

March 2020

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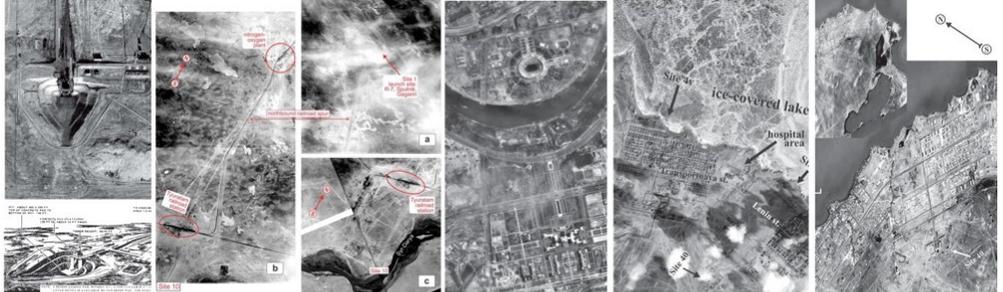
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Open Skies for National Security

by Mike Gruntman, Professor of Astronautics at USC, astronauticsnow.com



Open Skies for National Security

Sixty years ago, dramatic events closed one Cold War chapter and opened another in keeping skies open for overhead reconnaissance. Peacetime monitoring of adversaries has proved essential for avoiding war and remains indispensable today.

On April 9, 1960, an American reconnaissance U-2 plane took off from an airfield in Peshawar, Pakistan. The aircraft crossed the border of the Soviet Union, flew over and photographed nuclear and missile test sites, and then safely returned and landed at Zahedan in Iran. Soviet leader Nikita Khrushchev was indignant that the new “antiaircraft [guided missile] batteries had been caught napping and did not open fire soon enough.” He reprimanded a number of officers.

Only three weeks later on May 1, 1960, a Soviet surface-to-air missile S-75, known in the West as SA-2 and Guideline, brought down a U-2 plane piloted by Francis Gary Powers over the Ural mountains. Powers bailed out from his aircraft damaged by an explosion of the missile nearby. A second missile then directly hit his falling down plane. This was the 24th U-2 flight over the Soviet Union. American President Dwight D. Eisenhower promptly ordered termination of the intrusions.

Development of long-range ballistic missiles and nuclear weapons threatened devastating consequences should the Cold War turned into a full-scale military conflict. New technologies allowed no time for preparation for hostilities and mobilization which made monitoring military developments and posture of the adversary a key to avoiding a fatal miscalculation and hence reducing the risk of war.

In the wake of the Powers incident, Eisenhower explained at a press conference: “No one wants another Pearl Harbor ... Secrecy of the Soviet Union makes this [aerial reconnaissance] essential. In most of the world no large-scale attack could be prepared in secret but in the Soviet Union there is a fetish of secrecy and concealment.”

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(Authorized by the Author)

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Spy Pilot, Francis Gary Powers, the U-2 Incident, and a Controversial Cold War Legacy (Speaker: Francis Gary Powers Jr., Moderator: Prof. Mike Gruntman, 5 March, 2020)

(Photos only)



Prof. Mike Gruntman (USC Astronautics) starting the event by introducing the U-2 incident, Cold War, and the speaker.



The speaker, Mr. Francis Gary Powers Jr., speaking to the attendees about his father, and the U-2 incident.



The speaker, Francis Gary Powers Jr. (Right), signing books for the attendees. (Autographed copies of "Spy Pilot" can also be obtained online from the speaker/author at www.spyilotbook.com)



Attendees networking in front of the displayed U-2 pilot suits.



The helmet for U-2 pilots exhibited during the event.



Julian Vazquez (Left Standing) asking about Raoul Wallenberg.

(More photos on bit.ly/2U64Ldo)

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Raoul Wallenberg (4 August, 1912 – disappeared 17 January, 1945)

by Julian Vazquez

I was at an American Institute of Aeronautics and Astronautics (AIAA) monthly meeting listening to the amazing story of Gary Powers given by his son, Francis Gary Powers, Jr. He was talking about his father's jail time in Lubyanka in Moscow. He talked about a cell mate that his father had. Maybe a possible plant to get more information from Gary Powers. I usually do not ask questions during the Q&A sessions, but Francis Gary Powers Russian plant that his son mentioned aroused my interest even more. He mentioned that the plant who was with his father in the Russian prison might be a plant who might have been with Raoul Wallenberg in the Lubyanka Prison in Moscow.

I was an actor in a play called *Wallenberg*. I played five characters in the play. The play was written and directed by the then Theater Arts Department Chair, Robert Jensen, who later became the Dean of Fine Arts. Ever since that day, I have been working with Bob Jensen to write a screenplay about Raoul Wallenberg. Francis Gary Powers, Jr. mentioned that there was a plant with his dad, who might have seen Raoul Wallenberg made me believe that I could learn more about what happen to Raoul Wallenberg. Raoul Wallenberg is credited with saving close to 100,000 Hungarian Jews. At the end of WWII, Raoul had a plan to rebuild Budapest. He rode to the Russian headquarters to present his plan. The Russians arrested Raoul. Nobody is sure what happened to him after his arrest.

Around 1944, the world knew that Germany was losing the war. The Bloodhound, LtCol Adolf Eichmann, was still doing his job of ridding Europe of Jews, the final solution. At that time, the last area where there were free Jews was Hungary. Even though Hungary was part of the Axis Power, the head of Hungary, Admiral Miklas Horthy, did not let the Germans send Jews to German occupied Poland, namely to Auschwitz-Berkenau. In 1944, Hitler sent for Miklas, and gave him an ultimatum: "Change your government to follow German Jewish laws, or we will invade Hungary." Hitler, on that day had already invaded Hungary and helped the Hungarian fascist party, the Arrow Cross, assumed power.

By then pressure was place on President Roosevelt to do something to save free Jews in Europe. President Roosevelt signed Executive Order 9417, which established the American War Refuse Board (WRB). The

WRB, along with the JDC and with Sweden chose Raoul Wallenberg to go to Hungary to stop Adolf Eichmann and saved as many Jews as he can.



Raoul Wallenberg (4 August, 1912 – disappeared 17 January, 1945), Swedish version of Oskar Schindler. (Photo Courtesy of Julian Vazquez)



President Franklin D. Roosevelt meets with the National Jewish Welfare Board — (left to right) Walter Rothschild, Chaplain Aryeh Lev, Barnett Brickner and Louis Kraft — at the White House on Nov. 8, 1943. GEORGE R. SKADDING / AP

President Franklin D. Roosevelt (FDR) meets with the National Jewish Welfare Board - left to right: Walter Rothschild, Chaplain Aryeh Lev, Barnett Brickner, and Louis Kraft, at the White House on Nov. 8, 1943. (Photo Courtesy of Julian Vazquez)

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A Cold War Museum Locally in Los Angeles – The Wende Museum

by Steven Gelb

During the AIAA Los Angeles – Las Vegas Event on March 5, 2020 (Spy Pilot, Francis Gary Powers, the U-2 Incident, and a Controversial Cold War Legacy), the speaker, Mr. Francis Gary Powers Jr, talked about that very important Cold War aerospace incident. He also talked about the importance of preserving its history. There were also U-2 pilot suits and a pilot's helmet displayed during the event. The speaker was Founder and Chairman Emeritus of The Cold War Museum in Washington DC. I made a comment that there is also a Cold War Museum locally in the Los Angeles, CA area, though it's less well-known. Therefore, I now provide more information for people who might be interested.

The Wende Museum is located at 10808 Culver Blvd., Culver City, CA 90230, ((310)216-1600, info@wendemuseum.org, www.wendemuseum.org). The Wende Museum is in Culver City's arts and culture corridor near the intersection of Culver Blvd. and Overland Ave. It is within walking distance of the SONY Pictures Studios motion picture lot. Free parking is available in the city lots adjacent to the museum.

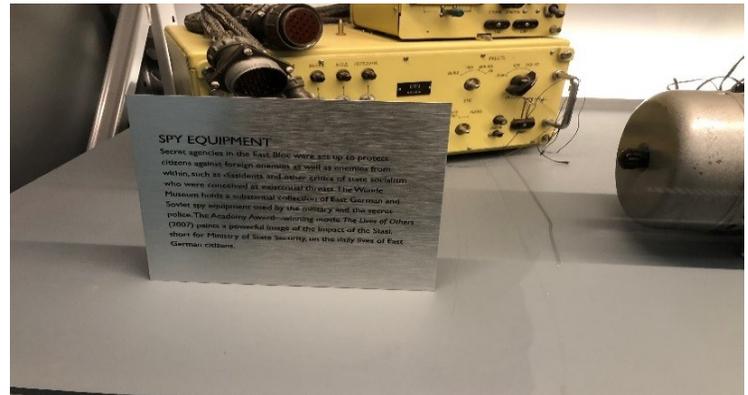


The Wende Museum in Culver City. (Photo from the Wende Museum Website)

I visited the Museum several times. I saw some Cold War spy equipment there. It's interesting as the topic and presentation of the March 5 event also discussed the spy mission using aerial surveillance equipment. And, it interested me when I saw some of materials there displayed for the STEM K-12 education, which AIAA has been emphasizing and performing for quite some time.

Since it's relevant, I was glad I brought it up and shared it with the audience. More information about the Wende Museum is provided below, which I obtained from the Wende Museum's public profile and brochures. This

Cold War U-2 Incident / Spy Pilot event really inspired me and reminded me about some important experiences and memories of the Cold War, and what they could bring to the public and help the nation / world in modern times.



Spy Equipment displayed in the Wende Museum. (Photo courtesy of Steven Gelb)

“The mission of the Wende Museum is to preserve Cold War art, culture, and history from the Soviet Bloc countries, inspire a broad understanding of the period, and explore its enduring legacy” - *From Wende Museum website*

“Named for the Wende (pronounced “venda”), a German word meaning “turning point” or “change” that has come to describe the transformative period leading up to and following the fall of the Berlin Wall in 1989. The Wende Museum collects and preserves artwork, artifacts, archives, films, and personal histories from Cold War-era Eastern Europe and the Soviet Union relating to the period 1945–1991. It also challenges and engages the public through experimental exhibitions and interdisciplinary programming inspired by the collection. It also illuminates the past and informs the present through creative collaborations with contemporary artists and designers. The Wende Museum promotes rigorous scholarship, educates students, and stimulates general interest through lectures, symposia, and publications.” - *From Wende Museum website*

“Recognizing the Wende Museum’s growing stature since its foundation in 2002, the City of Culver City has provided the 1949 National Guard Armory building and grounds to the Museum for 75 years.

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Cold War Spy Pilots: Black Bats/Black Cats

by Monica Chang



A Lockheed U-2S in flight. (From Wikipedia)

I stepped into the AIAA March 5th evening seminar room shortly after 7PM, and luckily found a seat with almost a full house. The speaker, Francis Gary Powers, Jr., delivered a long yet very interesting speech, aided with photo shots and pilot's pressure suits in exhibition. The audience was very inspired by the speaker and many questions were asked during the Q&A session. I took the opportunity not only asked a question, but also mentioned the March 7-8th "Black Bats" exhibition event to be held in the Republic of China's (ROC's, not PRC's) Cultural Center in El Monte, CA. "Black Bats" is a nickname popularly used to refer to another CIA sponsored Air Force Mission, which was executed and staffed by the ROC Air Force from Taiwan during the Cold War era, to investigate the Mainland China's military situation.

Francis' presentation made me recall the Cold War era, and the deep involvement of my father's and his comrades' flying missions to combat and investigate Mainland China after the Communists took over the Chinese continent in 1949. "Black Bats" was known as being supported by West Enterprise Inc., so those missions were also called "Flying the West" in my childhood.

The "Black Cats" mission was established later in my elementary school years, and my Air Force Elementary School in Taipei was even renamed by using the first and second names of U-2 pilot Chen, Hwai Shen, one of the famous pilots there at that time. The equipment used by "Black Cats" was U-2, while there were various types of aircraft used by "Black Bats". Please see the photo next. Another major difference is the former flew at very high altitudes, while the latter flew much lower altitudes.



