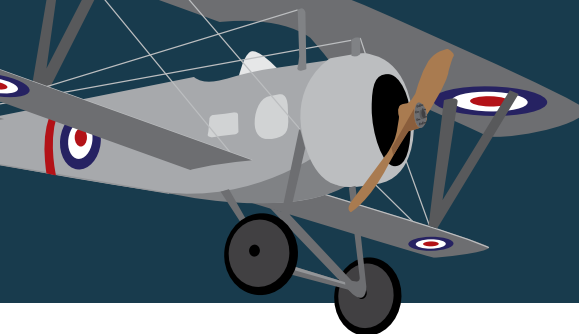


aloft

A close-up photograph of an astronaut's helmet and face, viewed from the side. The astronaut is wearing a white helmet with a clear visor. The Earth is visible through the visor, showing a blue and white horizon. The astronaut's face is partially visible on the right side of the frame. The helmet has various mechanical details, including a small green light on the left side and a rectangular panel with two circular lights at the bottom.

THE MUSEUM OF FLIGHT MAGAZINE

VOL. 42, ISSUE 1
JANUARY/FEBRUARY 2020



FREE MEMBER EVENTS

For all events, please RSVP to membership@museumofflight.org.



EXCLUSIVE! MEMBER MOVIE NIGHT *The Rocketeer*

The discovery of a top-secret jetpack hurls test pilot Cliff Secord into a daring adventure of mystery, suspense and intrigue. Cliff encounters an assortment of ruthless villains, led by a Hollywood screen star who's a secret spy. With the help of his actress girlfriend, the young pilot battles enormous odds to defeat his foes, who are anxious to use the device in an evil plan to rule the world.

WILLIAM M. ALLEN THEATER
Friday, Jan. 24 | Movie starts at 6 p.m.
(Doors at 5:30 p.m.)

RSVP to membership@museumofflight.org.
Rated PG. Family-friendly. Snacks provided.

STEM starters

STEM Starters is a monthly program series geared to our youngest Members! Children ages 3 to 5 and their co-pilots (one adult per child) are invited to explore the wonders of aerospace during this fun, educational program.

PLANETARIUM 4 sessions available!

Participants will learn the basics of the night sky while enjoying One World, One Sky with Sesame Street characters in our portable planetarium followed by a simple constellation craft!

January 13 and February 10

Two sessions each day:
10:30 to 11:30 a.m. OR 3 to 4 p.m.

**All sessions in the
SIDE GALLERY**

**RSVP required. Space is limited. To attend,
email us at membership@museumofflight.org.**

Due to limited space, supplies, and developmentally appropriate curriculum, we are unable to accommodate additional children (such as younger siblings). Thank you for understanding.



EXCLUSIVE!

Join us for a model plane building workshop! Each family will have the chance to step into the role of an aerospace engineer and build a model of a plane. **Space is limited to 60 participants.**

Saturday, Feb. 15 | 11 a.m. to 2 p.m.
SOUTH VIEW LOUNGE, 2ND FLOOR

FEE: \$10/model
Reserve your model online by Jan. 31
at museumofflight.org/MemberEvents

YOU ARE GO FOR LUNCH LECTURE SERIES



See artifacts in the Museum Collection not normally on view!

Coffee and light snacks provided. Featuring Red Barn Blend coffee, available exclusively at the Museum Store.

RSVP to membership@museumofflight.org.

CURATOR'S CHOICE

Friday, Jan. 17 | Noon to 1 p.m.
VIEW LOUNGE (2ND FLOOR)

In case you haven't heard yet, the Museum now has a curator to go with your coffee! Please join us as our new Senior Curator Matthew Burchette shares a selection of objects and other materials in our collection that relate to a special surprise topic of his choosing.

A FEW OF OUR FAVORITE THINGS

Friday, Feb. 14 | Noon to 1 p.m.
VIEW LOUNGE (2ND FLOOR)

Join the Museum's curatorial team for a new edition of "A Few of Our Favorite Things" where each staff member will share some of their favorite items in the Museum's vast collection. Come learn about some unique objects, interesting images, and hidden treasures.

EXCLUSIVE!

Soyeon Yi is an astronaut and biotechnologist who became the first Korean to fly in space. She is a fascinating and entertaining speaker who will delight you with stories from her unconventional education and career path.

Saturday, Feb. 8 | 11 a.m. to 2 p.m.
SKYLINE ROOM

Tickets: \$45/person Purchase online at
museumofflight.org/MemberEvents

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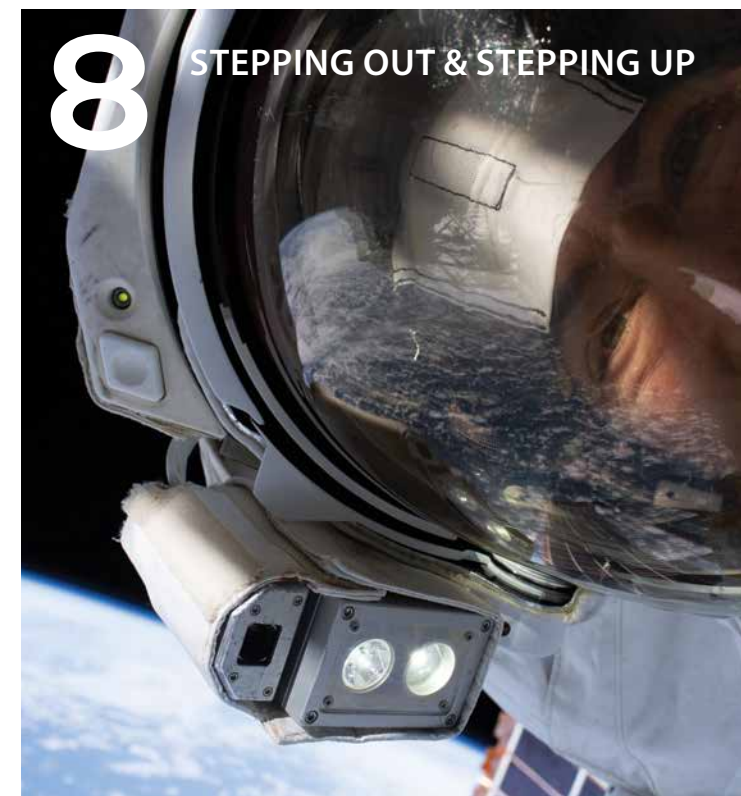
THE MUSEUM OF FLIGHT MAGAZINE

JANUARY/FEBRUARY 2020

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On the cover: NASA astronaut Christina Koch takes an out-of-this-world "space-selfie" with the Earth behind her. (NASA/CHRISTINA KOCH)

Questions or Comments?
Email us at aloft@museumofflight.org



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A SYNOPSIS OF TUSKEGEE ARMEN HISTORY

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CELEBRATING THE FIRST WORLD FLIGHT

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Note: The Jumble on the Junior Aviators page had two errors, the second jumbled word had an extra "F" and should have spelled LIFTOFF. The fifth jumbled word had an extra "K" and should have spelled SPARK.

In the Student Profile from the November/December issue, Clare Weigman's name was spelled incorrectly.

We wish to clarify a few statements made in the Exhibit Review section of the November/December edition of Aloft. Dr. Anselm Franz, not Dr. Hans von Ohain, developed the Jumo 004 engine. Our comparison between the development times of the Liberty L-12 inline engine (just 5 days) and the Junkers Jumo 004 jet engine (several years) is misleading as the Jumo 004 was a wholly new technology while the Liberty used existing technology. The statement "The Jumo 004 was the primary aircraft engine of World War II" is mischaracterized, and though it was an important step in the development of jet engine technology, its role in the War was less significant than many other engines.



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THROUGH HIS LENS



WELCOME.

It's a simple, positive statement. It translates well and once seen, typically makes the readers feel at ease. It's common to walk into a public institution and see the word posted in a dozen or two languages. I'm pretty sure that the only word I know in German and Italian is "welcome" as it was on pieces of construction paper on my elementary school wall.

Our Vision Statement is "To be the Foremost Educational Air and Space Museum in the World." To fulfill this vision we need to be really good at what we do. Thankfully we are blessed with the best staff and volunteers who make this possible. But being the foremost means even more. It means taking stock of where we are, embracing all we do well, and building on this foundation. That includes ensuring we deliver relevant and meaningful experiences to the diverse audiences that we serve or should be serving. And this is something we will strive to do each and every day.

We want all the communities that we serve to know, and we want to demonstrate, that they are welcome in our home. The Museum is starting the new year by rolling out an unambiguous Diversity and Inclusion Statement that clearly states that we welcome all. But our commitment does not end there. Saying welcome is important. Ensuring that anyone that visits feels welcome is even more so. And encouraging our team to learn, self-reflect, grow, and take action is imperative.

So today, rather than sharing a photo, I'm saying welcome—in just a few of the languages we hear around this institution. It starts with a word, is followed by a statement, and is made real by action and understanding. This, too, is what it means to be the foremost in the world.

Matt Hayes, President and CEO



Museum Flashbacks

TOP LEFT: Early birds do well here! The November A.M. Flight Breakfast fundraiser featured the fun and fascinating planetary scientist, Dr. Sara Mazrouei, she is a popular public speaker who is skilled at sharing her passion for space and astronomy with all audiences. (JACQIE CALLAHAN) • Senior Curator Matthew Burchette has been busy with media near and far since he assumed his position at the Museum in October. Here he is with the editor of Caijing magazine, He Gang, for a story about early Boeing history and to see the Air Force One that was part of the historic Nixon mission to China in 1972. Caijing is an influential Chinese magazine (with English and Chinese websites). (TED HUETTER) • In October, the Museum hosted a screening of a new documentary about the U.S. 93rd Bomb Group of WWII, *Return to Hardwick*. The event featured a warm and lively audience Q & A with the film's director, Michael Sellers, and the film's narrator, actor Michael Cudlitz of *Band of Brothers* and *The Walking Dead* fame. Before the screening, Sellers and Cudlitz toured the Museum, and made a special stop to meet B-17 pilot/Museum volunteer Dick Nelms while he was on duty by the Flying Fortress. (TED HUETTER) • The International Space University (ISU) is a leading university dedicated to the interdisciplinary study of space. The Museum was the site of its acclaimed one-week Executive Space Course for the third time. (TED HUETTER) • Veterans Day is unlike any other day at the Museum, with a palpable feeling of "being home" for generations of individuals who have served in the armed forces. This year's keynote speaker during the ceremony was General Peter W. Chiarelli, U.S. Army General (Ret.), former Army Vice Chief of Staff. (TED HUETTER)

cu·ra·tor

\ 'kyūr-ā-tər , 'kyər-; kyū-'rā-; 'kyūr-ə-, 'kyər- \

noun

one who has the care and superintendence of something

Who is this guy, anyway?

BY: MATTHEW BURCHETTE, SENIOR CURATOR

IT'S BEEN OVER THREE YEARS since Dan Hagedorn, the Museum's previous curator, retired. After an exhaustive search, the Museum found me, and I couldn't be more thrilled. Working here has been a goal of mine since I lived in Seattle in the early 1990s.

