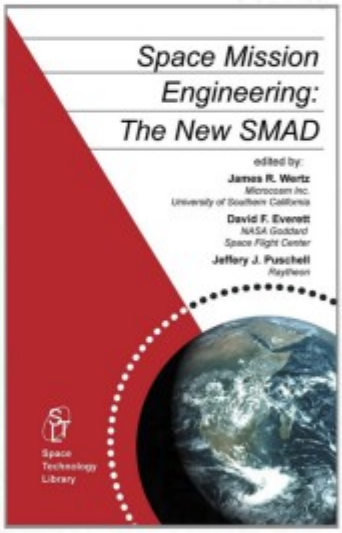
Live Streamed 4 Hours/Day Over Two Weeks

Technical Course Based on the Bestselling Textbook

Revised and Expanded!

Ask Your Organization to Cover Your Registration Fee: It Is a Rewarding Investment for Both You and Them!

New Space: Changing the way we do business in space!



Course Schedule:
Mon - Fri (8:00 AM — 12 Noon)

Broadcast Live

Microcosm Inc

For more information:
Tel: 310-539-2306 or jjackson@smad.com

- Course Price: $2,500
- Course Material:
  Each participant will receive a copy of *"Space Mission Engineering: The New SMAD"*, a copy of the presentation viewgraphs, a complete set of mission engineering equations implemented in Excel for immediate application, and additional supplementary material.

For questions please contact the Course Administrator, Julie Jackson:

Microcosm, Inc., 3111 Lomita Blvd., Torrance, CA 90505-5108
Phone: (310) 539-2306 • FAX: (310) 539-2312 • jjackson@smad.com • www.microcosminc.com

Director of Development

https://www.marsu.space/director-of-development

Mars University — Los Angeles, CA (Remote)
Volunteer-based (initially)
Up to $15,000 per summer/fall (Part time)

Mars University (MarsU) is an early stage academic and research institution that is offering higher education services. Our mission to unite students, researchers, and professionals in a multidisciplinary curriculum, to settle humans on planet Mars. MarsU plans to design and administer our first annual Mars summer program at a host site or university to begin in mid-June 2021.

The Director of Development is responsible for overseeing fundraising strategy and to help drive financial sustainability. As the acting grant manager and primary POC for grant making foundations, the Director empower professors, faculty, and researchers to help fund Mars-education and research oriented activities to achieve the mission.

Benefits: grant-based(initially), flexible, remote work, part time, bonus option

Responsibilities

- Create, manage, and implement first annual fundraising strategy
- Engage in conversations with potential corporate sponsors, individual donors, grant officers, etc.
- Identify and actively apply to recommended and new grant opportunities
- Co-lead proposal development, implement pre-proposal submission schedule
- Help support budgetary activities as liaison with faculty, Co-PI's, PI's
- Conduct research, inspire and advance grant funding opportunities
- Maintain database for lapsed and current prospective foundations
- Provide a detailed monthly briefing, presentation, and updates to Founding team
- Support and improve underdeveloped areas of Mars University

Skills

- Bachelor's degree in communication,E nglish, business, or a relevant field
- Proven experience winning grants related to education, academia, nonprofits, research, engineering, space, etc.
- Excellent grant writing, grammar, proposal development, and leadership skills
- Knowledgeable about education grants, academia structure, nonprofits, Mars

We are looking to recruit someone for this position within one to two months. We invite you to apply to join our Founding team and community of leaders, professors, and researchers pioneering the academic development of Mars.