Aircraft used in the Black Bats missions, mostly U.S.-provided aircraft taking off from Taiwan, including B-17 Flying Fortress, B-24 Liberator, and B-25 Mitchell etc. (Photo Courtesy of Monica Chang taken from the exhibition held on March 7-8. The original source was Taiwan's Military History Museum.)



Left standing: Monica Chang, the author of this article and the daughter of a ROC Air Force Colonel and later a Liaison Officer in the National Defense Division / President's Official Building in Taipei during the Cold War, asking questions in the Q & A session on March 5. Right standing: the moderator, Prof. Mike Gruntman of USC Astronautics. (Photo Courtesy of Ken Lui)

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Flying high: The X-15 and U.S. Spaceflight The X-15 Rocket Plane: It Literally Helped Launch the American Space Program

By Michelle Evans, Author "The X-15 Rocket Plane, Flying the First Wings into Space"



The X-15 rocket plane is shown in this artist's rendition. (Courtesy of Michelle Evans)

Michelle Evans is the author of "The X-15 Rocket Plane, Flying the First Wings into Space," and was the featured speaker at the January 30, 2020 program "In the Line of Duty: Michael Adams and the X-15" about the plane, Michael Adams, and her book. Evans wrote the following story about the X-15. Evans is our AIAA member and also the AIAA Distinguished Lecturer.

When people think of the American human spaceflight program, what most often pops into their head is John Glenn's first orbits of the Earth, or Neil Armstrong's boot touching the surface of another celestial body for the first time.

For a younger generation, thoughts may come of the Space Shuttle or the International Space Station. What is often overlooked in this historical perspective of space exploration are the contributions of the X-15 rocket plane, a hypersonic research aircraft that routinely flew into space and back, making precise landings under a pilot's control at Edwards Air Force Base in California's Mojave Desert.

The X-15 was the an experimental winged rocketship, built on the lineage of the famous X-1, which Chuck Yeager used to first break the sound barrier in October 1947. Without the contributions of the X-15, the later Space Shuttle program might not ever have happened.

Designed in the mid-1950s, the X-15 defied expectations. It was a time when, to the public, rocketships meant gleaming silver stilettos with swept-

back fins, filled with astronauts in bubble-headed spacesuits, doing battle against aliens bent on the annihilation of Earth. Although the X-15 was sleek from a distant perspective, a closer look revealed construction much heavier than might be expected.



Astronaut Neil Armstrong was one of the 12 test pilots of the X-15. (Photo Courtesy of Michelle Evans)

Protuberances such as bug-eyed cameras and antennae bulged from the heat-resistant hypersonic skin, while surfaces at the rear were corrugated for strength rather than aesthetics. Seeing the intricate details of the craft reminded one more of an industrial boiler rather than of the sculpted visage people were used to seeing in the science fiction of that period.



Michelle Evans in F-104. (Photo Courtesy of Michelle Evans)

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(With the Author's special permission here.)

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AIAA Los Angeles-Las Vegas Section Hosts Experts on Science Fiction Spacecraft (8 February, 2020)

by David Sunderland, Ph.D.



Aldo Spadoni (Left), Rick Sternbach (Middle), and Rod Pyle (Right) sharing and answering questions in the panel session after their presentations. (Photo courtesy of Ken Lui)

On February 8, 2020, the AIAA Los Angeles-Las Vegas Section compiled a panel of three speakers, with expertise from differing aspects of both real and imagined spacecraft, for presentations and discussions on “Spacecraft in Sci-Fi” at the El Segundo Public Library. The speakers were Rod Pyle, “space author, writer and historian”, Aldo Spadoni, a retired aerospace engineer who now consults for Hollywood, and Rick Sternbach, a “space illustrator” who has worked on a variety of science fiction productions, including 15 years with the Star Trek franchise. As many in the aerospace community were inspired by and remain fans of science fiction, the large audience was stimulated and engaged.

Rod Pyle launched the afternoon with a presentation on “Rockets and Starships of Yesterday, Today and Tomorrow.” His broad historical perspective began with Chinese concepts based on fireworks, and covered works from Jules Verne (From the Earth to the Moon, 1865) to Fritz Lang (Frau in Mond, 1929), pulp magazines and movie serials (e.g. Buck Rogers, Flash Gordon), the visions of Wernher von Braun (orbital shuttle, rotating rubber space station, moon lander, Mars glider), and Project Orion (fueled by detonating atomic bombs). He highlighted ships from the Star Trek TV shows and movies, 2001: A Space Odyssey, Star Wars, and more recent productions (e.g. Passengers, The Expanse), and contrasted these fictional and far-flung concepts with Vostok, Mercury and Apollo reality, as well as the latest plans from Blue Origin and SpaceX. Among my favorite take-aways: 1) Konstantin Tsiolkovsky (father of the “rocket equation” in 1914) and Fritz Lang got many of

the details right (e.g. weightlessness, air supply, staging), 2) nobody seems to leave enough room for fuel, 3) Rocketship X-M from Destination Moon (1950) looks similar to the SpaceX Starship, 4) most sci-fi ships assume “push button” gravity and fly like fighter planes (The Expanse is an exception), and 5) “don’t get him started” on Lost in Space.



Rod Pyle started the event with the history of spacecraft in Sci-Fi in front of enthusiastic attendees. (Photo courtesy of Ken Lui)

Aldo Spadoni spoke next, on “Spacecraft Design in Fact and Fiction.” Aldo has turned his experience developing “artist concepts” for real aerospace vehicles (at Hughes, TRW and Northrop-Grumman) into a consulting business called Aerospace Imagineering, where he develops “requirement-driven design concepts” for the entertainment industry. His presentation reviewed a variety of sci-fi spaceships and spacesuits (including one for a dolphin), and discussed how well (or not) their design features might meet the requirements of their missions. Here are some key examples: 1) the Star Wars X-wing fighter is much too small for all the functions and mission duration it would have to support, 2) the Passengers “Avalon” wastes too much space on rehab, when they could just deliver passengers still in hibernation, 3) rotating to produce artificial gravity requires a much greater diameter (1500’ for 1g at 2rpm) than in the 2001 “Discovery,” 4) a “skyscraper” orientation (a la The Expanse) makes use of thrust for artificial gravity and inertia management, rather than the “cruise ship” orientation, 5) the “Hermes” from The Martian is too roomy for 6 people (a nuclear submarine would be a better model),

(More photos on bit.ly/2W7konH)

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Marvelous Devices of Ray Bradbury's Fahrenheit 451

By Judy Sunderland, MFA

"We are cups, constantly and quietly being filled. Once the automobile appeared you could have predicted that it would destroy as many people as it did. We have too many cellphones. Stuff your eyes with wonder, live as if you'd drop dead in ten seconds." Ray Bradbury 1920 - 2012.

At the recent AIAA Los Angeles-Las Vegas Section Meeting (Feb 8) the lecture touched on the ideas planted by early science fiction writers. There were many such ideas and in fact, an entire meeting could be focused on one or more of the "imagineers" (to steal a phrase from Walt Disney) of contemporary science fiction books.

First, we must visualize; to create takes an idea. To use an old phrase, someone must plant a seed so it can grow. The most fantastic seeds have been planted by science fiction writers. The seeds they fling far and wide germinate into marvelous crops; these seeds are true magic beans. There are many great, contemporary science fiction writers: Robert Heinlein, Frank Herbert, Larry Niven, and the extremely successful Gene Rodenberry, to name a few. Each of these writers has plowed a permanent furrow in the future and raised a crop of brilliance. No modern writer of the genre would be as successful as he or she is today without (arguably) the greatest "gardener" of all time: Ray Bradbury.

As a 12-year-old, Nancy Drew had no mystery for me, so I branched out, raiding my mother's bookshelves for interesting literature. I wanted something that would transport me away from my life; I wanted some place to hope for and daydream about when I wasn't actually reading. I read everything my mother would allow, and some she didn't. On her approved reading list was science fiction author, Ray Bradbury.

The first of his books I picked up was a story of Earth in the future. Published in 1953, Fahrenheit 451 is a cautionary tale of common, working people in a time of magnificent industrial progress. The characters -- a fireman named Guy Montag (in this dystopian society, firemen burn books rather than put out house fires), and his wife Mildred, a strange neighbor girl named Clarisse, and Guy's boss, Fire Chief Beatty-- are part of a futuristic world full of many wonderful possessions. It seems like a world of fabulous wealth where everybody is happy to be served by the government and taken care

of while living a peaceful existence. There is a war going on, but the general public is unaware of it in a most zombie-like way. The wonderful possessions, public programs and entertainments are designed to keep the general populace happy and managed. As young as I was, I saw the hidden agenda. Overall, the story suggests that getting everything one wants in life has a dark side.

Still, I wanted that world of fabulous vehicles and diversions. I wanted to be able to drive recklessly, knowing I'd be safe in my steel cocoon. I wanted to be surrounded by walls of flickering entertainment. I wanted to see this future. Reading Bradbury encouraged me to be creative, and it also warned me and other readers to be careful at the same time. In looking back, I wonder if it is more than a fictional tale. I now see that by writing the story down, "giving it life," as I have heard him say (Mr. Bradbury regularly lectured to my writer's group, The Southwest Manuscripters), the author may have put the ideas (planted the seeds) of the devices in the minds of young, impressionable readers. These readers were inspired to grow up and become engineers and scientists who then helped create the present boon of magnificent must-haves.



Attendees enjoying the event. Laughter could be heard regularly. Facing the camera smiling: (Left) Aldo Martinez (AIAA LA-LV Membership Chair), and (Right) Glenn Gibson. (Photo courtesy of Ken Lui)

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In Memory of Freeman Dyson (15 December, 1923 – 28 February, 2020)

by Wes Kelly, Aerospace Engineer, Triton Systems, LLC, Houston, TX

Whether it is within the aerospace, astrophysics or physics community, there is widespread feeling to observe the passing of Freeman Dyson. While living and speaking rather quietly, it is remarkable how much of an impression he made on so many of us.

It was about six years ago, judging by the receipt posing as a bookmark, at one of the neighborhood used book store, I couldn't resist purchasing an old Dover paperback that I knew I would never be able to read or comprehend, but just had to have. Perhaps it was a premonition.

"Selected Papers on Quantum Electrodynamics", Edited by Julian Schwinger, Nobel Laureate.

"34 selected papers by...

...Fermi, Heisenberg, Dirac, Oppenheimer, Rutherford, ...Pauli, Bethe, Schwinger, Tomonaga, Feynman, Wigner...

On the cover it ran out of space before it mentioned the two papers by F. J. Dyson in the table of contents:

24. The Radiation Theories of Tomonaga, Schwinger and Feynman

25. The S Matrix in Quantum Electrodynamics.

The editor made some notes about the chronological order of the papers.

The 24th paper, submitted to Physical Review in 1948, began with the following abstract.

"A unified development of the subject of quantum electrodynamics is outlined, embodying the main features both of the Tomonaga-Schwinger and of the Feynman radiation on higher order radiative reactions and vacuum polarization phenomena. However, the theory of these higher order processes is a program rather than a definite theory, since no general proof of the convergence of these effects is attempted.

"The chief results obtained are (a) a demonstration of the equivalence of the Feynman and Schwinger theories, and (b) a considerable simplification of the procedure involved in applying the Schwinger theory to particular problems, the simplification being the greater the more complicated the problem."



Physicist Freeman Dyson. (15 December, 1923 – 28 February, 2020)
(Photo from Wikipedia)

Supposedly, this paper was the result of reflections occurring on a bus trip, hitting Dyson around Omaha [when he was] in his twenties in 1948. They would alter his life and many others. Maybe even the people he mentioned.

From time to time a few decades back, would read excerpts of Dyson's forthcoming books in the New Yorker – and then bought a couple. His books were always worth the read, illuminating about his life or significant events of the 1940s in England, New Mexico and the Manhattan project; eventually life at Princeton within its physics community.