So, what exactly IS a curator, and how will I fill that role? The term curator comes from the Latin curare, or "to look after." In the late 14 century the term was used to describe those put in charge of minors, lunatics, or those who could not care for themselves. Considering some of the places I worked over the years, I would argue that definition is not much different today! The contemporary use of the word describes a person who has the care and superintendence of something, especially a museum, zoo, or any other place that places objects on exhibit, i.e., yours truly.

The role of the curator at The Museum of Flight is primarily to be an advocate for the things that cannot speak. It is my job to ensure that the collection of aircraft, small objects, archives, and books are all treated in a manner that preserves their integrity for future generations to study, learn from and enjoy. I am also the face and voice of the Museum, which means that I will be doing television, radio, and blog interviews.

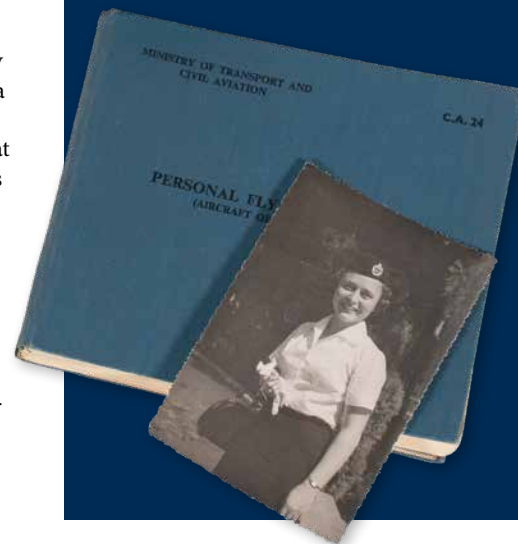
As an already respected institution, the Museum will continue to grow its digital outreach. Social media, for better or worse, is changing how people learn and digest information. Look for more Facebook posts, tweets, Instagram pics, blogs, and videos in the months to come about our collection and how it all fits in with aviation history. This direction is a departure from the traditional role of the curator, but I am excited about showcasing aviation history and even more of our collection on social media.

I hope you share in my excitement. The world is about to get much bigger for us, and we will certainly reap the rewards.

What's new in the collection?

BY: CHRISTINE RUNTE, REGISTRAR

The Museum of Flight recently received an Air Hostess collection from Sally Hodgson. Sally was an Air Hostess in the United Kingdom from the late 1950s to the early 1960's. She flew with Air Kruiise, Silver City Airways and finally British Overseas Airways Corporation (B.O.A.C.) The donation includes a B.O.A.C. ashtray/bowl from 1959 and B.O.A.C. silver cutlery from a de Havilland Comet 4 first class cabin. Sally also donated her Air Hostess personal flying log book documenting her flights with all three airlines. Before flying as an Air Hostess Sally was a theater, television and radio actor. Additional newspaper clippings and photographs document her previous career. This is a very welcome donation to the collection. Although the collection has a few artifacts related to B.O.A.C., there are no artifacts representing Air Kruiise and only one small pin for Silver City Airways.



THE MUSEUM OF FLIGHT

Scholarship Applications open January 1!

DO YOU KNOW A HIGH SCHOOLER interested in aviation and aerospace? The Museum offers scholarships for flight training and post-secondary education. Award amounts range from \$1,000 to \$120,000. Post-secondary awards are for high school seniors planning to attend a college or university and to pursue studies in science, engineering or mathematics subjects that are related to the fields of aviation or aerospace. The 2020 scholarships will range from one-time awards of \$1,000 up to a \$29,500 award that is renewable for three additional years.

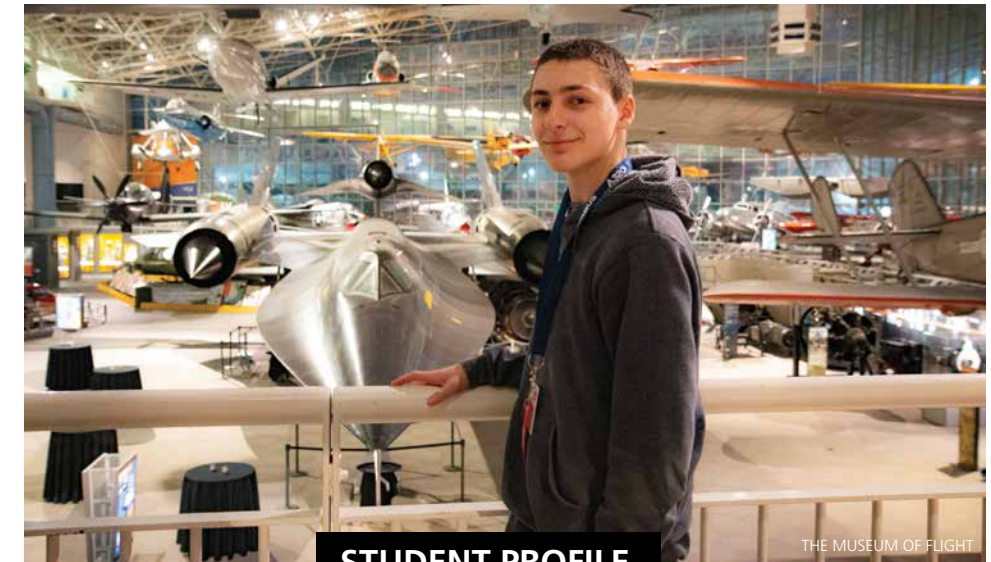
Flight training awards are for high school students aged 15 or older who want to earn their private pilot license. The scholarships are intended for people who are interested in becoming professional pilots (e.g., commercial, cargo, corporate, crop, rescue, etc.) or working in a career in which having a private pilot's license would be beneficial. Recipients will receive up to \$12,000 toward earning a private pilot license.

The Museum's annual scholarships are made possible through the generosity of Alaska Airlines, Jim & Sue Johnson, Frank & Betty Houston, Ben Ellison, and the families of Stuart Knopp and Stephen & Hazel Eastman. The online scholarship application will be open from January 1 to February 1, 2020.

For details and eligibility requirements visit: museumofflight.org/Scholarships.



STAY UP-TO-DATE by liking and following our new **Boeing Academy for STEM Learning Facebook, Instagram and Twitter** pages @BoeingAcademy to keep up with news, updates, and videos about our hands-on education programs.



STUDENT PROFILE

THE MUSEUM OF FLIGHT

Isaac Lyss-Loren

Isaac Lyss-Loren is a junior at The Bush School. He has been participating in the Museum Apprentice Program (MAP) since March of 2018. During a recent MAP meeting, he took some time to talk about his Museum experience and future plans.

BY: MEGAN ELLINGWOOD, EDUCATION DATA SPECIALIST
PHOTO: LINDSEY WEINBACH

HOW DID YOU FIRST BECOME INVOLVED WITH A MUSEUM PROGRAM?

I was visiting The Museum of Flight with a friend, saw a flier about youth volunteer opportunities, and was interested by the description of MAP. I sent an email asking for more information, and the rest is history.

WHAT IS YOUR FAVORITE PLANE IN THE MUSEUM?

I love the M-21 Blackbird. It's such a sexy plane, and looks so majestic. It is utterly amazing that a Cold War era plane still holds the records for both altitude and speed.

WHAT IS ONE SKILL THAT MAP HAS HELPED YOU WITH?

I have learned a lot about public presentation. I used to be very shy in front of audiences, especially when delivering information. Now I look forward to presenting about the Museum's amazing aircraft to crowds of curious visitors.

WHAT MOMENT FROM YOUR TIME IN MAP STANDS OUT THE MOST?

My first presentation on the F-4 Phantom. I did my research, prepared my notes, and presented to an audience of museum visitors. I stood in front of the F-4, and started off with some basic information about the aircraft. As visitors' curiosity grew, I went more in depth, according to the research I'd done, about how

fast, maneuverable, and threatening the F-4 was in a fight. Unexpectedly, after my presentation a docent approached and corrected me about the actual 'feel' of the aircraft. The docent told me that, as a former F-4 Phantom test pilot, he found the F-4 to be sluggish and heavy. It turned out that he was also a test pilot for some half-dozen other aircraft in the Museum's collection. It was incredible to talk to an actual test pilot from the Cold War.

WHAT IS YOUR FAVORITE LETTER OF STEM?

I think the best part of STEM is the E because engineering as a topic and practice is so interesting and dynamic to me. It is about being given a problem and creating a solution that is better than any others that may exist. Engineers make miracles happen.

WHAT DO YOU PLAN TO PURSUE IN THE FUTURE?

I would love to become a USAF Test Pilot. I love the idea of a career that is all about flying aircraft to gather data about their characteristics. You get paid to 'play around' with a big powerful expensive prototype, and are told to try and break it. It would be amazing to join the ranks of great pilots like Chuck Yeager, John Glenn, and Neil Armstrong.

Make a New Year's resolution to support your Museum of Flight!

Join us as a Frequent Flyer and make a monthly recurring gift! It's a great way for you to make a direct gift with ease to your choice of education, restoration, collections, or the Museum's greatest need.

Your monthly gift provides the Museum with a solid foundation to share the history of flight with others. Be a part of an amazing and dedicated group of aviation and space enthusiasts when you become a Frequent Flyer today!

For more information and to join, visit: museumofflight.org/Giving/Frequent-Flyer

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FEATURE ARTICLE

Stepping Out & Stepping Up

The First All-Woman Spacewalk and a Diversifying Astronaut Corps

BY: GEOFF NUNN,
ADJUNCT CURATOR FOR SPACE HISTORY

ON OCTOBER 18, 2019, NASA celebrated history's first spacewalk involving only female astronauts. The 7 hour, 17 minute extravehicular activity (EVA) sent Expedition 61 NASA flight engineers Christina Koch and Jessica Meir outside the International Space Station to replace a failed battery system for the station's massive solar arrays. The EVA, which was Koch's fourth, and Meir's first, brought the total number of female spacewalkers up to 15 (14 of them American). For NASA, this represents less than 10% of the astronauts sent to explore outside their spacecraft so far—a demographic that has a long way to go, but which is moving in the right direction with the 2019 EVAs by Anne McClain, Koch, and Meir .

Both astronauts arrived at this moment after exceptional careers steeped in the exploration of extreme environments. Koch, trained as an electrical engineer, had previously spent three years living and working in Antarctica, including a winter at Amundson-Scott South Pole Station. She also spent multiple winters at Summit Station in Greenland. Meir, a marine biologist, also visited Antarctica to dive alongside emperor penguins. In 2002, she served as an aquanaut aboard NASA Extreme Environment Mission Operations (NEEMO) 4 expedition, a weeklong space simulation aboard the underwater Aquarius research base. They were selected as part of NASA's 2013 astronaut class, which was planned to be the first group to focus on a return to deep space exploration. In an article for the Washington Post, they describe their spacewalk experience as "the story of two girls who gazed at the stars with an improbable dream, who as women were given the 'go' to egress the airlock."

Outside of the October spacewalk, Koch and Meir's time on station is historically significant for a number of other reasons. When Koch returns to Earth this February, she will have spent 335 days in space, setting a new single mission duration record for a female astronaut surpassing Peggy Whitson's 2017 stay aboard the ISS. This will also put Koch just short of NASA's single mission-duration record held by Scott Kelly's year-in-space mission. Koch has already broken the top-ten single mission duration records dominated by Russian cosmonauts. Meir, who is set to land later in the spring, holds dual U.S.-Swedish citizenship. She is officially the second Swedish national, and the first Swedish woman to fly in space.