And before that there was the book about him and his son, "The Starship and the Canoe", recounting Dyson's years pursuing a nuclear powered spaceship design in San Diego – and his son's adventures in British Columbia with a tree-house aloft in a Douglas fir and building a canoe as correspondingly ambitious as his father's plans for space. In between, Dyson's speculations about civilizations over our heads or beyond our telescopic view were like nothing seen in science fiction before (save maybe Olaf Stapleton). E.g., about neutron stars he would go so far as to conjecture how life could exist on their surfaces; fast, furious and tiny. Flat, at any rate.

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Building and Flying an Experimental Aircraft by Dr. Rhon Williams (3 December, 2019)

by Tiffany S.



Jenny, the airplane built and flown by Dr. Rhon Williams. (Photo courtesy of Ken Lui)

Dr. Rhon Williams embarked on a journey of making it happen and following your dreams. He did not give up, he accomplished his goal and built his dream plane, which became a memorable accomplishment and most importantly - a Beautiful Plane!

On December 3rd, 2019- I was grateful to attend the AIAA LA-LV presentation on “Building and Flying An Experimental Airplane” event with speaker Dr. Rhon Williams. What an amazing story and excellent accomplishment this person has made. His presentation was in an inside look at building and flight testing an experimental amateur-built aircraft called the Early Bird Jenny. It is 2/3 scale, designed to look like a Curtiss Jenny, a common WWI trainer. In 2002, Rhon joined EAA Chapter 96 and got involved with a chapter project to build an airplane from plans. He soon became the lead in converting plans and raw materials into a flying machine, needing to acquire many new skills along the way. Using modern construction materials and techniques, he constructed this airplane from scratch. His Jenny first flew on Dec. 30, 2015 at Chino Airport and has now returned home to Compton Airport, having completed the FAA required Phase 1 flight test, and can fly without restrictions. Dr. Rhon Williams is active in the Experimental Aircraft Association, Civil Air Patrol, Western Museum of Flight, and gives presentations to pilots as an FAA Safety Team representative. He is also a member of IEEE, AIAA, and AAAS.

From my own experience: Today, there are over 30,000

homebuilt aircraft on the FAA’s registry. When it comes to the question of building an airplane, this requires a lot of skill sets, perseverance, tenacity, a certain mechanical aptitude, and a lot of thought. To build your own airplane, and fly it, there are ongoing challenges that need to be confronted whether using wood, steel, aluminum, foam or fiberglass. Cost is a tradeoff with time. Next challenge that comes into play – Patience! Not all the building process is going to go smooth, yet – in the end, you will look back at those challenges and feel proud. I personally am very impressed with Dr. Rhon Williams' accomplishments. It takes a lot of work in what he has accomplished not only in the building of an airplane but there are a lot of experiments, trials, test design phases, to factor in along with the licensing that is involved with having an airplane to fly. Yet – regardless of all this – he made it happen. Kudu’s to Dr. Rhon Williams!!

Background: Dr. Rhon Williams got his love for planes by seeing all kinds of military planes flying over his house. He earned a Ph.D. in electrical engineering at the University of Illinois, where Dr. Rhon Williams took flight training, earning a commercial pilot license. He was able to fly single and multiengine airplanes, gliders, helicopters; and in addition to this, he became a flight instructor. When Dr. Rhon Williams, moved to California, he taught flying part time and flew his Mooney, and later, a Cirrus SR22 including trips to New Jersey, Bahamas, and to Cabo San Lucas.

He spent many years as a Program Manager at Northrop Grumman and he now gets to spend more time at the airport playing with airplanes and flying his charming Early Bird Jenny!



Gary Mair (Left, AIAA LA-LV Technical Chair) and the Speaker, Dr. Rhon Williams (Right), in Q & A. (Photo courtesy of Ken Lui)

(More photos on bit.ly/3aQQpV2, bit.ly/2U1AT1X, bit.ly/2vVt8mq)

“Women in Aerospace Art” Event Soars in Downey (15 January, 2020)

by Douglass M. Stewart, Jr.,

Producer / Writer / Director of the documentary film "Chesley Bonestell: A Brush with the Future"

Downey, California is a city with deep roots in the history of the American Space Program. It was here that North American Aviation and Rockwell International designed and developed Apollo Command Modules and Space Shuttles (the two companies would eventually merge to become North American Rockwell). Today, Downey is the home of the Columbia Memorial Space Center (CMSC). This museum is a potent force in educating the public, particularly those of school age, about the magnificent accomplishments we have made in space exploration. The CMSC was selected by LA-LV Section to host the AIAA's special presentation of “Women in Aerospace Art”.



Columbia Memorial Space Center in Downey, CA. (Photo courtesy of Ken Lui)

Artistic creations rarely give away the gender of whoever created them. The featured speakers at this event were Mimi Stuart and Michelle Rouch, two artists who have long demonstrated that aerospace art is not the exclusive domain of their male counterparts. Mimi and Michelle have imaginations and talents that know no boundaries and they each have different approaches to the medium they work in.



Mimi Stuart (Left) and Michelle Rouch (Right) speaking about their art and STEAM education efforts during the event on 15 January, 2020. (Photo Courtesy of Ken Lui)

The morning began with a warm welcome for the AIAA from Benjamin Dickow, President and Executive Director of the Columbia Memorial Space Center. Mr. Dickow also spoke about the month-long City of STEM Science Festival that kicks off with huge celebration on April 4, 2020 there at the Columbia Memorial Space Center. Last year, over 10,000 STEM enthusiasts attended.



Mr. Ben Dickow, the President & Executive Director of the CMSC. (Photo Courtesy of Ken Lui)

ABOUT THE ARTISTS

MICHELLE ROUCH:

Based in Arizona, Michelle has over 30 years of engineering experience working for the Department of Defense and serves currently as Lead Systems Engineer at Raytheon Missile Systems plant-site, covering multiple product lines for the Missile Defense Agency, the US Navy, the Air Force and the Army. On top of all that, she is the Chair of the AIAA Tucson Section, a member of AIAA Society & Aerospace Technology Integration and Outreach Committee (SAT IOC), and is currently pursuing an Associate Fellowship. She's a self-taught artist with over 37 years of experience, but her passion since 2002 is giving back to the community, especially working with young people using art as a vehicle to communicate Science and Engineering. In the last 10 years her artwork has raised over \$150,000 to support kids interested in aviation.

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(More photos on bit.ly/2SFfuMx, bit.ly/2P3GqDd)

Virtual Radar Can Prevent Airliner Shoot Downs, Sheep May Safely Graze!

by Shawn L. Huang, Robert V. Ragsac, Sr., and Jerry Huang

Malaysian Airlines Flight MH17 was shot down in July 2014 by an unidentified Russian-made surface-to-air missile. This tragedy could have been avoided by an available technology meant to track and identify commercial aircraft. Such technology is ubiquitous, along with its amateur users. One specific example is an aviation enthusiast website, FlightRadar24.com, which was the first to publish the loss of Ukraine International Airlines Flight 752 in January 2020 when some Iranian civilian feeders in Tehran uploaded their airspace data to the website.

Such tragic losses of life could have been prevented. The objective of this video is to demonstrate the technology and know-how that should have been used to avoid the accidental shooting down of commercial airliners.

We are workers at NASA/Moffett Field in Silicon Valley, and we are part of the international aviation community of users of virtual radar technology by means of Automatic Dependent Surveillance-Broadcast (ADS-B). This technology collects local airspace aircraft movement data and then feeds it to crowd-sourcing websites such as FlightRadar24.com. We had successfully tested these systems and also applied the concepts to other safety/surveillance/spying apps for smart phones, tablets or PCs. Other similar apps are Aircraft Spots twitter, OpenADSB, and TrackView.net.

The best-known example of crowd-sourcing is Wikipedia, used globally (except in China). FlightRadar24.com, a Swedish crowd-sourcing website, is accumulating ADS-B flight data provided by feeders/contributors from all over the world. This is why the logs of the doomed Ukraine Flight 752 were published first by people, and not by any government agency. Such a feat was timely even though the websites have an inherent delay of up to two minutes (latency plus processing time) for them to collect, process, and filter such large amounts of data.

Only local feeders equipped with ADS-B radars can acquire the real-time, originally observed aircraft flight data about the sky immediately above them, as in the earlier-cited Iranian civilian feeders in Tehran who provided inputs to FlightRadar24.com. Military air

defense forces are using the system as a reference. It is as easy and fun as playing Pokemon Go, as children love to do. However, the military of several totalitarian regimes have not used that system as yet, possibly because they may lack knowledge exchanges and have undue concern over foreign conspiracy. To fill this void, the civilian aviation communities FlightRadar24.com and AirTrafficTower.com are willing to provide virtual radar systems free of charge to the Iranian Revolutionary Guard, China's People's Liberation Army (PLA) in the South China Sea, and potential users in remote geopolitical areas. This offer is on a strictly non-political and free-of-governmental-oversight basis and is solely to prevent the accidental shooting down of airliners, thereby saving lives. To apply for the virtual radar systems, refer to the links presented in this YouTube video description.

Airline accidents, though tragic, have contributed to improving airline safety throughout the decades. There are two noteworthy examples: (1) Korean Airlines KAL007, which drifted off course into Soviet airspace and was shot down in 1983. Two Sukhoi Su-15 fighter jets were ordered to intercept the airliner. The missile was launched without any attempt to contact the airliner by radio. Navigation had been a very tricky art, subject to errors. For centuries, dead reckoning was needed, but it has been said that dead reckoning could lead to death. To prevent such navigation errors from happening again, President Ronald Reagan announced the release of the then-secret Global Positioning System (GPS) for civilian use. Glonass, Galileo, and Beidou followed. (2) In July 1988, the USS Vincennes, a U.S. Navy-guided missile cruiser, shot down Iran Air Flight 655, mistaking the Airbus A300 for an Iranian Air Force F-14 fighter jet after trying radio contacts. The incident may have been caused by Flight 655 failing to identify itself. The U.S. government issued notes of regrets and provided compensation to the victims. It was subsequently determined that an automatic airliner identification system would have prevented this incident. ADS-B was the solution.

(This is the narration of a video that will be available in multiple language subtitles: English, Chinese, Russian, and Persian [Farsi], etc.)

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Leaders of the Third Revolution of Aviation Spoke at the Electric and Hybrid Aircraft Mini-Conference at The Proud Bird (22 February, 2020)

by Arpine Ovsepyan, AIAA Council Member



Dr. Marty K. Bradley opening the event.



Michael Kruger (Center, in a gray suit) and Saakar Byahut (Center, in a white/light brown sweater and wearing glasses) volunteering in this Feb. 22 event and listening to the presentations, sitting next to Mr. Joseph Oldham (in red shirt), one of the speakers/panelists.

Ushering in the Third Revolution of Aviation, the distinguished panelists that gathered together at The Proud Bird on Saturday, February 22, 2020, reflect industries leaders that are paving the way for a greener future in the field of Aviation.

AIAA members and attendees of the Electric and Hybrid Aircraft mini-Conference were fortunate enough to hear the innovative presentations made by Cory Combs, Joseph Oldham, Scott Burgess, Dr. Anita Sengupta and other panelists.

Amongst those in attendance, Ampaire's Co-Founder and CTO Cory Combs lead his session by reviewing the rich history of aviation and the spirit of flight.

In his presentation, he made reference to the countless pioneers that helped pave the way for his company to build on the legacy of ingenuity, innovation, and inspiration that eventually lead to the creation of the Ampaire Electric EEL, which is a reconfigured twin-engine Cessna 337 Skymaster, that put his company on the map.

During my interview with Combs, he shared his personal journey as an engineer that can be traced to the age of five when his Grandfather, who was a World War II Fighter Pilot, would fly over their home that was near an airport. While spending time together, his Grandfather planted the seed of aviation in Combs' heart and helped initiate his dream of building airplanes.

Now, years later, Combs is a role model for engineers around the world as he works with Ampaire team and applies the strong knowledge base he has in engineering from his studies at Stanford to revolutionize the aviation industry.