The October spacewalk represented the second opportunity for an all-female EVA after a previous walk planned earlier in the year was subject to a last minute crew change. The earlier spacewalk, scheduled to take place on March 29, was originally planned to be performed by Christina Koch and Expedition 59 astronaut Anne McClain. A shortage of flight-ready medium sized spacesuits that fit the original crew led to a change in which astronaut Nick Hague took McClain's place. The switch resulted in a public relations dustup for the space agency, with some decrying the lack of appropriately-sized spacesuits and the ultimate decision as sexist. In the previously mentioned Washington Post article, Koch and Meir emphasized that the decision was ultimately



ABOVE: Astronaut Christina Koch (left) helps Jessica Meir (right) prep her spacesuit ahead of their historic spacewalk.(NASA) • OPPOSITE: Cover photo, NASA astronaut Christina Koch takes an out-of-this-world "space-selfie" with the Earth behind her. (NASA/CHRISTINA KOCH)

due to NASA's technical rather than cultural shortcomings. They cited a delayed cargo launch, followed by the in-flight abort of Soyuz MS-10 as the reason the second medium suit on station could not be prepped. Ultimately, the decision not to step out in a larger suit was McClain's. Though she had trained in both sizes, she decided the difficulty operating in a larger suit might compromise her safety and determined that was ultimately most important.

While the immediate decision resulted from purely technical challenges, from an historical perspective, the lack of appropriately sized suits on ISS has a connection to the makeup of the astronaut corps. The suits carried aboard the ISS trace their legacy back to the 1970s when NASA was shifting focus from Apollo to the Space Shuttle Program and no U.S. woman had yet flown in space. While America's Moon walkers each had their suits custom fit, the anticipated increase in the astronaut corps, which would happen under Shuttle, made such bespoke space tailoring cost prohibitive. NASA instead switched to generic suits built in different sizes from extra small to extra large. Budget cuts in the 1990s eliminated the extra small and small categories leading to a few-sizes-fit-most situation. NASA has not built any new suits since the original design in the 1970s and supply is dangerously dwindling. Today, the ISS is equipped with six suit torsos (two each in medium, large, and extra large). One medium, and one extra large suit are kept as spares, however, and require hours of work to be made space ready. Ultimately, NASA decided it would be more practical to swap the crew rather than rearrange the schedule to prep the spare.

In a sense, NASA's culture has been evolving faster than the technology the astronauts use, and increased diversity in gender and other axes is a big part of that shift. All the astronauts involved in the two



ABOVE: A ground prototype of NASA's new Exploration Extravehicular Mobility Unit (xEMU) as seen Tuesday, Oct. 15, 2019 at NASA Headquarters in Washington, DC. (NASA)

spacewalks mentioned in this article came from the 2013 astronaut group, which was the first to include 50% women in its ranks. The 2017 class which followed almost matched that mark with just one more male astronaut than female.

As NASA looks to the future, the agency prepares to celebrate 20 years of continuous occupation of the ISS later this year. It is also preparing to return astronauts to the Moon under the Artemis Program, which will carry the first woman to the Moon sometime in the 2020s. Just days before Koch and Meir's spacewalk, NASA revealed its new suit being designed for lunar EVA. Dubbed the Exploration Extravehicular Mobility Unit, or xEMU, the new suit features mobility enhancements designed to reduce the exertion required to operate inside the suit. The suit will be configurable for both surface operations, as well as spacewalks aboard stations like the ISS. With a 21st century spacesuit in the works at last, hopefully NASA's suit technology will finally provide a better fit to its more diverse astronaut corps.

MUSEUM MUSINGS

Blackbird Revealed on Leap Day?

BY: TED HUETTER, SENIOR PR MANAGER



An SR-71B Blackbird sits on the runway after sundown. (U.S. AIR FORCE)

WE SOMETIMES HEAR that the government made the first public announcements about the secret SR-71 Blackbird on Leap Day, Feb. 29, 1964. That's not quite true. The Blackbird was outed, but it was given a fake name. So, the secret was revealed, but not the real secret. And then there's the matter of President Johnson mis-identifying the plane and this incorrect name became the real name. Whew!

To clear the matters up, I asked Blackbird expert Peter Merlin, author of *From Archangel to Senior Crown: Design and Development of the Blackbird* to help. Pete replied with what I believe to be the definitive word on this matter. He also credits retired Col. Richard H. Graham, former commander of the 9th Strategic Reconnaissance Wing and author of *Flying the SR-71 Blackbird*, for disentangling the LBJ speech controversy. Hang on!

First, some dates. Blackbird first flights are as follows: A-12 (April 24, 1962); YF-12A (August 7, 1963); SR-71 (December 22, 1964).

The National Security Council (NSC) decided to publicly "surface" the Blackbird on February 29, 1964. Later that day, the White House announced the development of an advanced experimental aircraft, the "A-11, which has been tested in sustained flight at more than 2,000 miles per hour and at altitudes in excess of 70,000 feet." So, the secret plane is no longer a secret, but it's true identity is not revealed.

To keep the Central Intelligence Agency's A-12 spy plane covert, the NSC opted to reveal the YF-12A because it was an Air Force interceptor and because it lacked anti-radar

("stealth") treatments. Lockheed designer Clarence "Kelly" Johnson suggested referring to the airplane as the "A-11," which was actually the designation for an earlier, rejected design that was even less stealthy than the YF-12A.

About six months later, the LBJ/SR-71 myth begins. On July 24, 1964, President Lyndon B. Johnson announced the development of the SR-71, a new Air Force spy plane. That is correct. The myth is that LBJ made a mistake during his speech, transposing "SR" for what was "RS," so the name SR-71 was born because nobody wanted to shame LBJ with a correction. He actually got it right.

The SR-71 started out as the R-12 (a Lockheed internal designation) but was at one time destined to be called the RS-71. This was because it followed closely on the heels of the cancelled North American Aviation RS-70 Valkyrie bomber. Strategic Air Command chief Gen. Curtis LeMay disliked the designator and lobbied successfully to change the spy plane's designation to SR-71.

Audiotapes from the LBJ Library prove that President Johnson used the term RS-70 once (for the cancelled Valkyrie) and mentioned the Blackbird three times, each time correctly calling it the SR-71. In an official transcript of the speech a stenographer accidentally switched the letters, changing all three references to "RS-71." This transcript was given to news reporters, ultimately giving birth to a persistent myth that LBJ transposed the letters during his speech. The tapes prove otherwise.

MUSEUM MUSINGS

Gunairstructor Though Forgotten

BY: SEAN MOBLEY, VOLUNTEER SERVICES COORDINATOR

YOU FEEL YOUR BONES RATTLE from the steady drone of the P-51 Mustang's Merlin engine below your seat. Ahead you see your target silhouetted against the clouds, a Messerschmitt Me 109, come about. Peeping through the sights you attempt to put into practice all the gunnery theory you've learned, hoping the complex trigonometry involving lead radii and range has become second nature enough that you can simply know on instinct when to pull the trigger before the enemy pulls his.

You squeeze the trigger, the guns chatter from somewhere ahead of you, and the Me 109 lights up bright red indicating a hit. You sit back and breathe a sigh of relief as your instructor's voice comes from somewhere near the nose of your 'plane.' The sound of the engine dies away and the lights on the ceiling turn on, revealing the whole mechanism of the Gunairstructor, a new synthetic training device installed by the United States Army Air Forces (USAAF) in late World War II.

Training pilots is a dangerous affair. Training accidents plagued pilots in the First World War, killing more aviators than actual combat. One observer claimed that for every 100 British pilots killed in the early war, only two were from "enemy action." By the 1940s, aviation technology had improved dramatically. Advancements in aerodynamics, engines, materials, and technique had made planes more stable than ever.

Yet these did not fully overcome issues with pilot training. An April 1947 US Navy report shows that of the 12,133 naval aviation personnel fatalities over the course of the war, 3,257 were listed as "Plane Crashes-Other Than Operational" (ie. Training), hundreds more than the 2,891 killed in actual air combat. In addition to the human cost, training eats up materiel. Air fuel, ammunition, and other supplies needed to get a practicing pilot up in the air continued to be precious as the war wore on.

As a result, all branches of the military sought ways to safely and cost effectively bring meaningful training experiences to their soldiers. The Link Trainer, two examples of which are found at the Museum (one in the Personal Courage Wing and a second,

more complete example at our Restoration Center and Reserve Collection at Paine Field in Everett, Wash.), was one such instance of the military using cutting-edge technology to help pilots train on navigation. But simulating basic instrument flight is one thing. Simulating combat was another still.

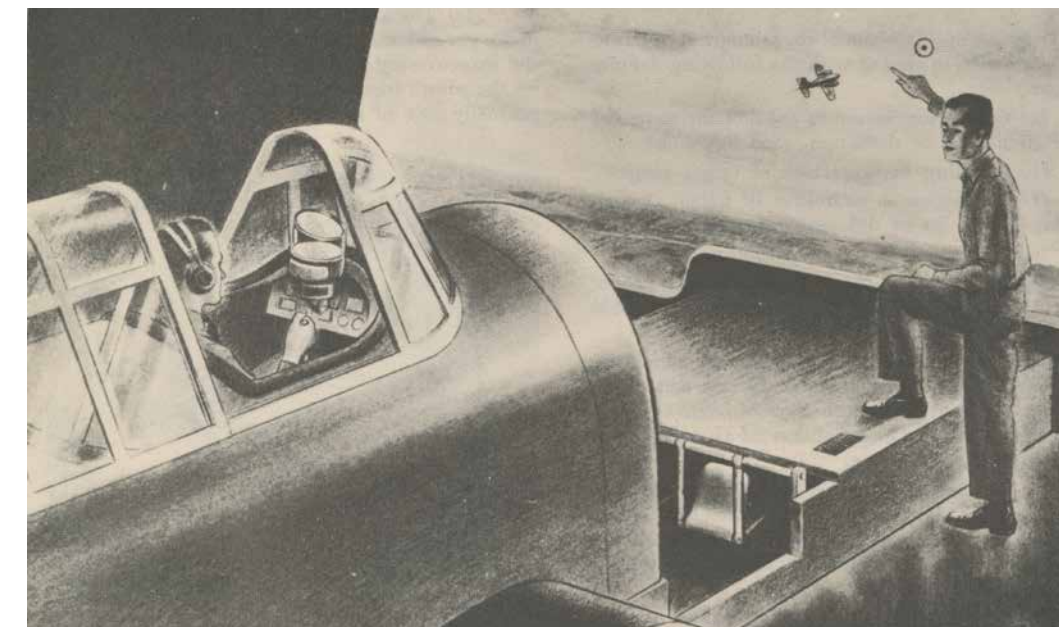
The Gunairstructor was introduced to fighter pilots in the Army Air Forces and the Navy in the middle of the war as a way to solve this problem. A 1943 training manual titled *How to Make Your Bullets Hit* described the Gunairstructor as "a synthetic device...Climb into the cockpit and you will find the same old stick and rudder pedals, the throttle, trigger, and reflector gunsight...there is the skyscape (land, sea, and sky) just as it looks to you from about 10,000 feet aloft." Note the use of the term synthetic device. The word simulator would not come into use until 1954.

The elaborate device used a system of sound, wires, and projections to give the gunner the feeling of being among the clouds. The instructor, from his position seated in front of the cockpit and out of sight of the trainee, would control a projection of the enemy aircraft which the trainee would try and line up in his sights and shoot down. The rudimentary computer would track how many

rounds the trainee used to down the enemy and if he was successful or not, two key data points for use in the post-session debrief. The instructor could even activate a light that showed the pilot the correct aim point based on the enemy aircraft's speed and distance, giving the trainee a chance to see just how far off (or close) his reckoning was.

Though the Gunairstructor has fallen into obscurity today, this device stands as a landmark achievement from a training technology standpoint. It clearly captivated the training commands for the USAAF and the Navy, who ordered over 500 of them before the war ended. And from an engineering standpoint, the sophisticated mechanisms necessary to mechanically calculate values like distance and speed, not to mention to process the dual input of both the pilot's and instructor's commands to the system, seem far ahead of their time in an era before computers. Though forgotten today, the Gunairstructor opened the door to new approaches of safely and cost-effectively introduced pilots to the skies.

BELOW: An illustration for the Gunairstructor. (OPERATION AND SERVICE INSTRUCTIONS FOR AERIAL GUNNERY TRAINERS ARMY TYPE E-15 NAVY 3B-1, USAAF, 1944, PAGE 2.)





A Synopsis of Tuskegee Airmen History

BY: DANIEL L. HAULMAN, PHD
PHOTOS: U.S. AIR FORCE

BLACKS WERE NOT ALLOWED to serve as pilots in American military service until 1942. President Franklin D. Roosevelt authorized the training of the first Black pilots in American military service as a 1940 campaign promise, and in 1941, they began training at Tuskegee, which had been selected because of its climate and because Tuskegee Institute was already training Black civilian pilots successfully.

The Tuskegee Airmen were the first Black pilots in United States military service, and the men and women who served in their units and at their bases. There were more than 14,000 of them, of which approximately 1,000 were pilots. They excelled in combat overseas and resisted segregation at their home bases, contributing to a double victory.

There were three phases of military flight training, primary, basic, and advanced, and each phase took about nine weeks. Primary flight training took place at Moton Field, a Tuskegee Institute facility under contract with the Army, with mostly civilian Black flight instructors. Moton Field had no paved runways during World War II, and most of its training aircraft were biplanes.

Those who graduated from primary flight training continued on to basic and advanced flight training at Tuskegee Army Air Field; this

was a much larger base, with paved runways, to the northwest of Tuskegee. The majority of the flight instructors there, throughout WWII, were White. Colonel Noel F. Parrish commanded Tuskegee Army Air Field during most of the war. He desegregated the facilities there, and supported the success of the Black pilots. Tuskegee Army Air Field trained not only single-engine fighter pilots but also twin-engine bomber pilots.

A total of 44 classes of pilots completed training at Tuskegee Army Air Field. The training was so demanding that only about half of the cadets who entered the training graduated. The first class started with 13 and only 5 completed the training. One of them was Benjamin O. Davis Jr., who had graduated from West Point, and whose father became the first Black general in the U.S. Army.

The first Black flying unit was the 99th Pursuit Squadron, later called the 99th Fighter Squadron, activated at Chanute Field, Indiana, in March 1941, but moved to Tuskegee to obtain its pilots. The unit deployed under Colonel Benjamin O. Davis Jr. to combat overseas in the spring of 1943, first going to North Africa and then to Sicily and Italy. It was attached to various white fighter groups at first. One of the white fighter group commanders attempted to have the 99th Fighter Squadron

taken out of combat, but failed because the 99th was flying as well as the other P-40 fighter squadrons in the Twelfth Air Force in the Mediterranean Theater. At Anzio in a two-day period, the 99th shot down more enemy airplanes than the other squadrons.

In the meantime, the 332nd Fighter Group and its 99th, 100th, 301st, and 302nd Fighter Squadrons were activated at Tuskegee, and went on to Selfridge Field, Michigan, for further training, before deploying itself to Italy in early 1944 to fly P-39 airplanes for the Twelfth Air Force.

In the middle of 1944, the War Department reassigned the 332nd Fighter Group to the Fifteenth Air Force and equipped it with P-47 and eventually red-tailed P-51 fighters to escort B-17 and B-24 four-engine bombers on missions deep into enemy territory. At the same time, the 99th Fighter Squadron was assigned to the 332nd Fighter Group.

Under the leadership of Colonel Benjamin O. Davis Jr., the 332nd Fighter Group lost bombers to enemy airplanes on only seven of its 179 bomber escort missions between early June 1944 and the end of April 1945. It lost only 27 escorted bombers to enemy aircraft, while the average number lost by each of the other fighter groups was 46. The Black pilots also shot down 112 enemy airplanes.

The bomber pilots who trained at Tuskegee were assigned to the 477th Bombardment Group, which flew B-25 bombers. It never deployed to overseas combat, because it was activated so late. Members of the 477th Bombardment Group resisted segregation in what was called the "Freeman Field Mutiny." The outcome was the reassignment of the unit's White leaders to other units, and the assignment of Colonel Benjamin O. Davis Jr. as commander. Benjamin O. Davis Jr. was the first Black base commander when the Air Force was established in 1947.

In 1948, President Harry S. Truman issued Executive Order 9981, mandating desegregation of the military services. Since Tuskegee Army Air Field closed in 1946,

the Air Force was already training Black and White pilots together at Williams Field, Arizona. In 1949, the Air Force continued integration by inactivating the all-Black flying units and reassigning their personnel to formerly all-White units. Eventually Benjamin O. Davis Jr. became the first Black general in the United States Air Force. General Daniel "Chappie" James, who had been a member of the 477th Bombardment Group, eventually became the first Black four-star general in any of the military services. In fact, the first three Black generals in the Air Force had all been Tuskegee Airmen.

By their excellence in combat, and their resistance to segregation in the United States, the Tuskegee Airmen contributed to the racial integration of the military services, and eventually of American society. Many of the Tuskegee Airmen themselves continued to serve their country as pilots in the Korean and Vietnam Wars, and some of them also took part in the Civil Rights Movement of the 1960s. The first Black mayor of Detroit, Coleman Young, was a Tuskegee Airman. Certainly the Tuskegee Airmen were not only military heroes but also civil rights heroes, justly deserving of the honor they receive. In 2007, President George W. Bush unveiled a Congressional Gold Medal that Congress had authorized to honor the Tuskegee Airmen in 2006. That medal is currently on display at the Smithsonian Institution's National Museum of African American History and Culture in Washington, D.C.

For a deeper dive into the history of the Tuskegee Airmen, join me on Feb. 29 at the Museum. See page 18 for details.

FROM LEFT: Benjamin O. Davis Jr., one of the first Tuskegee Airmen went on to become first Black general in U.S. Air Force. • Pilot trainees get physical instruction at Tuskegee Army Air Field. • Advanced instruction turned student pilots into fighter pilots at Tuskegee Army Airfield, Alabama. • Graduation day at Tuskegee Army Airfield, Ala. The school produced 992 pilots during World War II. • Benjamin O. Davis Jr. commanded the "Red Tails," an all-Black combat flying squadron during World War II.

SPiRiT of FLIGHT A JURIED PHOTOGRAPHY EXHIBITION

2020 Theme:
"SPIRIT OF FLYING HOME"

CALL FOR ENTRIES
Open to all photographers
Entry Deadline: March 31, 2020

For more information
and how to enter, please visit
museumofflight.org/spirit-of-flight



Ed Shipley flies a P-51 Mustang in a heritage flight during an air show at Langley Air Force Base, Va. The plane is painted with the distinctive Red Tail flown by the Tuskegee Airmen. (U.S. AIR FORCE/TECH. SGT. BEN BLOKER)

The Museum of Voices

BY: TED HUETTER, SENIOR PR MANAGER



AT THE MUSEUM WE SAY that this is a place full of stories. Stories (and a few tall tales) about people in all realms of flight. It's that sort of place.

I'm inclined to imagine the voices in these stories. Yes, I hear voices. Individual conversations among the thousands of people who have been on board our flying machines. Stepping into our United 727 I hear flight attendants chatting after their preflight patter, and the pilots with their radio chatter. My ears ring as newlyweds whisper while crossing the Great White North in our Trans-Canada Constellation. Then there are the two strangers in the aft lounge, flirting with equal-but-different anxiety. Even standing outside of our DC-2 I hear a team of smoke jumpers joking inside before leaping out over a forest fire in 1950s Montana.

Inner voices also haunt the collection. Daydreams in the old Stinson. Curses in the Blackbird. Fear in the B-17. All languages, including sign.

Our world of flight is very vocal. We'll never know a fraction of the conversations that live in our collection. Some may know a few. I'm happy just imagining them, and enraptured when I meet Museum visitors that hear them too.

Russell Munson introduced himself to me a couple years ago. His father was an airline pilot during the 1930s. When he was a boy, Russell asked his dad (Russell Sr.) if he had ever been in a crash. "Just once," he replied, when he was a copilot in a Boeing Trimotor. "That was that. End of story," Russell recalled. Long after his father's death, Russell visited the Museum and saw the Boeing Model 80A-1 trimotor. He heard the voices, and was resolved to look into his dad's cryptic story.

"I found a yellowed Western Union

message in my father's belongings after he died, along with a snapshot of the wreckage that I believe he had taken after the crash. The telegram was sent by my father to my mother from Reno, Nevada on April 20th, 1932: 'IN BAD CRACKUP WASHED OUT TRIMOTOR IN SNOWSTORM NO ONE HURT LOVE RUSSELL.'" Checking his dad's logbook, he saw this simple entry for the date: Oakland to Soda Springs, 1 hour 45 minutes.

"That first caught my eye because Soda Springs was not a stop on United's route nor that of any other airline. In fact, Soda Springs didn't have an airport. The log entry didn't explain that the reason the flight terminated in Soda Springs was because it crashed there. The following entry the next day was 'Reno to Oakland, 1 hour 37 minutes,' in another trimotor. Ho-hum." Russell then found a story in the April 21, 1932 Reno Evening Gazette that filled in the dots.

"Dad was the co-pilot on that United Air Lines Boeing 80A trimotor flying the Oakland to Salt Lake route when it got caught in a spring snowstorm over the Sierras west of Reno." The pilot was a pioneer air mail pilot named Harry Huking. "Trapped by unreported worsening weather, Huking was attempting to land in a meadow west of Reno near Soda Springs when one wing clipped a high tension powerline, spinning the ship around into a shallow stream short of the meadow. Huking had been in radio contact with Reno, who immediately alerted authorities. Emergency crews arrived at the crash site within an hour, but passing motorists seeing the crash had already helped the passengers and crew out of the ship. All on board were then driven to Reno for the night," and Munson adds, "I would guess for a stiff drink." The fact that nobody was seriously injured was a credit to Huking's skills.