Fueled by his passion for making a difference in the world, Combs dedicated much of his presentation to encourage new and veteran engineers to analyze that we have a responsibility to reduce the carbon footprint left by conventional airplanes. In his presentation, he elaborated on the fact that as we embrace the new technologies' available to us, we can protect the environment, reduce the cost of flying, and reduce noise pollution.

For example, he discussed how the battery power density increase every year and in turn, this will allow for more passengers to fly on longer routes. Also, Combs elaborated on short hop flights in Hawaii and other places worldwide which had expressed interest in using his hybrid plane instead of the conventional ones in order to be environmental friendly, reduce noise, and pollution.

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(More photos on bit.ly/3diWagg)

AIAA LA-LV Exhibition in GoFly in support of the AIAA HQ (28-29 Feb., 2020)

by Ken Lui (AIAA LA LV Events/Program Chair)



Big GoFly sign at the entrance of the event site at the NASA AMES Research Center in Mountain View, CA. (Photo Courtesy of Ken Lui)

Responding to the call for volunteers from the AIAA Headquarter, one of the sponsors for the GoFly event on February 27-29, the AIAA Los Angeles – Las Vegas Section participated in this event and had an exhibition table at the event site, the NASA AMES Research Center in Mountain View, CA. The AIAA San Francisco Section also joined on February 29 and had their table together / next to the LA-LV Section table. Other organizations like Boeing, Hiller Aviation Museum, California Aeronautical University etc. also had their tables or even separate tents there.

The Executive Director of AIAA, Dan Dumbacher, gave a talk during the "Meet the Executive Directors" panel in the morning on February 28. Some other speakers talked about the technologies and business of personal aviation, or their teams / designs in this festival/competition, before they went on to actually demonstrate their aircraft or flying devices on / next to the airfield.

The exhibition was very well received. There were a few visitors on February 28, but the majority showed up on February 29. Many were happy to learn about AIAA and some said they would join the membership / attend events. Some were already AIAA members. Some forgot to pay the dues but said they would renew after the visits. Two former speakers in the AIAA LA-LV events stopped by and said hello. Overall, people were very inspired by what AIAA and AIAA members had been doing, and the AIAA events and programs. Several STEM demos were performed, such as the electric paper plane launcher, magnetic levitation gyroscope, rocket launcher, and a green energy robot.

People also enjoyed viewing and playing with several models, such as B-1B Lancer, F-35, International Space Station, Space Shuttle, SR-71, F/A-18 Hornet and Super Hornet, B-52/X-15, WhiteKnightTwo/SpaceShipTwo, Mars Rover, and rockets etc. The AIAA SWAGs / promotional items, like the rocket pens, squeezable earth etc., along with the ASCEND event promotional bottles and fliers, were very popular and getting lots of attention from the visitors. At the same time, the contests were taking place inside the airfield. There were also some breath-taking airshows in between.

It was a fun event! It's also great quite many visitors stopped by and got interested in AIAA. Look forward to the future opportunities!



The AIAA LA-LV exhibition table. (Photo Courtesy of Ken Lui)



Children and adults playing / viewing the displays & demos, and getting to know more about AIAA. (Photo Courtesy of Ken Lui)

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Postponement of parachute tests for ExoMars 2020

by Philippe Mairet, Aerospatiale Sector Engineer, retired

The high-altitude tests of the parachute system of the Russian-European mission ExoMars 2020, which were to be held in February 2020 in Oregon in the United States, have been postponed until next month, obviously due to changes in the program of work of the American partners.

The calendar is becoming extremely tight for the Martian launch window of this summer, which must open on July 28 and close on August 11 (for an arrival on the red planet on March 19, 2021). A victim of significant delays, the mission had already missed the window within the summer of 2018. The new launch target for ExoMars Mission is 2022 at present.

(Main Source : French Magazine "Air et Cosmos", dated February, 21st 2020)

About the Author: Philippe Mairet
 AFAIAA, Sénior 3AF
 Aerospatiale Sector Engineer, retired
 Former Cockpit specialist in European Hermes Space Project Operational Group
 Former AIAA HS IAC member
 Born in 1962
 Married with Catherine, one son : Loup
 Pets at home, Toulouse Region, France
 University of Pittsburgh, PA, USA Alumnus

Misc. AIAA LA-LV Exhibitions and Mixers (Photos Only)



Dr. Dan Dumbacher (Right), AIAA Executive Director, watching the demo by Mr. Liam Kennedy, for an ISS camera gadget, with other attendees, in the Professionals Networking Mixer with AIAA HQ Executives in the Proud Bird on Feb. 24.



Moises Seraphin (Left, AIAA LA-LV YP Chair), Champion of the Night (Middle), and Fred Lawler (Right, AIAA LA-LV STEM K-12 Chair), after the YP Bowling College Themed Night in Bowlero, Westchester, CA, on Jan. 25, 2020.



Mr. Steve Isakowitz, President & CEO of the Aerospace Corp. (Middle, facing the camera), talking to the attendees in the exhibition area after his talk and the reception on Feb. 27, in the Loyola Marymount University.



AIAA LA-LV Exhibition in the Mira Costa Community STEM Night in Manhattan Beach, CA, on Feb. 12, 2020.

Open Skies for National Security *(continued from Page 1)*

Four years earlier at a summit of the Big Four powers in Geneva in July 1955, President Eisenhower proposed the “open skies” plan based on reciprocal aerial overflights of the American and Soviet territories. Khrushchev rejected the proposal. Then Eisenhower made peacetime overhead reconnaissance of the denied areas a national policy and authorized U-2 overflights. The planes first flew over Leningrad (today’s St. Petersburg) and Moscow on July 4 and 5, 1956, respectively. Soviet radars detected the high-altitude U-2s, but air defenses could not stop them yet.

U-2 photo of Moscow 5 July 1956



Fig. 4.18 Aerial reconnaissance photograph of southwestern Moscow showing a head of the Moscow river around the Leningrad sports arena (top) and the recently constructed main building of the Lomonosov Moscow State University (bottom) on the Lenin (Ploshch' Crui) Hill across the river. This area is at the bottom-right (southeast) corner of Fig. 4.8. The vertical center of the U-2 (aircraft) Mission 2014 obtained this photograph at 18:08 on Moscow time on 5 July 1956.

The U-2 planes made their first over-identification flights over the Soviet Union in early July 1956. Mission 2014 over Moscow followed Mission 2013, which had been over Leningrad on the previous day. Then Mission 2020 (9 July), 2021 (9 July), and 2022 (10 July) covered Lithuania, Belarus, and Kiev, Odessa, and the Crimea in Ukraine. The overflights ended the “bomber gap” disagreement. Many in the United States at that time believed that the Soviet Union had been rapidly building up its fleet of three strategic heavy bombers. They argued for deployment of additional U.S. B-52 bombers in response. The U-2 photographs did not confirm these alarming estimates and allowed President Eisenhower to rule on accurate intelligence assessments to respond government. Similarly, space reconnaissance Corona satellites helped later to resolve the uncertainty of the “missile gap.”

Original photograph from the National Archives and Records Administration; photograph identification, interpretation, and processing by Mike Greenham.

Later, AF persiwich corrected the text in the electronic posting (PDF file) of the book on the website of the Almaz-Antei Corporation (the successor organization to KB-1) “On July 4, the Day of Independence of the USA, a U-2 airplane was sent to our airspace—the latest achievement of transoceanic

U-2 photograph of Moscow at

http://astronauticsnow.com/fip/fi_p_078.pdf

More on the U-2 program at

<http://astronauticsnow.com/u2/>

In mid-1950s the United States initiated the next step in photoreconnaissance development, the satellites that became known as Corona. This program was the primary space objective of the national-security-focused Eisenhower administration. Space reconnaissance would rely on universal acceptance of freedom of space, that is the right of satellites to fly over other countries. Consequently, President Eisenhower approved putting into orbit a scientific satellite (Vanguard) first in order to demonstrate the right of overflight by spacecraft. Ironically, it would be the Soviet artificial satellite Sputnik, with no country objecting its orbiting the Earth, that made in October 1957 the principle of freedom of space a tacit “common-law” reality.

The U-2 overflights played a key role in accurate assessment of the Soviet military threat. In particular the missions revealed that the feared “bomber gap” with the Soviet Union did not exist. They also showed the

growing air defense capabilities that would bring the program to an end in May of 1960.

Many technical challenges and setbacks marked development of the top-priority Corona satellites, disguised as the civilian Discoverer program. Only on its fourteenth flight attempt in August 1960 the spacecraft completed its full mission with all film exposed and transferred to a recovery capsule, which reentered the atmosphere where a C-119 plane captured it in air. This single mission photographed a larger Soviet territory than all prior U-2 overflights of the Soviet Union combined. The photographs confirmed absence of a new threatening ballistic “missile gap” between the superpowers, a contentious and politicized topic of the presidential election campaigns of John Kennedy and Richard Nixon.



Fig. 7.2 Aerial reconnaissance photograph of the 4000 (10000) km long receiving antenna (the large facility of the large-scale air equipment under the 2 of the 1st of the 1st on the shore of Lake Balkhash. This received data partially obscured details of the antenna about 1.5 U-2 aircraft obtained this aerial photograph on 9 April 1960, which also showed another antenna of similar length about 1 km to the north. Another clouds covered the scene, preventing its detailed analysis. Original photograph (U-2 Mission 4018). A page from “National Archives and Records Administration” photograph identification, interpretation, and processing by Mike Greenham.

Corona photographs of Saryshagan Test Site at

http://astronauticsnow.com/fip/fi_p_169.pdf

http://astronauticsnow.com/btpp/btt_p_407-408.pdf

Under direction of the National Reconnaissance Office the Corona program continuously improved its performance and remained operational until 1972, followed by next generations of optical space systems. Simultaneously, signals and electronic reconnaissance satellites provided complementary capabilities. The early open-skies vision of President Eisenhower was also implemented after the end of the Cold War, with more than thirty countries signing a treaty allowing occasional aerial overflights of their territories for military transparency.

Freedom of space keeps skies open for reconnaissance satellites to this day, vitally contributing to national security and making verifiable arms-control agreements possible. Protecting this “freedom of operation for the United States in ... space” is among main tasks of the new Space Force.

Spy Pilot, Francis Gary Powers, the U-2 Incident, and a Controversial Cold War Legacy (continued from Page 2)



Mr. Peter Arvedson (Left) taking picture for the speaker (Middle) and Dr. Paula Arvedson of CSULA (Right).



Attendees listening to the speaker about the story of his father, the books he wrote, and the movie made by Steven Spielberg.



Col. Mark Pestana (USAF-Retired) (Standing) making comments on the Cold War Global Aerial Reconnaissance.



Marty Waldman (Second to the Left), Chair of the AIAA Las Vegas Chapter, listening to the presentation. The AIAA LA-LV Section Co-Chair, Marsha Weiskopf, (Third to the Left) also attending.



The speaker (Left) receiving the appreciation certificate signed by the AIAA LA LV Section Chair, Dr. Chandrashekhar Sonwane, from the AIAA LA LV Events/Program Chair, Dr. Ken Lui (Middle). Prof. Mike Gruntman (Right) also received one. (Photo Courtesy of Dr. Seth Potter)



(Left) Santosh Kumar, wearing an aircraft-themed shirt, networking with the attendees;



(Right) Dr. Seth Potter taking pictures of the speaker. (Photo Courtesy of Ken Lui)

Raoul Wallenberg (4 August, 1912 – disappeared 17 January, 1945)

(Continued from Page 3)

Raoul Wallenberg was part of a Swedish bank and industrial family during and prior to WWII. The Wallenberg family is renowned as politicians, diplomats, in business and are present in many Swedish industries, i.e., SAS Group, Ericsson, Electrolux and more. While Raoul could fold in the family business, his dreams were somewhere else. He did not want to be a banker or be in business because he was a Wallenberg. In 1930, his grandfather sent him to study architecture at the University of Michigan. After completing his degree, he worked as a trainee in a trading company in South Africa and a bank in Palestine. Wallenberg's employer sent messages to his grandfather saying that he seemed to be a good worker. Raoul later wrote to his grandfather that banking was not his business. It is too calm, cynical and cold for me. Raoul's dream was in architecture. He returned to Stockholm and designed buildings but none of his designs were built. He later changed his mind about banking but his great uncle, Marcus Wallenberg, refused his request. The great uncle saw Raoul more as a politician.