The Gazette described the incident as an unplanned "adventure" for the flight's eight passengers. No harm, no foul. No reported threats of lawsuits or high drama. Perhaps some of the travelers were thrilled with the experience, while others simply decided to continue riding the rails until airlines worked out their kinks. I can't help thinking about words exchanged onboard before the landing, and picture a guy in rumpled, double-breasted suit leaning over to someone fidgeting across the aisle, "nothin' to worry about pal, the flight attendant's a registered nurse."

It was the end of the road for that trimotor, but the voice of Russell's dad still lives in our Model 80—his logbook shows he flew it as a co-pilot for the same airline. And likely with a different timber you can hear it in the Museum's Boeing 247, a plane he flew as a captain.

Russell became a pilot, acclaimed photographer and an author. Now in his eighties, he still flies his Aviat Husky A-1B and takes great photos. "Each time I visit The Museum of Flight I am in awe of the creatures of the air that live there. You can see their personalities by their lines in the same way that a person's face reveals theirs. Each has a life story. Perhaps you can imagine the thoughts I have when I look up and see those two airplanes that my father actually flew in his pilot life, and try to imagine what it was like to fly in those days." We do imagine. And some of us hear voices.

ABOVE: The United Air Lines Boeing 80A after its crash landing during a snow storm west of Reno in 1932. (COURTESY OF RUSSELL MUNSON)

January



DISPLAYS

Astronaut Remembrance

The Museum pays tribute to the astronauts who were lost in the quest to explore outer space. Through displays and video the fallen astronauts of Apollo-1 and Space Shuttles STS-51-L *Challenger* and STS-107 *Columbia* are remembered.

CHARLES SIMONYI SPACE GALLERY
Jan. 24 through Feb. 2 | 10 a.m. to 5 p.m. (daily)



LECTURE

Astronaut Remembrance Presentation

This presentation reflects on the loss of crew for Space Shuttles STS-51-L *Challenger* and STS-107 *Columbia*, as well as Apollo 1, and explores the risks and successes of space travel. For details on the speaker and program, visit museumofflight.org/Calendar.

CHARLES SIMONYI SPACE GALLERY
Saturday, Jan. 25 | 2 to 3 p.m.



Weekly Aerospace Update

Get the latest news in astronomy, aviation and spaceflight from our own experts. Q&A follows. **Every Saturday at 1 p.m. in Jan. and Feb.** in the Charles Simonyi Space Gallery.



WELLS FARGO

FAMILY EVENT

Wells Fargo Free First Thursday

On the first Thursday of each month, the Museum stays open late—and admission is FREE. Enjoy the Museum's T.A. Wilson Great Gallery, J. Elroy McCaw Personal Courage Wing, Charles Simonyi Space Gallery, Aviation Pavilion and more from 5 to 9 p.m. The Museum Store and Wings Café will also remain open for extended hours.

T.A. WILSON GREAT GALLERY
Thursday, Jan. 2 | 5 to 9 p.m.

WEEKEND FAMILY WORKSHOPS

Join us on Saturdays and Sundays for our Weekend Family Workshop. Each month, we'll explore a new topic through a hands-on activity designed for all-ages!

Astronaut Training

Come by and learn about what it takes to go to space! Participate in some astronaut training activities and learn about the skills and technology astronauts use when travelling outside of Earth's atmosphere.

SIDE GALLERY
Saturdays and Sundays,
Jan. 11-12, 18-19 and 25-26
11 a.m. to 2 p.m.

NOTE: Times and locations subject to change. Please check our website for changes.

February



LECTURE

History of the Tuskegee Airmen with Dr. Daniel Haulman

Author and Historian Dr. Daniel Haulman, former Chief of Organizational Histories at the Air Force Historical Research Agency, will discuss the history of the Tuskegee Airmen, the first African American pilots in American military service, who fought in WWII.

WILLIAM M. ALLEN THEATER
Saturday, Feb. 29 | 2 to 3:30 p.m.



LECTURE

Michael P. Anderson Memorial Aerospace Program Special Presentation

In honor of Black History Month, and in conjunction with the Michael P. Anderson Memorial Aerospace Program—an annual event which gives underserved children throughout Washington the chance to participate in the Museum's educational programs rooted in aerospace—the Museum will hold a special public presentation. For details, visit museumofflight.org/Calendar.

WILLIAM M. ALLEN THEATER
Saturday, Feb. 1 | 2 to 3 p.m.



Sponsored by the Younger Member Forum of the American Society of Civil Engineers

SPECIAL EVENT

Popsicle Stick Bridge Contest

Passions run high as teams of high school students from around Puget Sound compete to have their dreams shattered. Competitors must design and build small bridges that are strong and aesthetically pleasing while using only popsicle sticks and white glue. The bridges are judged for creativity, and then subjected to the pressures of a hydraulic press until they snap. The longest-lasting and most original structures win.

T.A. WILSON GREAT GALLERY
Saturday, Feb. 8 | 10 a.m. to 2 p.m.

SPECIAL EVENT

2020 NorthWest Scale Modelers Show

Experience vast numbers of scale model aircraft, cars, tanks, ships, figures, & more at one of the largest model shows in North America! A special display will commemorate the 75th anniversary of the end of WWII.

T.A. WILSON GREAT GALLERY
Sat.-Sun., Feb. 15 & 16 | 10 a.m. to 5 p.m.



WELLS FARGO

FAMILY EVENT

Wells Fargo Free First Thursday

On the first Thursday of each month, the Museum stays open late—and admission is FREE. Enjoy the Museum's T.A. Wilson Great Gallery, J. Elroy McCaw Personal Courage Wing, Charles Simonyi Space Gallery, Aviation Pavilion and more from 5 to 9 p.m. The Museum Store and Wings Café will also remain open for extended hours.

T.A. WILSON GREAT GALLERY
Thursday, Feb. 6 | 5 to 9 p.m.

WEEKEND FAMILY WORKSHOPS

Light and Shadows

This month, we'll be investigating shadows. From explorations of the universe to helping us tell time and seasons on Earth, the science of shadows is full of surprises. Depending on what you see, there may be six more weeks of winter!

SIDE GALLERY
Saturdays and Sundays, Feb. 1-2, 8-9, 15-16, and 22-23
11 a.m. to 2 p.m.

NOTE: Times and locations subject to change. Please check our website for changes.

SPECIAL EVENT

Puget Sound Engineering Council Fair

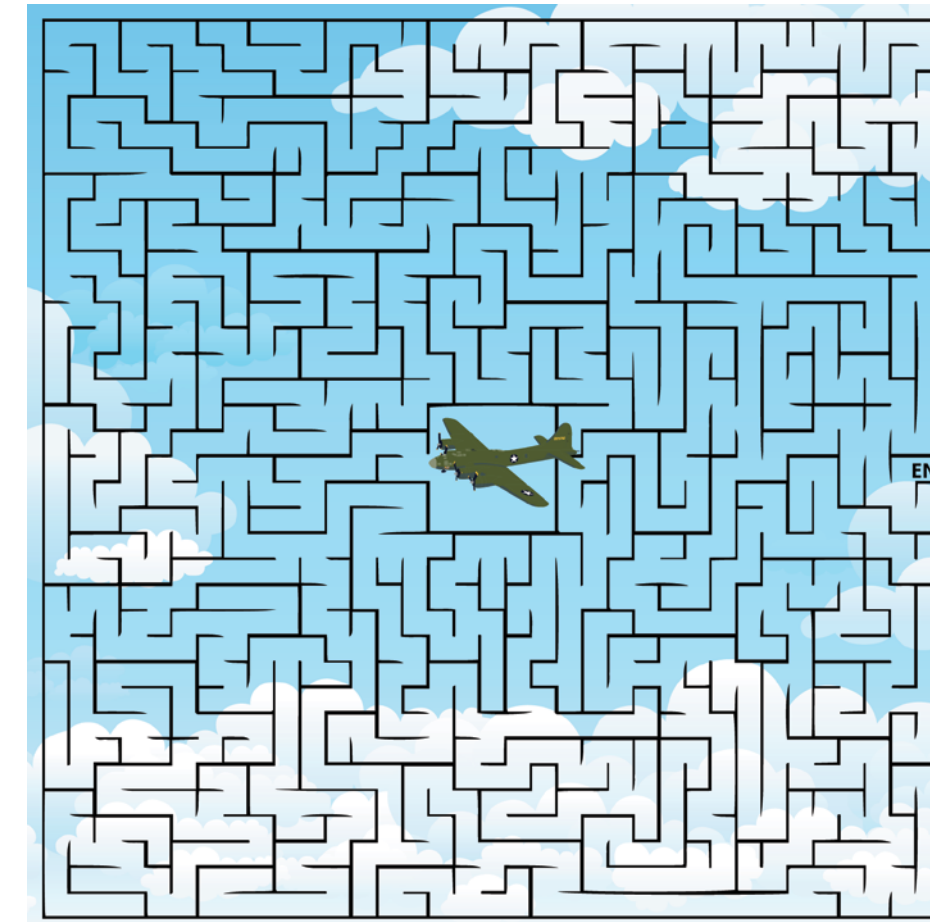
The universal span of engineering is demonstrated at The Puget Sound Engineering Council's annual Engineering Fair. Youth interested in engineering can learn all about exciting career opportunities by talking to professionals in the field from local chapters of NASA, Boeing and universities. Student clubs will be in force, along with hands-on activities for children.

SIDE GALLERY
Saturday, Feb. 8 | 10 a.m. to 4 p.m.

Junior Aviators

WWII Maze

Can you get the B-17 on the right path back to the military base? Start at the B-17.



Maze solution on page 22.

TOY FROM THE COLLECTION

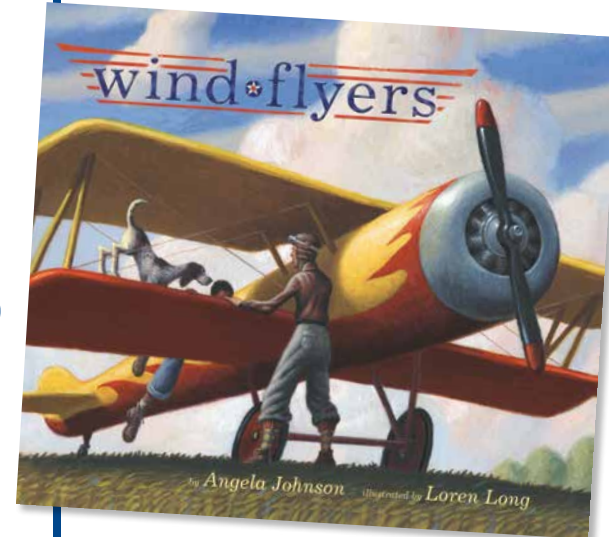
USS Missouri Die-Cast Toy

The USS Missouri battleship is best known as the ship that accepted the surrender of Japan in 1945 near the end of World War II. She participated in the Pacific Theater during WWII, as well as in the Korean War and in Operation Desert Storm. During WWII, the Missouri sailed with a group of aircraft carriers, and served as support for departing US aircraft, notably during the Iwo Jima invasion. The USS Missouri is now a

museum in Pearl Harbor, Hawaii and is listed on the National Register of Historic Places due to the important role she played in ending WWII. This die cast toy was collected by aircraft engineer and air racing enthusiast James E. Francis. It was donated to the Museum in 2012, along with 50 other aircraft models from his collection. The toy was made by Motor Max, circa 2002.



Credit: The Museum of Flight, Donated by Thomas J. Francis and the Estate of James E. Francis



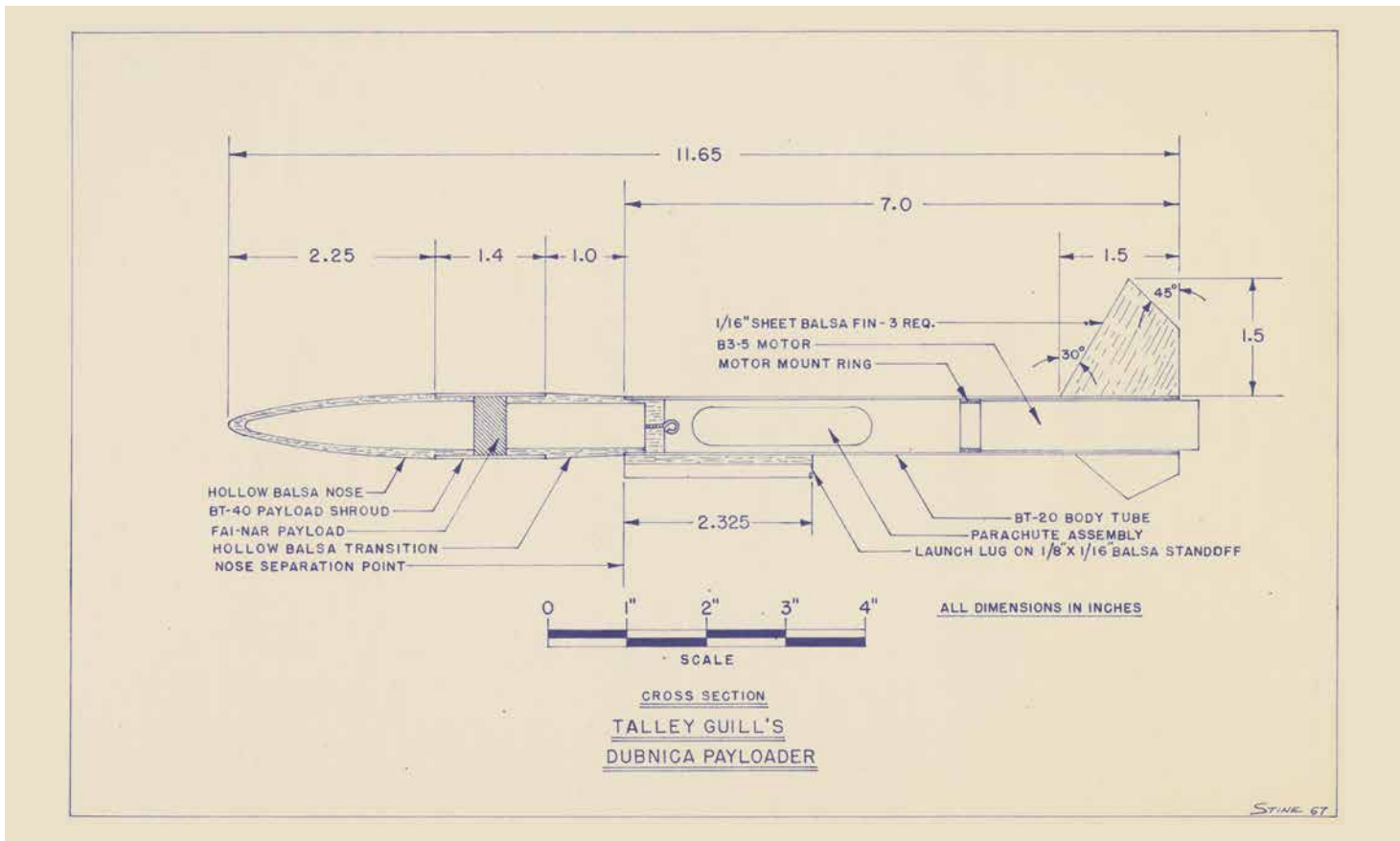
BOOK RECOMMENDATION

Wind Flyers

By: Angela Johnson
 Illustrated by: Loren Long

Three-time Coretta Scott King Award-winning author Angela Johnson and New York Times bestselling illustrator Loren Long invite readers to ponder a band of undercelebrated World War II heroes -- the Tuskegee Airmen. With fleeting prose and transcendent imagery, this book by the masterful author/artist duo reveals how a boy's love of flight takes him on a journey from the dusty dirt roads of Alabama to the war-torn skies of Europe and into the hearts of those who are only now beginning to understand the part these brave souls played in the history of America.

MEMBER PRICE: \$15.29 (\$17.99 retail)
 Available in the Museum Store and online at museumofflightstore.org



FEATURE ARTICLE

Open for Research

The G. Harry Stine Space History and Model Rocketry Collection Archives

BY: CHARISE MICHELSEN, PROJECT ARCHIVIST

THE COLLECTIONS DEPARTMENT is excited to announce that it has completed processing the archival component of the G. Harry Stine Space History and Model Rocketry Collection; all the archival material is now organized and preserved. There is also now a comprehensive finding tool for the public to search through our archives research portal online at archives.museumofflight.org. The finding tool provides contextual background information and includes a detailed listing of all series and folders. With online access, researchers from around the world can easily “access” the collection and request materials for on-site viewing in our Kenneth H. Dahlberg Research Center.

G. Harry Stine (1928-1997) established the roots of the model rocketry hobby in the United States and founded the National Association of Rocketry (NAR) in 1957. The collection is comprised of personal papers representing his prolific career as a pioneer in model rocketry as well as a researcher in aeronautics. Stine wrote the quintessential guide *Handbook of Model Rocketry* that is still the go-to guide for rocketry hobbyists. In addition to his work in rocketry, Stine was a science fiction author under the penname Lee Correy.

In 2012, the Museum and the National Association of Rocketry formed a partnership designating the Museum as the official repository of the NAR and its associated collections. As part of the agreement to

make the materials related to hobby rocketry available to the public, the Museum launched an exciting multi-year project to preserve and catalog the first collection received from the organization, The G. Harry Stine Space History and Model Rocketry Collection.

The Museum hired me as Project Archivist in August 2018 to process the Stine Collection, largely thanks to the generous support of the NAR, its members, and Museum of Flight Trustee Dr. John Brantigan and his wife Carolyn. The large collection arrived at the Museum on nine shrink-wrapped pallets, including file cabinets and large crates, and needed a substantial amount of work to make it accessible for researchers and Museum use. The collection consists of three major components (archives, artifacts, and library materials) that I was hired to organize, catalog and place in proper storage for long-term preservation.

For the past year, I have worked primarily on the archival component, which includes correspondence, drafts of Stine’s writings, research files, 1,800 oversized technical drawings, hundreds of photographic prints, over 3,000 35mm slides and a variety of audiovisual materials. I had to review everything, put materials into proper enclosures, humidify and flatten rolled drawings, inventory oversize and audiovisual materials, and finally determine the best way to

organize the collection. Ultimately, the archival collection was organized into six series: I. Model Rocketry, 1957-2008; II. Writings, 1957-1994; III. Aeronautical Research Files, 1918-1994; IV. Personal and Other Professional Work, 1955-1997; V. Slides and Audiovisual Materials, 1946-1992; and VI. Henri Coanda Archives, 1914-1965.

The first series on model rocketry documents the founding of the National Association of Rocketry, the growth of the model rocketry industry, and other research and developments on rocketry in the latter half of the twentieth century. The papers that make up the “National Association of Model Rocketry” subseries, are some of the many strong aspects of the collection. There are early committee records, publications, Plan Program Fact Sheets, safety code and reports, examples of early meets and competitions of the NAR, as well as sections throughout the United States. There are also numerous documents regarding international model rocketry and the symbiotic partnership in developing the hobby between the U.S. and Europe from the 1960s until the late 1980s.

Together with founding the NAR and developing model rocket designs, Stine was instrumental in creating safety standards and protocols. There is material in the collection related to his work on the Pyrotechnics Committee acting as a liaison between the model rocket developers and the National Fire Protection Agency from the early 1970s until 1990s. There are also documents of court cases, which Stine was requested to contribute his expertise on.

Also noteworthy are the correspondence files between Orville Carlisle, who designed one of the first model rockets (Rock-A-Chute Mark I), and Stine. One of the documents is the very first letter Carlisle sent to Stine addressing his interest in the hobby of model rocketry and his original design. In addition to this early documentation of the hobby are thousands of photographs illustrating the founding years of the annual model rocket meets held by the NAR beginning in the late 1950s.

Another unique aspect of the collection are the many drafts of Stine’s writings. Included are some of the numerous articles he contributed to publications such as *American Modeler Magazine* and *Model Rocketry Magazine*, between the 1950s to 1980s. These works are well documented with original drafts as well as final publications. As part of the manuscript

material there are also early versions and revisions of Stine’s renowned publication *Handbook of Model Rocketry*. Included are examples of notes where he formulates new ideas for model rocket designs.

In addition, a large portion of the collection consists of files devoted to Stine’s personal and professional interest in aeronautical research. These files, which encompass rocket and missile designs and development, space programs within the United States and the Soviet Union, aircraft, and aerospace research facilities, will be of great interest to those studying the history of rocketry.

During the processing of the collection I developed a crowd-sourcing project, with help from volunteer Kris Ikeda and our Digital Asset Coordinator Ali Lane, to identify individuals in some of the photographs. We focused on photographs of the early NAR meets and the individuals who took part in the excitement. A couple hundred unidentified photographs were selected, digitized, and posted on a Flickr site that was open to the public from January-October 2019. The goal was to identify, with input from the NAR community, the individuals in the pictures. The NAR community supplied valuable knowledge and the site was extremely successful. The information acquired has been subsequently cataloged by Museum staff in the metadata record for the digitized files. The images and the identifications will be added to our Digital Collections site in the coming months.

Processing the collection was a necessary part of preserving and bringing access of the G. Harry Stine Space History and Model Rocketry Collection to researchers. The Museum’s Collections Department staff is dedicated to preserving artifacts and collection material related to the history of space and model rocketry. Now that work on the archival portion of the collection is complete, I will focus on cataloging and preserving the related artifacts and library materials. In the interim, researchers are welcome to use the material already archived. Contact curator@museumofflight.org for more information or to make an appointment.

OPPOSITE PAGE: Technical drawing of Dubnica Payloader designed by NAR member Talley Guill and illustrated by G. Harry Stine. (G. HARRY STINE SPACE HISTORY AND MODEL ROCKETRY COLLECTION, THE MUSEUM OF FLIGHT)



Celebrating the First World Flight

BY: ROBERT DEMPSTER

[April 6, 1924, The first flight around the world started in Seattle, Washington.]

FOUR DOUGLAS WORLD CRUISER aircraft, named for American cities Seattle, Chicago, Boston, and New Orleans, and flown by United States Army Air Service pilots, departed, on floats, taking a northerly route through Alaska and the Aleutian Islands, to Japan. This was a major achievement with harsh conditions in Alaska, and loss of the flagship, Seattle. Maj. Martin and Sgt. Harvey spent 10 days hiking through the snow, to their rescue at Port Moller. The three remaining crews undertook the long,

first aerial crossing of the Pacific Ocean to Asia, where their landings were met by huge, congratulatory crowds at all five stops in Japan. Many meetings and generous receptions, with government and military officials were arranged for the flyers. One very special presentation was at the University of Tokyo, where a heartfelt speech given by the university's president, Dr. Yoshinao Kozai, reached far and wide. In it, he described the courageous flight as "Your honor and that of your country to be shared by the whole of mankind because it is a manifest expression of the power of human stock."