Instead of politics, Raoul turned to trading coffee, attempting to corner the Swedish market for Portuguese sardines and inventing a Quick Cork for wines. The Quick Cork would pop out of wine bottles without using the corkscrew. The French did not respond. So, here is Raoul Wallenberg, considered a poor Wallenberg, a failed entrepreneur who had not lived up to his architecture dreams and did not keep up to his families reputation. Now, he was selected by the United States, the JDC and Sweden to embark on an international level to stop the slaughter of Jews in Europe. At this time, Hungary still had free Jews, but by July 9, 1944, 440,000 Hungarian Jews had already been sent to Auschwitz-Berkenau. That is when Raoul entered Budapest, July 9, 1944.

Raoul's friends already knew of his uniquely energetic, idealistic, sensitive nature and given the right opportunity he could use his talents and be guided by his ideals. His friends knew that Raoul was brave and calm in the face of danger. When Raoul was studying architecture at Michigan University, he hitched a ride from the 1934 Chicago's World Fair back to the Michigan University campus. He was picked up by group of hoods. They turned down a deserted road and rob him at gunpoint. He behaved so calmly that he scared his robbers. He wrote to his mother: "After my nice 'travel companions' had

counted my money, and I could see that they were pleased, I thought it was their turn to do me a favor. So I told them the lease they could do was to drive me back to the main road. After discussing it among themselves for some time they agreed. They got into the front seat and threw me into the rear....Oddly enough, during this whole time I wasn't at all frightened. The robbery seemed like an exciting adventure. However, I think I was so calm that they became suspicious and then frightened of me. They became afraid that I'd lured them into some kind of trap. All of a sudden they stopped the car and tossed me into a ditch."

His friends knew, too, that he agonized over the plight of the Jews. He told a young date of his what was happening to Jews in Germany. His friends knew that Raoul's going to Budapest thought of it to be inside of his dreams of doing something big or that it was not out of character of him. When he left his going-away party he said, "I'm going to leave you now for one reason: to save as many lives as possible; to rescue Jews from the claws of those murderers." The following morning he flew to Berlin, and without hesitation he continued to Budapest after the Swedish ambassador in Berlin wanted Raoul to spend the weekend in Nuremberg with his sister.

Raoul is credited with saving close to 100,000 Hungarian Jews.

More to come.



A statue of Raoul Wallenberg in Los Angeles, CA, on the northeast corner of Fairfax and Beverly, in front of the Chase Bank. (Photo Courtesy of Julian Vazquez)

(continued on Page 29)

A Cold War Museum Locally in Los Angeles – The Wende Museum

(Continued from Page 4)

“Recognizing the Wende Museum’s growing stature since its foundation in 2002, the City of Culver City has provided the 1949 National Guard Armory building and grounds to the Museum for 75 years.

The Museum’s vision is to seize the opportunity provided by the move into the Armory in 2017 to fully implement its experimental approach to making the history of this period relevant to today’s audiences, and to achieve financial sustainability.

The Armory building is where the two industries that powered the economy of Southern California in the post-World War II period – defense and movies – converged. The defense industry was moved into high gear by the Cold War; the movie industry promoted, shaped, and later also criticized Cold War politics and culture. A building once designed to prepare for World War III will now be reimagined as a cultural center for preserving and interpreting Cold War art and history.” - *From Wende Museum website*

“Examining the history of Eastern Europe and the Soviet Union can be fraught with political and personal bias, and the complex, often contradictory stories that underlie the Museum’s artifacts may provoke uncomfortable questions. The Museum’s location in Culver City, California, provides independence and critical distance from current political debates in Europe, and facilitates the questioning of preconceived ideas about our past and present. Moreover, the Museum’s physical remoteness from Central and Eastern Europe has enabled it to attract significant artifacts and collections that might otherwise have been destroyed as a result of emotional and political reactions.” - *From Wende Museum website*



STEM education is also important for the Wende Museum. (Photo courtesy of Steven Gelb)

About Steven Gelb:

Steven Gelb is a retired aerospace engineer from the Hughes Aircraft Company and the BOEING Company. He specialized in computer analysis and performance predictions of spacecraft solar arrays for approximately 35 years. Most of the information contained in this article may be found on the Wende Museum web site unless marked otherwise.



Steven Gelb, the author of this article, mentioning the Wende Museum to the speaker and the attendees during the AIAA LA-LV “Spy Pilot, Francis Gary Powers, the U-2 Incident, and a Controversial Cold War Legacy” event on March 5. (Photo Courtesy of Ken Lui)

Cold War Spy Pilots: Black Bats/Black Cats

(Continued from Page 5)

It was also very interesting to learn from the speaker that his father did fly a reconnaissance mission with U-2 over Communist China during the Cold War. Another interesting story from Q&A was about Mike Hua, a late ROC Air Force General and also a former U-2 pilot in Taiwan, and the book he wrote about U-2.

In fact, U-2 is still being used these days, and it has been modernized by Lockheed Martin for modern warfare.

My dad was a member of the 8th Brigade, 34th Squadron. Many from his Squadron took the the assignment -- Flying the West, now known as the "Black Bats" mission. Dad had never flown U-2, for my whole family relocated to Taipei in 1957. The father of a friend of mine, Dr. Chin Hai Lee (Ph.D. in Aerospace), was also a member of the 8th Brigade. Through my introduction, Dr. Lee has attended AIAA seminar before and he enjoyed the professional connections provided by the Institute.

It was the 34th Squadron of the 8th Brigade being selected as the members of Black Bats, while the 35th Squadron of the same Brigade became members of the Black Cats (U-2). All the Republic of China's (ROC's, not PRC's) pilots in early days were trained by the U.S. Air Force, and only the best of the best were selected as members of Black Bats/Black Cats.



The modernized Lockheed Martin U-2 Dragon Lady still in use nowadays. (From Lockheed Martin Official Website)

All in all, I liked the presentation on March 5th. My first impression of AIAA was very good in terms of the quality of its seminar, its organizers' professionalism, and attendees' friendliness. I wish to attend as well as to collaborate with AIAA for some of its future events.

About the Author: Monica Chang was educated as an economist from the Columbia University, N.Y. City. Then she taught Economics for many years full-time mainly at St. John's University. In addition, she got her certificate in 2009 as a Court Mediator in California. She currently holds her own office as a Mediator, and also serves as a business/employment advisor.



All "315-C" classmates right after they graduated from SMAAF Navigation School on Sept. 29th, 1945. Frank Hsien Kuei Chang, Author's father, is the first one from the right in the top row standing. Dr. Chin Hai Lee's father is the second to the right in the middle row sitting. Some of those young men went on to participate in the Black Cats or the Black Bats missions during the Cold War. (Photo Courtesy of Monica Chang)



The speaker listening to the questions and comments from Monica Chang, author of this article. (Photo Courtesy of Ken Lui)

Flying high: The X-15 and U.S. Spaceflight *(Continued from Page 6)*



Michelle Evans in front of the X-15A-2 at the National Museum of the U.S. Air Force in Dayton, Ohio. This is the fastest piloted aircraft ever flown at Mach 6.70 or 4,520 mph. (Photo Courtesy of Michelle Evans)

Yet the X-15, which most believed would take the first American astronaut into space, was still a beauty in its own right, not created to please an audience, but instead was the vanguard of a far-reaching research program that dealt with the real idea of being able to fly a fully reusable winged spacecraft out of the atmosphere and land it safely back on terra firma under a pilot's touch.

And even though the experimental data garnered from more than nine years of flight testing often lent itself to technical journals and scientific publications, the program also inspired people about the real excitement and promise of air and space exploration.

Twelve men flew the X-15, including Scott Crossfield, Joe Walker and future Moon walker Neil Armstrong. Also included in that cadre of elite pilots was the exceptional aviator Joe Engle, who commanded two early missions of the Space Shuttle, and was the only such person during that 30 year long program who was allowed to bring the Shuttle back from orbit under manual control because of his experience doing the same thing on the X-15 in the 1960s.

As for Armstrong, he was nearly fired from the program because of a series of mistakes made during a mission on the X-15 and also on several support flights. These difficulties are what led to his transfer away from Edwards to become a NASA Gemini and Apollo astronaut.

The X-15 existed as a pure research aircraft, to test the problems of hypersonic flight, defined as speeds above five times the speed of sound, or about 3,800 miles per hour. During the program, pilots exceeded 4,500 mph, and flew more than 67 miles high. The sorts of things being looked at were the effects of extreme heat on an

airframe reentering the atmosphere from space, the ability of a pilot to control a vehicle in the weightless environment, then to be able to make pinpoint landings. All of these, and more accomplished by the X-15, helped pave the way for future access to space for humans.

I first became enamored by this rocket plane when I was very young. My father started taking me with him when he had to visit Edwards for work, and I got a chance to roam around the hangars, talk to the people and watch the operations happening around me. The race to the Moon with Mercury, Gemini and Apollo was happening at the same time, and I followed that with great enthusiasm, but with the X-15, I got to see it unfolding first hand rather than on a flickering television screen.



Joe Engle with the X-15. (Photo Courtesy of Michelle Evans)

Many years later, when I was looking for the subject that would capture my interest to write a book about, the X-15 was the first thing that came to mind.

I started my research, began talking to participants, and after many years was finally able to write what is now considered the definitive book on the program. Even more importantly is that I knew the story could not just be about the remarkable aircraft, but it had to be about the people who made it all happen.

Sitting and talking with people like Neil Armstrong and Joe Engle was a thrill, but even more so was being able to discuss these men with others who worked with them on a daily basis. Getting their insights, getting the feel for what it was like out in the high desert air was an experience of a lifetime.

Being able to tell their story, for me, has been the deepest honor I think it is possible to have. Their personal stories, and the story of the X-15 itself, of flying higher and faster than anyone ever had before, should inspire a new generation on a quest for the unknown.

Marvelous Devices of Ray Bradbury's Fahrenheit 451 *(Continued from Page 8)*

Arguably, the most remarkable and most easily recognized creation in the book is Mildred Montag's "TV Parlour" (definitely a "must-have" possession). Mildred bewails the poverty of only three walls – she wants the total experience, which means her family needs to be completely surrounded by four pulsing, colorful walls. She urges her husband to buy the final wall because "it's really fun" and it's only "one third" of Montag's fireman's yearly salary. Interactive television is, in his story, worthless, mindless drivel without any redeeming value, yet entire families are hypnotized by it and have turned away from socializing and physical activities. Imagine owning a giant television screen that would encompass four walls for a totally engrossing, interactive experience. In Bradbury's future, viewers were encouraged to participate in programs in which the characters on screen turn blind eyes towards the cameras and so appear to be asking for input. These characters are referred to as "the family". They are invited into homes and made relatives.

Today, in 2020, home theaters are created of huge, flat, plasma screens and surround sound which allow viewers to completely immerse themselves in programs that encourage audience participation. While television manufacturers promote the promise of, "the ultimate personal experience in home theatre viewing" the interaction is not exactly as Bradbury predicted, though. Today's viewers actually provide input to contests and influence the outcomes. Whole families regularly watch so-called "reality programs" and phone, text, or access internet sites to vote for their favorite competitors or plots. Not only are these programs discussed at length at work and school, but even regular, hard news programs have begun reporting the latest outcomes and developments.

We've taken Bradbury's home theater idea to the next level.

Mr. Bradbury also wrote of tiny radios, "... little Seashells, the thimble radios...an electronic ocean of sound" with tiny earplugs that allow people to listen privately to music or news 24/7 without disturbing anyone sleeping nearby. People in Montag's world are mesmerized by these personal radios and, again, poor Mildred is especially under the spell. "Every night the waves came in and bore her off on their great tides of sound...There had been no night in the last two years

that Mildred had not swum that sea, had not gladly gone down in it for the third time". Mildred is not alone, of course; these devices are de rigueur, nearly everyone has one and they are quite the fad.