Maj. Gen. Mason M. Patrick, then Chief of the Air Service, when officially announcing the project, stated "The purposes of the proposed flight are to gain, for the Air Service, added experience in long distance flying and, particularly the supply problems connected therewith; to complete an airplane flight around the world in the shortest practical time; to demonstrate the feasibility of establishing an airway around the globe and, incidentally, secure for the United States, birthplace of aeronautics, the honor of being the first country to encircle the world entirely by air. A great deal of valuable information, especially the difficulties of operating aircraft in various climates, will also be obtained." All of these objectives, and more, were accomplished on the first world flight.

From Japan, the World Cruisers advanced to Calcutta, where landing gear with wheels replaced the floats, for overland portions of the route across India, the Middle East, and Europe, to England, where again, the flight resumed on floats, for an eventful island hop over the Atlantic Ocean. During that crossing, one aircraft made a forced landing, and was eventually lost. The Boston crew was transported to Nova Scotia by the Navy, where the prototype World Cruiser was delivered, and named the Boston II, so that they continue the flight. The flight of three then headed to Boston, USA, with a final transfer to wheels for a jubilant tour around the USA, final destination: Seattle.

Their momentous flight made 73 stops, in 22 countries, flying over 26,000 miles, in 363 flying hours, spanning almost six months, landing back in Seattle on the 28th of September, at Sand Point Air Field, thus completing the first aerial circumnavigation of the world. It was a journey made possible through US government support at the highest levels, with the assistance of U.S. Embassies in attaining passage permissions through the various countries on the route. All of this was aided with the joint cooperation of the U.S. Army Air Service, Coast Guard, and especially the U.S. Navy.

Writer and historian, Peter M. Bowers, wrote, in 1974—on the 50th anniversary of the first world flight:

"The magnitude of that flight, in terms of preliminary study and engineering, worldwide logistic support, crew training, inter-service cooperation, diplomatic clearances, personal skill and determination is almost directly comparable to a Moon landing today."

Seattle Aviation History Starts Early

Sixteen years earlier, in 1908, balloons flew over Seattle. In 1910, Charles Hamilton flew the first airplane at The Meadows, a racetrack in the Duwamish River Valley. By and by, Jefferson Golf Links, Harbor Island, Kent, and Lake Union would be used for landing fields. By 1915, Bill Boeing was flying off of Lake Washington, shifting over to Lake Union in 1916. By June 1920, King County had purchased a large tract of land at Sand Point. At the dedication ceremony, Sand Point's history begins with the allocation of this field to the service of our community. In 1924, when the world fliers landed there, the flight was graciously hosted by the Seattle Chamber of Commerce, with receptions, parades, dinners, and a christening ceremony of the aircraft at Sand Point. The Chamber also financed building the pier at Sand Point, so the aircraft could be transitioned from wheels to floats.

The Boeing Company was also instrumental in helping with the preparations. Boeing workmen helped assemble the floats, made subsequent adjustments during the flight testing, welded repairs on some of the airframes, and patched holes in the floats. Boeing workmen also spent all night repairing a propeller for Maj. Martin's aircraft, the flagship Seattle, so they could make their April 6 departure. The Boeing Company's enthusiasm and support for the world flight was evidenced in a letter from then Boeing president Ed Gott, where he described how the company collected flight gear and tools for the aircraft and crew members. In tribute, The Boeing Company took out a public advertisement of well wishes for the success of the fliers.

As he did at the onset, after the flight, Mr. Boeing, met the flight crews at Sand Point with his hearty congratulations for a successful accomplishment. From this meeting, two of New Orleans' flight crew members were hired by The Boeing Company: Jack Harding, Mechanic/Co-Pilot, and Pilot/Chief Flight Engineer, Erik Nelson, who was retained as advisor to Mr. Boeing. Nelson went on to become vice-president, in charge of sales and later, a Boeing Company director. Nelson served during WWII, at the request of Gen. Hap Arnold, to perform duties as special assistant on technical matters, for the B-29 program.

Seattle World Cruiser Project

The Seattle World Cruiser Association was established in 2001, as a 501(c)3, nonprofit, charitable, Arts & Cultural Organization, with a focus on aviation and historical preservation. As part of our mission, we provide community

educational programs, public tours of our projects and historical presentations. The first world flight represents not only the second major milestone of flight, after the Wright Brothers, it laid the groundwork for exploration that continues today.

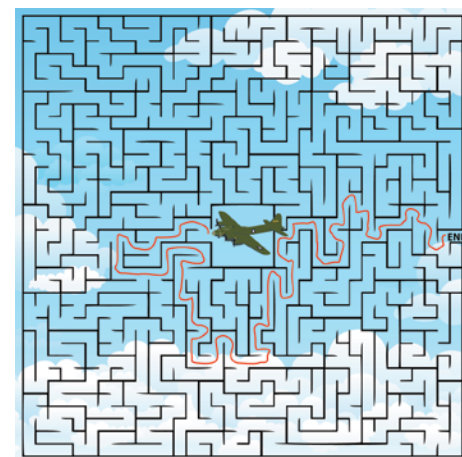
Inspired by this great feat, a small, dedicated team of volunteers and craftsmen—using original drawings and a few significant parts of the original Seattle, the flagship of the 1924 flight—have constructed a full-scale, 50-foot wingspan, flying reproduction of the Douglas World Cruiser, that weighs over four tons, fully-loaded, on floats. At a christening dedication at The Museum of Flight, and following the precedent of naming the prototype the "Boston II," we have christened our sturdy ship Seattle II, and were honored by the Duwamish People, after whose chief our city and aircraft are named. At that ceremony, Mr. Ken Workman, 5th generation great-grandson of Chief Seattle, in his presentations, called this airplane "Thunder Canoe," a name which proudly joins "Seattle II" on the aircraft's bow.

In 1924, Admiral Robinson said, at the conclusion of the flight, "Other men will fly around the earth, but never again will anybody fly around it for the first time."

This historic flight was exceptional, occurring in an era when aviation had recently advanced from planes being used for barnstorming, progressing to the pivotal event of circling the planet. Our 2020 celebration of world flight will honor this amazing original flight, and those who made it possible. And, on a larger scale, we are celebrating our human heritage of "Man As Explorer."

Please visit our website for more information, seattleworldcruiser.org.

JUNIOR AVIATORS: WWII MAZE (PAGE 19) SOLUTION



VOLUNTEER PROFILE

Pete Metzelaar

BY: STEVE DENNIS, VOLUNTEER

THERE WAS A CERTAIN POIGNANCY about Pete Metzelaar's first volunteer assignment as a Boeing B-17 tour guide. He saw his first B-17 seventy years earlier as a young, Dutch, Jewish boy looking skyward as B-17 bombers lumbered overhead on their bombing missions to Germany.

Pete was born in Amsterdam, the Netherlands, in 1935. When he was seven years old, the Nazis, who'd invaded the Netherlands, seized everyone in his family except for Pete and his mother. His father was just 35 when he disappeared. Pete and his mother were the only members of his family to survive the Holocaust, hiding on a farm, protected by a Christian family and the Dutch Underground. Liberated by the Canadian Army in 1945, the two survivors made it to the USA.

Why did a Christian family risk their own lives to shelter them? "Because they felt it was the

right thing to do," according to the family's heirs.

He received his education in Radiology, served in the Army and spent his career as a Radiology Technologist. Like so many volunteers, Pete's life experiences enrich the messages that he brings to visitors from around the world.

It was his wife of 54 years who suggested Pete volunteer at the Museum. Pete has accumulated nearly 1,600 volunteer hours since completing docent training in 2013. He works a Friday shift and fills in other times when there is a need.

In addition to his docent work, Pete is a member of the Holocaust Center for Humanity's Speakers Bureau and, based on his studies and personal experiences, has told his story to thousands of students and community groups in the Northwest. Pete has presented his story at a Museum volunteer gathering

and is a regular speaker in the Quonset Hut Storytelling program, in the World War II Personal Courage Wing, under the title "Dutch Holocaust Survivor."

Pete tells his personal story with a passion for its grim lessons and with a realization that each year there are fewer people who experienced the terror firsthand and can share their personal stories.

His favorite area as a docent is the T.A. Wilson Great Gallery. His favorite aircraft are a bit of a dichotomy. Pete enjoys talking about the Blackbird, the world's fastest manned jet aircraft, and the Gossamer Albatross, arguably the slowest.

Pete is not above having a bit of fun when he experiences a Dutch visitor, who he can identify by their accented English. He will comment on their good English and on how difficult the Dutch language must be. When they rise to defend their native tongue he responds in Dutch and the ice, if any, is broken.

Pete enjoys his docent friends, the visitors and the chance to tell his story that the Museum offers. (And his English is excellent!)

Thank you
to our community
partners for their
continuing support!



Teaching in Alaska? Juneau It!

BY: NATALIE COPELAND, EDUCATOR



Rosemary Walling stands next to the Museum's portable projector in the Marie Drake Planetarium. (MICHAEL PENN, COURTESY OF THE JUNEAU EMPIRE)

LOOK—YOU CAN SEE THE AIRPORT! And there's the Mendenhall Glacier!" From the carpet of the Marie Drake Planetarium floor, eager stargazers indicate the landmarks of Juneau projected on the thirty-foot dome above our heads. We've just traveled to the edges of the known universe and we're ending our voyage by flying home. I'm piloting, but I've handed off my laser pointer to the audience and we're using their prodigious local knowledge to navigate the islands, channels, and vast ice fields that comprise southeast Alaska.

The Museum is committed to delivering inspiring outreach education opportunities to schools, groups, and partners across the Pacific Northwest region, including Alaska, but this is no ordinary outreach trip. In early October, a team of Museum educators set off for Digital Planetarium Week by invitation of the Friends of the Marie Drake Planetarium. The Marie Drake is tucked inside of an elementary school of the same name, and has provided free monthly shows to the community during the school year for over 30 years on their 1967 analogue Spitz Starball projector. You may be familiar with the type—imagine a pin-pricked metal ball, illuminated from the interior by multiple lamps, and set in motion with a variety of gears. Installed in the space age and used to teach prospective engineers astronomy, it has a long history. But over time, pieces have stopped working.

In 2017 a few members of the Marie Drake board took a fateful trip to

Warm Springs, Oregon to check out the solar eclipse. This is where they ran into our education team, inflatable traveling planetarium dome, and digital Digitalis™ projector. After experiencing a show where one could skim along the surface of planets, overlay constellations from different sky cultures, view eclipses from space and much more, the team returned to Alaska excited about updating their aging technology.

Digital Planetarium Week, architected by board member Rosemary Walling, is a fundraiser to do just that. Over the course of our visit, a team consisting of Mandy Walker-LaFollette, Paul Martinez and yours truly visited every elementary school in Juneau, spent every evening in public shows, and even hosted a teacher workshop on incorporating space science and planetarium visits into lessons. At final count, we saw 1,050 students (every 3rd-5th grader in town), and 677 members of the public for a total of 48 shows. As of November 1st, we are excited to congratulate the Marie Drake on raising enough money to complete the first stage of their purchase, which will make its community debut in 2020. Walling says that the anticipated update will be "like going to a computer from a slide rule." This event would not have been possible if not for the generosity of Alaska Airlines, who paid for half the cargo fees to get the planetarium from Seattle to Juneau and back again. Thank you Alaska Airlines!

BUILDING A RUNWAY TO SUCCESS

THE MUSEUM HOSTED its annual A.M. Flight Breakfast in November to raise support for our wide array of education programs. Guests enjoyed breakfast under the Lockheed M-21 Blackbird in the T.A. Wilson Great Gallery while learning about the hands-on experiences and opportunities the Museum provides for students ages 5-18 who are interested in science, technology, engineering and math (STEM). Women represent approximately 28% of the workforce in science and engineering careers, and only 20% of those individuals are women of color. It's not surprising that by the year 2025, a predicted 2 million STEM jobs in the United States will go unfilled due to lack of qualified candidates. The Museum is actively working to counterbalance this inequality by providing educational opportunities specifically for demographics underrepresented in STEM careers, like Amelia's Aero Club for middle school girls. The keynote speaker, Dr. Sara Mazrouei (pictured left), is a planetary scientist who co-founded the Women in Space Conference and is an outspoken advocate for women and nonbinary individuals in science. "We need to rebuild the pipeline if we want everyone to have a seat at the table," Dr. Mazrouei said. "But for some people, the table doesn't exist. You have to build your own table, pull up a chair and invite people to sit with you."

Thanks to the generosity of the A.M. Flight Breakfast donors, sponsors and a matching donation from our Board of Trustees, the Museum was able to raise a total of \$63,611 towards providing more opportunities for our students to learn, grow and succeed!



JACQIE CALLAHAN



MUSEUM NEWS

THE MUSEUM OF FLIGHT

New Plaques in Memorial Park

THE MUSEUM COMMEMORATED

Veterans Day over the weekend of November 9-11 with a full lineup of programs including the unveiling of 29 new Tribute Plaques in the Vietnam Veterans Memorial Park. Since the park's May 2019 opening, we continue to receive interest from veterans and their loved ones in our community who want to add their personalized messages to the Memorial Park Tribute Wall to honor their dedicated service.

The event's keynote speaker was Dave Cable, a Museum docent, a veteran Navy pilot who flew Grumman A-6 Intruders during the Vietnam War, and an integral part of the *Project Welcome Home* steering committee that helped raise the funds to build this beautiful Memorial Park. "Two of my best friends are among those being added to the Tribute Wall today," Dave

said. "I know that every tribute plaque has a story, known only to that hero and their loved ones, and I sincerely wish that we had time to tell all of their stories today."

Also speaking at the event was Mr. Alex Kuo-shu Fan, the Director General of the Taipei Economical and Cultural Office in Seattle. One of the plaques unveiled was in honor of the Black Bat Squadron, a Republic of China Air Force reconnaissance squadron based in Taiwan who assisted the United States in gathering intelligence during the Vietnam War. Mr. Fan said, "The U.S. government's appreciation towards the Vietnam War veterans and the contributions of the Black Bat 34th Squadron is long-lasting proof of the close bilateral relationships between Taiwan and the U.S."



Legacy Planning Workshop

ARE YOU CONFUSED by Powers of Attorney? Do you need the 4-1-1 on beneficiary designations? Join us for a **Legacy Planning Workshop**. Learn the basics of creating an estate plan for the legacy you want to leave. We will cover the topics of wills, power of attorney, beneficiary designations and more. Presented in partnership with the Seattle Humane Society, Northwest Harvest and Ranier Scholars. **Wednesday, Jan. 29 from 1 to 2:30 p.m. RSVP required. Seating is limited.** Please contact Sandra Dolese at 206.768.7199 or email at SDolese@museumofflight.org.

2020 Kids Challenges

THE MUSEUM'S CELEBRATION of the 50th anniversary of the Moon landing contributed to what was a banner year featuring lots of new programs and activities including two contests for kids ages 5 to 17. These contests included Spacesuit Design Challenge where students designed and built their own spacesuits and Space Art Challenge where students were encouraged to create a two-dimensional art piece honoring the creativity involved in space exploration.

We are always striving to engage students with science, art, and history. In 2020, we will have four contests for students ages 5 to 17. The first contest is **Spirit of Flight Junior**, a photo contest for all young photographers to capture the spirit of flight. The second is **Spacesuit Design Challenge: What Would Yuri Wear?** We are asking students to put a vintage spin on their designs to create something Yuri Gagarin, the first man in space, might have worn back in the 60s. Next is the **Victory Garden** contest. To celebrate the 75th anniversary of the end of World War II, we are encouraging students to grow their own victory garden and participate in a produce contest. The last contest is **Empire Writes Back!**, a Star Wars writing contest to encourage students to think beyond the story they know to create something new.

These contests highlight the link between science, art and history. We look forward to lots of entries and to see how our contestants use their imaginations to create colorful new worlds.

For more information on any of these contests, please visit, museumofflight.org/Kids-Design-Challenges.

Changing Young Lives Through Access to Technology

BY: MARY BATTERSON, CORPORATE PARTNERSHIPS OFFICER

IN A REGION THAT IS HOME to some of the biggest names in the technology sector, it may come as a surprise that many families in our community don't have access to technology in their homes. The "digital divide" refers to the growing gap between those with access to computers and the internet and those who lack access. A unique partnership between The Museum of Flight, First Tech Federal Credit Union and InterConnection, is helping bridge the digital divide for students enrolled in the Museum's Michael P. Anderson Memorial Aerospace Program (MPA).

Now entering its 11th year, the MPA program inspires underserved middle school (6th-8th grade) youth of color from across Washington state to experience the thrill of math and science and to dream of their own possibilities within the fields of Science, Technology, Engineering and Mathematics (STEM). The program is a combination of online assignments, field trips and mentorship by aerospace and aviation professionals of color. To increase access and encourage participation—especially for students that live a considerable distance from the Museum—the program is offered to students at no cost.

First Tech Federal Credit Union, founded in 1952 by a group of employees at Hewlett-Packard and Tektronix, serves the world's leading technology-oriented companies and their employees. First Tech Federal Credit Union is committed to building strong communities and donates 2% of their annual net income to a variety of non-profit organizations in an effort to support the next generation of leaders, thinkers and innovators. Of the \$3.2 million they invested in 2018, \$1.2 million was directed toward education programs serving under-resourced communities.

"The students of today are the future leaders of our communities," said Nicole Frisch, Senior Director of Community Engagement with First Tech Federal Credit Union. "We're proud to partner with The Museum of Flight because we share a common



"Providing access, equity and inclusion to STEM education for underserved communities"

goal: providing access, equity and inclusion to STEM education for underserved communities and helping to build the bright future that every child deserves."

The third organization in this partnership, InterConnection, is a Seattle-based nonprofit, whose mission is to provide high-quality, refurbished computers and high-speed internet to underserved communities. "For nearly a year, our team worked with the Museum to put this technology into the hands of students who would otherwise not be able to afford it," said Cheryl Roe, InterConnection President. "Funding from First Tech Federal Credit Union allowed us to move the project from discussion to reality."

Through this collaboration, the Museum was able to provide 20 laptop kits, including broadband internet access, to students enrolled in the MPA program who did not have a computer at home or who were without permanent housing. It is the first time this kind of support has been available to students at the Museum. Not only did these computers impact the lives of the MPA scholars, they

also impacted their siblings and parents, by providing much needed tools for completing homework, finding employment, and participating in the social aspects of a society that increasingly revolves around access to technology. Without the support of First Tech Federal Credit Union, it is highly unlikely these students would have been able to participate in the MPA program.

As the Museum works to increase its educational reach through digital learning opportunities, partnerships like the one with First Tech Federal Credit Union and InterConnection will help bridge the "digital divide" and provide increased access to underserved communities. A renewed commitment from First Tech Federal Credit Union will provide 20 additional laptop kits to participants in the 2020 MPA program.

For information on how you can help support this program or others like it, please reach out to Mary Batterson, Corporate Partnerships Officer at 206.764.5879 or email MBatterson@museumofflight.org.

Tribute Gifts

In Memory

In memory of Michael P. Anderson
Harold L. "Mitch" Mitchell, USAF (Ret) and Kelly Mitchell

In memory of Harry L. Arndt, Sr.
Cristina and Mitchel Arndt

In memory of B-17 crash victims, Collings Foundation's "Nine-O-Nine," Bradley International Airport
Paula Clark

In memory of William E. Boeing, Jr.
Brad and Sandra Barnard

In memory of Virginia (Missy) E. Buringrud
Nancy Lynn Bittner
Richard and Gwyn Fowler
Douglas and Terry Morrison
John and Joan Winslow

In memory of Henry (Hank) L. Buttelmann
Paula Clark

In memory of Charles (Chuck) L. Childs
Stephen and Carmen Moddle

In memory of Oliver (Ollie) R. Crawford
Paula Clark

In memory of Roy Grinnell
Paula Clark

In memory of James H. Jackson
Fred and Janice Naslund

In memory of George M. Kau
Peggy A Kau
Chelsea, Alexandra, Victoria, Samantha, Matthew, Sierra

In memory of Richard B. Kimball, Sr.
Robert Kimball

In memory of Theodore (Ted) E. Knudson
Guy Falskow

In memory of Chuck Lyford
Pamela Lyford
Raymond and Carole Marty

In memory of C. Diane Neider
Karl and Tina Neiders

In memory of Robert A. Northey, Sr.
PotlatchDeltic Corporation

In memory of Donald W. Oja
David Gauger

In memory of Edward A. Pottenger
John Purvis and Nancy Wright
Marlene Taylor Houtchens

In Honor

In honor of Katy Ahrens
Anne Melton

In honor of Luella M. Armstrong
Walt and Rita Braithwaite
Wilcox and Sharon Creeden

In memory of Clarence A. Borley
Paula Clark

In honor of Terry Brown
Pamela and David Kiesel

In honor of Aaron Luethe
Laura Luethe

In honor of Museum of Flight Volunteers
Matthew B. Hayes and Laura Jacumin

In memory of Charles A. Schuh
Terry and Marsha Mason

In memory of Robert Morgan Thomas
Sarah Thomas

In memory of Richard E. Wallace
Valley Family Medicine

In memory of Lester L. Warriner
Mathilda Warriner

In memory of Thomas Yee
Colleen Cameron

In honor of Brien Wygle's 95th birthday
Ardell and Frances Anderson
CG "Jerry" King
Emily King
Frederick and Mary Mitchell
John K. Wimpress
Ronald and Carolyn Woodard

In Memoriam

JoAnn Alexander
Byron G. Behrens
John C. Blackman
Lil Bub
Timothy C. Burkart
Charles L. Childs
Dorothy I. Collings

Robert E. Drew
J. Orin Edson
Daniel E. Elkins
James R. Ellis
Goldie T. Feinberg
Ruth Forhan
Harry L. Hill

David K. Idler
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Robert L. Neir
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