Today, almost everyone travels with a set of ear buds or headphones, which can be plugged into a cell phone, radio, or digital music player, thereby excusing him or her from any social interaction. Entire generations of children have grown up lacking basic social skills and are unable to simply sit and think; children must be entertained at all times. Mini vans come with panels in the armrests providing headphone jacks for private listening. Music and digital programs and information is downloaded to cell phones, personal computers, iPods. In September 2019, it was announced that more than 450 million Apple iPods have been sold in the world. Have we taken this idea too far? Possibly.

Bradbury also provides physical entertainment for his characters. He gives them giant "fun" parks full of thrill rides with names like the "Window Smasher Place, and the Car Wrecker place with the big steel ball". It sounds like these recreational arcades are antagonistic places where people go to work out their frustrations. Similarly, in 2020, we have vicious, blood soaked video games like Mortal Combat and Grand Theft Auto: Vice City. It's all in the name of fun.

This is the dark side of Bradbury's vision. In the book, high speed driving promotes recklessness and excitement. Mildred Montag advises her husband to relieve his stress by taking the keys to their vehicle, the "Beetle." (a nearly self-driving vehicle). Mildred points out that "It's fun out in the country. You hit rabbits, sometimes you hit dogs. Go, take the Beetle".

There is even a time where Montag, himself, is physically threatened by a car.

This "future" is frighteningly familiar. Hit and Runs are reported on a daily basis. Aggressive driving, or road rage is a common occurrence. It is both common and modern, as evidenced by its recent appearance in the on-line, interactive reference Wikipedia. According to that source, the phrase "road rage" was added to the American lexicon in 1997.

Ray Bradbury's ideas show he is definitely a man born before his time.

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In Memory of Freeman Dyson (15 December, 1923 – 28 February, 2020)

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Finally, after the 1970s and 80s, I did get to meet him a couple of times. Attended a couple of the Space Studies Institute conferences at Princeton back in 96 and 97 or something like that – and gave a couple of papers the second time. The Space Studies Institute was based at Princeton and Freeman Dyson headed that institute as well as being a member of the Institute for Advanced Studies staff. One of my papers was about using the External Tank on orbit, and how it could be stabilized with a magnetic damper. ET discussions always brought out enthusiasts, so there was a lot of discussion later. But a highlight for me was the fact that Freeman Dyson was out there in the audience in a front row. As far as I know, the most distinguished individual to whom I ever had the opportunity to give a talk. Outside the auditorium we only talked briefly while I was there during the cocktail party portion. Mostly he was telling me about some features of various star systems or stars – but I can't recall now what that was about, even if I had only a ginger ale. What was easier to remember was his faith that the New Jersey skunk cabbage was bound to be a boon for Martian settlers. Growing up in NJ, sometimes I would walk a shortcut to school, down a railroad track back in a woods that was full of them. Skunk cabbage sprouted before winter was over and were resistant to freezing.

Off the book shelves I located “Infinite in All Directions”, but I haven't yet located “Disturbing the Universe”, which is where, I believe, his accounts of the 1940s are. More recently, Dyson had published much of his correspondence in lieu of an autobiography.

It was Saturday when I discovered that Freeman Dyson had passed away. I had picked up the NYT at a news rack.

“After finishing high school at Winchester College where his father taught music, he entered the University of Cambridge, Trinity College, and excelled in mathematics.

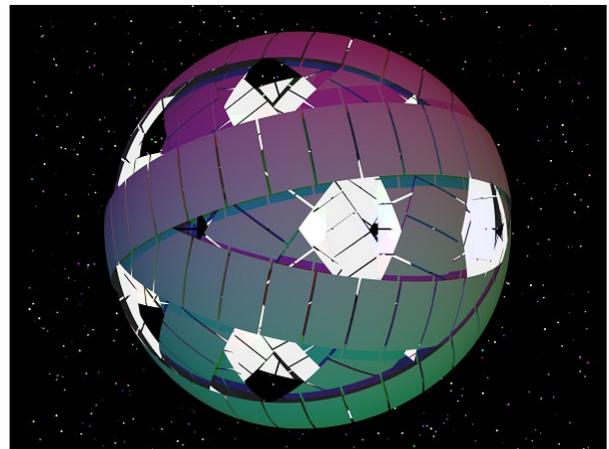
“Looking for a way to serve the war effort while satisfying his pacifist leanings, he took leave in 1943 to work as a civilian scientist for the Royal Air Force Bomber Command...”

I recall his writing in “Disturbing the Universe” and elsewhere that he did have misgivings about those years: for both the crews dispatched on those missions and the

terrible costs it had on people below them. After the war, he did return to Cambridge and concentrated on becoming a physicist. He then came to the United States and entered graduate study at Cornell, studying with Hans Bethe – and working with Richard Feynman. His accounts of people associated with the Manhattan Project seemed to suggest to me that he spent much time in New Mexico. Probably it was while he was working closely with Bethe and Feynman after the war.

As the article goes on to say, Feynman, Julian Schwinger at Stanford and Sinitoro Tomonaga in Japan were all working on descriptions of the behavior of electron – photon and positron interactions – and Dyson found a way to describe their theories in a mathematically integrated manner, showing that they were equivalent, consistent even with the constraints imposed by relativity and quantum mechanics (quantum electrodynamics), publishing his results in 1949. Perhaps ironically, the three aforesaid physicists were awarded the Nobel Prize in 1965. Dyson moved on to the Princeton Institute of Advanced Study in 1953, remaining on staff. Freeman Dyson was also a regular adviser to the US government on science matters, often with a group known as the Jasons, a group which has even become involved in propellantless propulsion studies.

In the space community, Dyson was known for his speculations about extra terrestrial civilizations and their possible mark, e.g., the Dyson sphere. Of late, thanks to the Kepler mission and other observations, at least one star was named as a suspect site, (“Tabitha's”), likely something for another story.



Dyson Sphere. (from Wikipedia)

(Continued on Page 28)

“Women in Aerospace Art” Event Soars in Downey (15 January, 2020)

(Continued from Page 11)



Michelle Rouch in one of her studios, working on a commissioned piece for the Tucson International Airport Military Lounge. The artwork is titled "P-40 Tiger Mouth." (Photo Courtesy of Michelle Rouch)



Michelle Rouch with visiting students at the CMSC. (Photo Courtesy of Michelle Rouch)

MIMI STUART:



Michelle working with children at the “Night Wings” event at the Pima, AZ Air & Space Museum. (Photo / Slide Courtesy of Michelle Rouch)



Mimi Stuart and “Momentum” (Photo courtesy of Mimi Stuart)

Michelle has a question that she never stops asking: “Kids are creative by nature...how do we keep that creativity going as they grow up?” During her talk to the AIAA LA-LV Section members, she emphasized the importance of working with children and young adults to teach them and to keep them inspired. STEM (Science, Technology, Engineering and Math) and STEAM (which includes an Art component) programs are a big way because she’s found they appeal to hard-to-reach young people on so many levels. In fact, when a group of visiting students dropped by at the CMSC event, Michelle just had to take time to visit with them and encourage them to fulfill their dreams.

When looking at a painting by Mimi Stuart, you can’t help but notice how the colors make it vibrate and practically come alive. She’s always known she was an artist and her early schooling in Spain and Germany, as well as travels to tropical countries, gave her a love for bold colors. After graduating from UC Berkeley, Mimi went to study at the Art Center in Pasadena and from there, she pursued a career in animation and illustrating books. From those experiences, she developed a passion for bringing canvas alive as a full-time painter.

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Virtual Radar Can Prevent Airliner Shoot Downs, Sheep May Safely Graze!

(Continued from Page 12)

These two and many other accidents prompted the release of advanced U.S. defense technologies such as GPS, the Internet, cloud computing, and digital photography to support civilian aircraft safety. These technologies are now in everyday use by most people, without their knowing the background stories. The airliner-identifying ADS-B had been advocated by the U.S. Federal Aviation Administration (FAA) and International Civil Aviation Organization (ICAO) since the last century. Furthermore, ADS-B has the potential for being an online, real-time flight data recorder (black box), ensuring no aircraft will disappear into thin air as did Malaysian Airlines Flight MH370, the most notable mystery in aviation history. Nor will there be the expensive recovery of flight data recorders, such as those of Air France Flight 447 in the Atlantic Ocean. It is an international effort for all the sovereign nations' Civil Aviation Authorities (CAA)-mandated ADS-B. China is playing a major role in making the equipment.

The ADS-B virtual radars can be stationary or mobile. Because building the system is challenging, the civilian aviation communities FlightRadar24.com and others have provided instructional videos; the links are provided in the description. According to our experience and strong recommendations, stationary radar should be built first and then converted to mobile if needed. We are showing the instructional video of building mobile radar for studying the signal characteristics. The basic components are similar: a software-defined radio (SDR); an antenna; an optional band-pass filter; and the computer, a Raspberry PI 3. All are made in China and can be purchased online. As stated above, the civilian aviation communities can provide ready-to-use equipment for free to selected parties as mentioned above.

We are located in NASA/Moffett Federal Airfield. Our ADS-B radar is tracking 145 aircraft over the busy San Francisco Bay Area, with a radar range of 200 nautical miles. The antenna is mounted on top of a vehicle, while the receiver, radar computer and power supplies are inside. A smartphone is used as the hot spot Wi-Fi; the virtual radar and a tablet are connected wirelessly, while the tablet is used as the radar screen. A Wi-Fi hot spot is required to be in effective range between the radar and

display tablet.

We also learned from the aviation enthusiasts in Taiwan about their ADS-B devices watching the sky over Taipei last year. There were air power muscle shows between the USAF and Communist China's PLA. PLA's H-6 bombers (copies of the Russian Badger) flew around Taiwan threatening the election. Figure 5 shows Aircraft Spots' records of the B-52s from Guam flying over the Taipei Flight Information Region (FIR) to support Taiwan.

This video is dedicated to the memory of Ernest "Mac" McCauley, the pilot of the ill-fated B-17 Flying Fortress Nine-O-Nine of the Collings Foundation. He and the crew kindly allowed us to perform flight tests of the TrackView.net, an ADS-B safety surveillance system, on both the B-17 and B-25 Mitchell bombers.

Background music for the video: J. S. Bach Aria "Sheep May Safely Graze"

Lyrics: "Sheep may safely graze where a good shepherd watches over them. Where rulers are governing well, people may feel peace and safe, that makes countries happy."

"Schafe können sicher weiden, Wo ein guter Hirte wacht. Wo Regenten wohl regieren, Kann man Ruh und Friede spüren. Und was Länder glücklich macht."

How and where to apply for a free ready-to-use virtual radar system:

<https://www.flightradar24.com/apply-for-receiver>

<https://flightaware.com/adsb/flightfeeder/>

How to Do-It-Yourself build a stationary virtual radar: instructions and videos links:

<https://www.flightradar24.com/build-your-own>

<https://flightaware.com/adsb/piaware/build>

(Continued on Page 31)

Leaders of the Third Revolution of Aviation Spoke at the Electric and Hybrid Aircraft Mini-Conference at The Proud Bird (22 February, 2020) *(from Page 13)*



Mr. Cory Combs talking about the Ampaire's efforts and his passion in Electric and Hybrid Aircraft.

He described how the FAA certified his planes under experimental projects and provided opportunities for test flights where they can conduct research and development for future use.

When asked about advise Combs would give to new engineers, he encouraged them to look back at the history and spirit of the aviation and realize that they have to “start small” and work their way up.

Following a light lunch, attendees listened eagerly to the next presenter, Joseph Oldham, the Reedley Airport Commissioner. Oldham’s advice to new engineers is to “dream big” as they enter into a dawn of a new era of aviation. Oldham shared the visionary partnership Boeing had sponsored with local schools that provided students in the Central Valley with opportunities to use flight simulators in schools. Reflecting on the need to provide pathways to students in the Central Valley that often come from disadvantages populations, Oldham shared excitement and progress local area students displayed in using this technology that may not have been available to them if this partnership did not exist. Known as “The World’s Fruit Basket,” the City of Reedley has been known for its prowess in the agriculture sector of the economy. However, now with the movement towards electric and hybrid aircraft, Oldham explained how the City of Reedley has a lot to offer to help with this movement specifically in the area of open space and a population that is looking for diversification in the economy and job opportunities for future generations. By using these simulators and STEM



Panelists discussing key subjects and answering questions from the audience. Right to Left: Dr. Anita Sengupta (holding the microphone), Scott Burgess, Joseph Oldham, and Cory Combs. (Dr. Marty K. Bradley standing behind them, moderating the panel)

education programs along with further development of hybrid planes, Oldham and attendees hope that the City of Reedley will be not only be known as the breadbasket of California but also, as an economic powerhouse for the changing field of aviation where future generations move from working with in the field to actually being part of the air fields.

Next, Scott Burgess, the President and Co-Founder Eco-Aviation Foundation International shared his insights by raising awareness to global efforts being made to utilize electric and hybrid planes as part of the “revolution of green flight.” He described his start with Eco-Aviation that began when many residents in the Santa Monica area complained about noise at the nearby airport. Given Santa Monica’s track record to being an environmental consciousness community, his efforts to research and advocate for “greener” airports has started to gain momentum. Burgess encouraged new engineers to realize that we are entering into a time of accountability in aviation where some countries in Europe are having penalties being put into place for pollution. Burgess shared an eye-opening view of an airport in India that uses 100% solar energy. He explained how Cochin International Airport Limited answered the call of zero emission by doing whatever it takes to convert to solar energy. By doing so, they will save 300,000 tons of carbon emissions over the next 25 years. In fact, as the fourth largest airport in India, Cochin International

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Marvelous Devices of Ray Bradbury's Fahrenheit 451 *(continued from Page 22)*

Years ago when I reflected on what I was reading, I stared mindlessly at my tiny black-and-white television or I coveted a brand new transistor radio with a headphone jack so that I could listen to my own music, secretly and silently. I watched cars steer past my home and expected that they would soon go faster. When I originally read Fahrenheit 451, I wondered if the future could really be like that.

And so it is.

Mr. Bradbury's fantastical devices must have sparked more imaginations than mine. I believe that of the millions he reached over the years, many grew up to create what he imagined. Some might say that these inventions were inevitable. Perhaps they were merely the expansion of ideas already festering in somebody's mind. Somebody named Bradbury, at least.

I believe that Mr. Ray Bradbury knew, even in 1953, that the future would be full of wonderful things. He was a genius gardener.

About the Author: Judy Sunderland is a freelance writer and editor (operating under the banner of "O'Kelley's Ink") and holds a Masters of Fine Arts degree in Creative Nonfiction from Antioch University Los Angeles. A "Jack of All Trades," she has work experience in a variety of fields, including aerospace (Hughes/Boeing). She is a past President of the Southwest Manuscripts. Personal specialties include tutoring remedial English and assisting Ph.D. candidates with thesis editing.



Rod Pyle talking about *Battlestar Galactica*, and *Space Battleship Yamato*. (Photo courtesy of Ken Lui)

In Memory of Freeman Dyson (15 December, 1923 – 28 February, 2020)

(Continued from Page 23)

Several times, evidently, Dyson has delivered wide ranging lectures which were published later in book form. The NYT obituary mentions the Templeton lecture. "Infinite in All Directions" is another example, the Gifford lectures in Aberdeen, Scotland, delivered in 1985.

Freeman Dyson was unique in the scientific community. He never bothered with obtaining a doctoral degree, perhaps because of the differences between the US and the UK. The university research establishments in the US and the UK were somewhat different. In the US, we probably resemble the German system more than the British system, perhaps because of the influence German science had in the early 20th century. Consequently there was more emphasis on doctoral degrees here than in Britain, maybe resembling Germany more than Britain. He found comfort in both cosmology and his religious convictions. In other words, despite what others might perceive as randomness or no purpose, he conveyed a message that there was purpose in the universe, if you will, in its genesis; and it was good.

About the Author:

Wes Kelly is an aerospace engineer residing in Houston near the NASA Johnson Space Center. He has a small aerospace company Triton Systems, LLC. The company and its associates is looking at a partially reusable horizontal launch and landing small satellite launcher.



Left to Right: Prof. Madhu Thangavelu, Mrs. Imme Dyson, and Freeman Dyson (2018). (Photo Courtesy of Madhu Thangavelu)

AIAA LA-LV Exhibition in GoFly in support of the AIAA HQ (28-29 Feb., 2020)

(Continued from Page 14)



Visitors were curious about the little robot demo by the AIAA LA-LV Section. (Photo Courtesy of Ken Lui)



Amazing acrobatic airshows while the GoFly competition is taking place inside the airfield. (Photo Courtesy of Ken Lui)



A helicopter and a transporter airplane performing airshows. (Photo Courtesy of Ken Lui)

Raoul Wallenberg (4 August, 1912 – disappeared 17 January, 1945)

(Continued from Page 18)

About the Author: Julian Vazquez is a retired Marine LtCol, flying F-4 Phantoms as a Radar Intercept Officer (RIO). He is an engineer and taught math in the Marine Corps and 7th grade. He earned his BSEE at Cal-Poly, Pomona. He worked as an engineer, program manager and data management manager in the defense industry. He worked on the navigations systems for the Poseidon, Ships DMS, flight engineer on the AirEye System for the Coast Guard's HU-25 and the AN/ALQ-123 and AN/ALQ-157 IRCM. He was the program manager for qualifying the AN/ALQ-123 IRCM System on the A-37 Dragonfly for a Central American country. In the Marine Corps, Julian defeated modern heat-seeking missiles using the AN/ALQ-123.



Julian attended the 2 year program for acting at the Stella Adler Academy and has many lead roles in stage plays. His memorable plays include *Wallenberg*, *Blade to the Heat*, *Sick and Tired* and *North of South Central*. Julian had lead roles playing Pontius Pilate

and Caiaphas in *The Choice*. Also, besides doing stand-up comedy and improv, he produce comedy shows, directed a few stage plays, produced film and TV. He also taught acting for 5 years and continues to coach actors. He produced and hosted *Inside the Industry*, a talk show interviewing people who work in and around the entertainment industry. He produced and had a lead role in an award winning short film, *Tasteless*. Julian has had speaking roles in independent films, "Phrenic" and "Los Coyotes."

Julian also served as Associate Producer on a new musical called *Bert n' Eddie*, the story of Bert Williams and Eddie Cantor. Julian has performed at the Improv, The Comedy Store, Flappers and The Ice House. Peterson Air Force Base and venues in other cities. He serves as Chief Editor of The Stand Up Comedy Magazine, which is in its fifth year of publication. www.thestandup.net

Julian has conducted military operations with the following military forces – Britain, Canada, Australia, New Zealand, Thailand, Italy, France (Studied French in order to work with the French military) and underwent cold weather training with the Canadians.

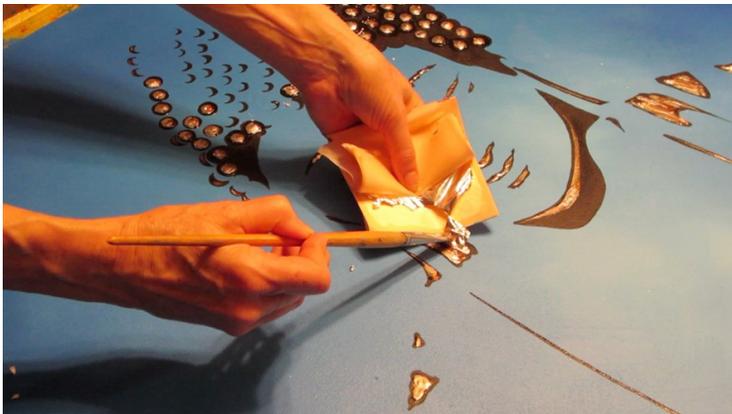
“Women in Aerospace Art” Event Soars in Downey (15 January, 2020)

(Continued from Page 25)



Mimi Stuart in her Timber Studio in Sun Valley. (Photo courtesy of Mimi Stuart)

Working today in her studio in Sun Valley, Idaho, Mimi has developed an impressive style she calls EOS, which stands for Energy Of Subject. Her use of intense colors and masterful lines captures the essence of her subject. One way she accomplishes this is that she uses real 24k gold, silver and copper leaf to add luster to her bold expressionist-style canvases.



Mimi applies 24k gold leaf to a painting. (Photo courtesy of Mimi Stuart)

Mimi’s work is displayed in museums like the Smithsonian and is collected by celebrities like Morgan Freeman, Julia-Louis Dreyfus and John Travolta. She’s also in the collections of those who have actually been in space, like astronauts Buzz Aldrin, Charles Duke and Eugene Cernan. Like Michelle, Mimi also enjoys spending time with members of younger generations to encourage them to use their talents to create a meaningful life for themselves and others.



Mimi and with her paintings of astronauts. (Photo courtesy of Ken Lui)

As creators, Mimi and Michelle efforts truly demonstrate the power of art and their paintings bring a special richness to the realm of aerospace...and beyond. We were fortunate to have these busy artists take the time to help create a very special experience for LA-LV AIAA members.



Group Photo after the event with attendees. Left to Right: Tatiana Overturf, Mimi Stuart (holding her art), Michelle Rouch, Ken Lui (holding Michelle's art), Doug Stewart, and Aldo Spadoni. (Photo Courtesy of Michelle Rouch)

Virtual Radar Can Prevent Airliner Shoot Downs, Sheep May Safely Graze!

(Continued from Page 26)

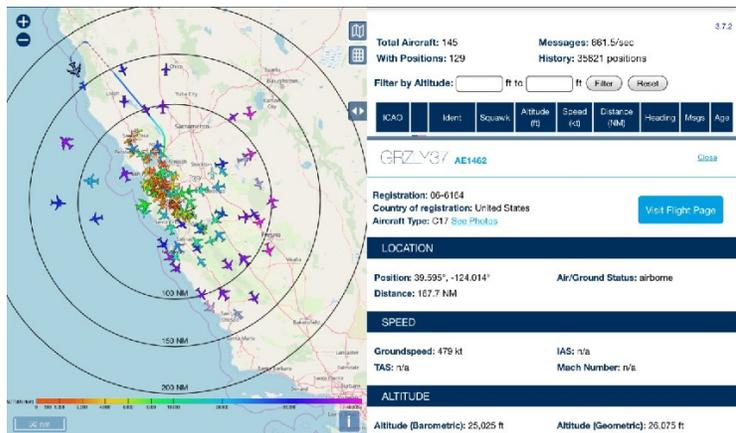


Fig. 1: A C-17 Call Sign CRZLY37 was seen with its flight path. (Screen Capture Courtesy of Jerry Huang)

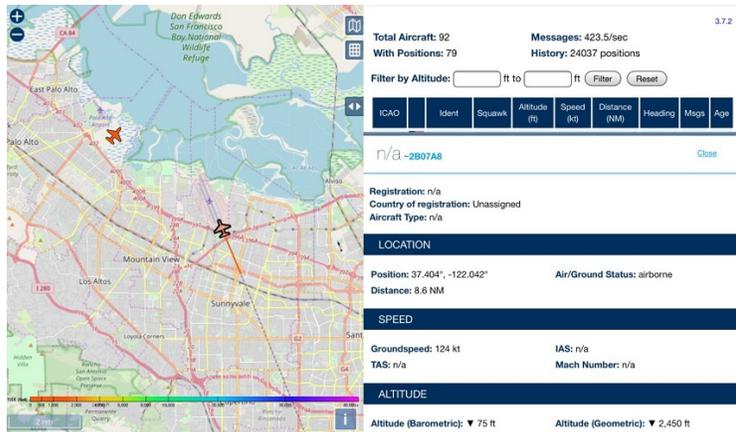


Fig. 2: An unidentifiable aircraft was approaching Moffett Field (NUQ). (Screen Capture Courtesy of Jerry Huang)



Fig. 4: Air Force Two tail number 80001 and Vice President Mike Pence. (Photo Courtesy of Jerry Huang)

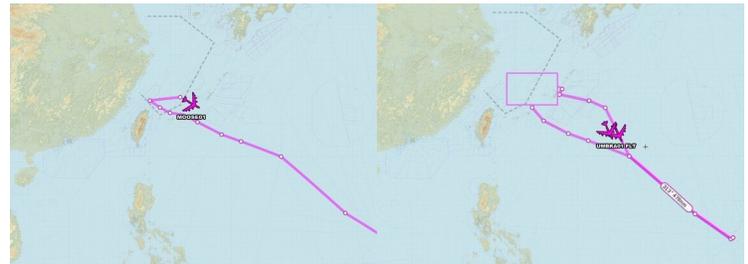


Figure 5: ADS-B records of B-52s from Guam. (Screen Capture Courtesy of Jerry Huang)



Fig. 3: Air Force Two tail number 80001 and Vice President Mike Pence. (Photo Courtesy of Jerry Huang)

About the Authors: Shawn L. Huang graduated from the University of California, San Diego. As an engineering student, he performed flight tests on airlines and presentations at an ION (Institute Of Navigation) conference on the topics of aircraft tracking and viewing by means of a special ADS-B (Automatic Dependent Surveillance – Broadcast) implementation with night vision video that can be used as a real-time, online Black Box or Flight Data Recorder. The system was from the same concept but with different platforms from the standard ADS-B mandated by the FAA and ICAO.

Robert V. Ragsac, Sr. is a retired aerospace systems engineer who worked in the aerospace and defense industries in research and project management positions. Projects included DOD-classified contracts, NASA space systems studies, and commercial communications satellites. Systems included rocket, ramjet and electric propulsion; ballistic and ramjet missiles; surveillance, weather and communications satellites; interplanetary probes; and associated ground-based tracking networks. He is a member of the board of directors of a military museum and an ethnic cultural museum.

Jerry Huang is an aviation enthusiast and a retired researcher at CAST (Center for Aviation/Space Technologies) and CAA in Taiwan, ROC. He did studies on GPS and ADS-B in the 1990s shortly before they were made available to the civilian aviation. He performed flight tests on Collings Foundation’s World War II vintage bombers B-17 and B-25. He is the author of “GPS Puzzles and the Sherlock Holmes Mystery” and “Newton’s Cannon Ball, Hawking’s Floating Apple” under the pseudonym Jets Hunt.

Leaders of the Third Revolution of Aviation Spoke at the Electric and Hybrid Aircraft Mini-Conference at The Proud Bird (22 February, 2020) *(from Page 27)*

Airport Limited acts as a wonderful model for the rest of the world to follow. Burgess shared that the airport even grows vegetables under the solar panels and this in turn helps our environment. He also encouraged everyone to sign up for News Center Updates at www.eco-aviation.org and watch for news on steps airports can take around the world to have infrastructure that is part of the green renaissance in aviation with the goals of being clean, quiet, and efficient.

As the Co-Founder at Airspace Experience Technologies (ASX), Pilot, Former NASA and Hyperloop Engineer, Dr. Anita Sengupta revealed her passion for aviation by showing us a playful Jetson's cartoon to remind us the role creativity plays in engineering. Her discussion of a variety of new opportunities for engineers in using electric and hybrid planes for commuting and travel was extremely informative. As a recently AIAA Spotlitged Member, Dr. Sengupta's work with ASX expands efforts to have electrified autonomous VTOL urban aerial mobility.

Powered by the drive to make a difference in the aviation industry, the presenters at the Electric and Hybrid Aircraft Mini-Conference electrified the audience who stayed after the talks to ask clarifying questions to continue the legacy the described by the panelist. This type of professional Mini-Conference exemplified AIAA's core value to being a forum for innovation and global leadership for all members of the aviation and aerospace industry.



Dr. Anita Sengupta sharing her efforts with ASX on eVTOL.

About the author: Arpine Ovsepyan is an internationally award winning educator who is passionate about empowering future generations to pursue STEM careers. As a STEM educator for Glendale Community College and Glendale Unified School District, she has worked hard to help inspire marginalized groups expand their post graduate plans. In fact, her work earned her distinguished awards where she was recognized at the White House by ASCD for her contributions to the educational field. She recently worked with the California Department of Education to review Next Generation Science Questions for statewide tests. Sharing a joint passion for science, education and nature, she and her husband, Vahik Khodagolian who is an aeronautical engineer and AIAA Council Member, co-authored a book on science topics related to engineering, space, and biomimicry entitled *Nature's Magicians*. They both enjoy volunteering for AIAA as Council Members, California Science Center and mentoring future generations by participating in the Von Kármán lectures at JPL with students to spark their creativity as engineers.



Mr. Joseph Oldham talking about his efforts with the New Vision Aviation, Sustainable Aviation Project, and STEM education in Electric and Hybrid Aircraft.



An attendee asking questions during the Panel Q&A session.

AIAA Member Spotlight Summary (February 10, 2020 – March 2, 2020)

March 2, 2020

Dr. Jeffrey Puschell

AIAA Fellow

Principal Investigator, Technical Director, Principal Engineering Fellow, Chief Scientist, Chief Engineer, Lead System Engineer
Raytheon Space and Airborne Systems



Former AIAA Region VI Director
Former AIAA LA-LV Section Chair

Dr. Jeff Puschell is an internationally recognized scientist-engineer with 30+ years of proven success as Principal Investigator, Chief Scientist, Chief Engineer, Technical Director or Lead System Engineer on 15+ major projects sponsored by governments and private industry in space-based remote sensing, laser-based systems, observational astrophysics and underwater laser systems. He is author or co-author of 130+ technical publications, co-editor and co-author of *Space Mission Engineering: The New SMAD*, the leading textbook and reference source for space systems engineering, co-author for *Standard Handbook for Aerospace Engineers*, 2nd Edition and co-author for *AccessScience*, among many other publications. He is a Raytheon Principal Engineering Fellow, AIAA Fellow and SPIE Fellow. He and his wife Dana live in Hermosa Beach and Solvang, California.

Dr. Puschell been a space guy since first grade. His earliest memory of wonder is from a dark summer night. After arriving home with his family, his father picked him up from the back seat of their 1959 Edsel to carry him into the house, because he had been asleep. As his father picked him up, he woke up and looked up at the summer Milky Way, immediately awestruck. That moment propelled him to who he is today. His parents reinforced that wonder on his next birthday with a 2.5 inch Gilbert Newtonian reflector telescope, which he used until he made an 8 inch Newtonian reflector from an Edmund kit in junior high school. Along the way, he made and launched Estes rockets, entered and won awards in local, regional, state and national science fairs. He has been blessed with a life of endless wonder that he is always happy to share with others.

February 10, 2020

Dr. Marty K. Bradley

AIAA Fellow

Technical Fellow for The Boeing Company
Boeing Commercial Airplanes Advanced Concepts Group



Dr. Bradley currently advises and executes projects to investigate advanced sustainable aviation and electric aircraft concepts for Boeing Commercial Airplanes and NASA. Over his 36 year aerospace career, he has been a team leader for projects related to advanced concepts and technologies, electric and hybrid electric aircraft, green aircraft design, alternative fuels, environmental life cycle assessment (LCA), and propulsion.

He has a B.S., M.S., and Ph.D. in Aerospace Engineering, all from the University of Southern California and currently teaches their capstone senior aircraft design course.

He is an AIAA Fellow and the Founder of the AIAA Aircraft Electrified Propulsion and Power (AEPP) Working Group. He helped create and was the General Chair of the Electric Aircraft Technologies Symposium (EATS). He previously was Chair of the AIAA Green Engineering Program Committee and the High Speed Airbreathing Propulsion Technical Committee. He is an instructor for the AIAA short course on the “Design for Electric and Hybrid Electric Aircraft”. He is the Technical Chair for P&E 2020.

He has authored 2 book chapters, 50 publications, 2 patents, and conducted 15 addresses or speeches at technical conferences related to green aviation and advanced propulsion. He has lectured in courses and seminars at USC, Auburn, MIT, and Cal State Los Angeles and Long Beach on electric aircraft, alternative fuels and green aviation technologies.

As a kid, he was inspired by his math and science teachers and the Apollo program. As a college student and early career, he was inspired by the Cold War technological race with the Soviet Union. In about 2000, he realized that the environmental impact of aviation was going to be his next inspirational challenge and has led to his significant role in what today is called *Sustainable Aviation*.

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AIAA Member Spotlight Summary (February 10, 2020 – March 2, 2020)

(Continued from Page 33)

February 17, 2020

Dr. Anita Sengupta

AIAA LA-LV Member
Co-Founder at Airspace Experience Technologies (ASX)
Former NASA Engineer
Former Hyperloop Engineer
@Doctor_Astro



Dr. Sengupta is an aerospace engineer, rocket scientist, pilot, and veteran of the space program. She worked for NASA for 16 years where her engineering projects included her PhD research on developing the ion propulsion system for the Dawn Mission (currently in the main asteroid belt), the supersonic parachute that landed the Curiosity rover on Mars, and the Cold Atom Laboratory an atomic physics facility now on board the International Space Station.

After leaving NASA she led the development of the hyperloop as senior vice president of engineering systems at Virgin Hyperloop, a technology that can enable ground based travel in excess of airline speed.

Her current venture is Co-Founder at Airspace Experience Technologies (ASX), an electrified autonomous VTOL urban aerial mobility technology company. As an engineering savvy executive and pilot, she is now leading the mobility solutions for smart cities by eliminating congestion and reducing the carbon footprint of air travel.

Dr. Sengupta received her MS and PhD in Aerospace Engineering from the University of Southern California, where she is also a Research Associate Professor of Astronautics and Space Technology specializing in interplanetary entry system and green transportation technology.

In her spare time she is an avid pilot, motorcyclist, scuba diver, snowboarder, hiker, long distance runner, and Sci-Fi fan.

Her childhood inspiration was science fiction, specifically Dr. Who and Star Trek.



(Photo Courtesy of Dr. Anita Sengupta)

February 24, 2020

Dr. Junhan Kim

AIAA LA-LV Member
Robert A. Millikan Postdoctoral Scholar in Physics
California Institute of Technology (Caltech)



Junhan is an experimental astrophysicist and has been working as a postdoctoral researcher at Caltech since September 2019. He finished Ph.D. in the Department of Astronomy and Steward Observatory at the University of Arizona in Tucson. As a graduate student, he worked on the Event Horizon Telescope (EHT; <https://eventhorizontelescope.org>) project to study the supermassive black holes.

The EHT project is an experiment that announced its first results last year: imaging the nuclear black hole in the galaxy M87. The EHT combines a global network of widely separated radio telescopes to simulate a much larger aperture, to make images at the highest angular resolution ever achieved. He developed a receiver for the South Pole Telescope (SPT; <https://pole.uchicago.edu>), and the EHT became a true Earth-sized virtual telescope with the successful addition of the SPT to the array. For this work, he has traveled to the South Pole, Antarctica, five times since 2014. He is broadening the research area from the black hole study to observational cosmology with several new projects at Caltech.

He has been fascinated by astronomy since high school when he took pictures of astronomical objects as a hobby. He was curious about the nature of the objects he photographed and enjoyed expanding knowledge on the subject by reading college-level textbooks. Also, he found electric circuits and robots to be very interesting as well. Therefore, he studied both electrical engineering and astronomy at Seoul National University in South Korea before entering graduate school in the US. During the undergraduate years, he realized that astronomy had expanded its research frontiers with the help of leading-edge instruments and techniques. Then he decided to take part in the development and application of technologies to achieve still-unsolved problems in astrophysics.

He very much enjoys sharing his scientific experiences with others. He had a chance to share his graduate work with AIAA LA-LV section members as soon as he moved to California last Fall (November 9, “Event Horizon Telescope: Studying Black holes from the South Pole”). Recently, he wrote a popular science book, “Exploring the Universe from the South Pole,” in Korean with his friend Dr. Jae Hwan Kang (Stanford University). In the book, the authors share their experience at the South Pole and introduce the astronomers’ efforts to take pictures of the black holes and search for the signal from the early universe.

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