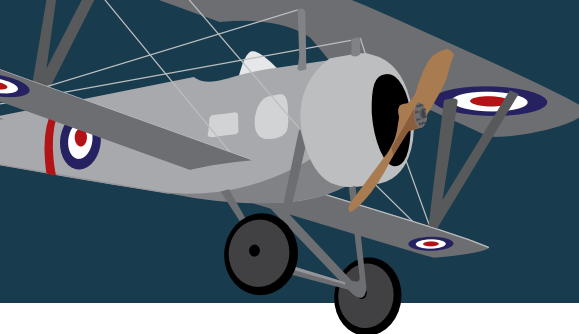


# aloft

THE MUSEUM OF FLIGHT MAGAZINE



VOL. 40, ISSUE 6  
NOVEMBER/DECEMBER 2018



# MEMBER EVENTS

For all events, please RSVP to [membership@museumofflight.org](mailto:membership@museumofflight.org).

## Santa's Landing Party Member Reception

Join us for some holiday cheer, light refreshments, and festive entertainment as Santa and Mrs. Claus land their plane at the Museum!

Members will enjoy a prime view from the 2nd floor balcony as the couple touches down at 9:45 a.m. Following their arrival, we encourage Members to head to the T.A. Wilson Great Gallery where Santa will be available to hear children's wishes until 2 p.m.

**Saturday, December 15**  
9 to 10:30 a.m.

RSVP by December 7  
to [membership@museumofflight.org](mailto:membership@museumofflight.org)

Due to limited space, admission to this event is restricted to two adults and any children or grandchildren under age 18 as covered by your membership level. RSVPs are required.



Want to see artifacts in the Museum collection not normally on view?

Join us for Coffee with the Curator. You're welcome to bring your lunch—coffee and dessert is on us! Featuring Red Barn blend coffee, available exclusively in our Museum Store. **RSVP to [membership@museumofflight.org](mailto:membership@museumofflight.org) to attend.**

### WWI COLLECTIONS

**Friday, Nov. 16 | Noon to 1 p.m.**  
NORTHWEST AEROCLUB ROOM  
(RED BARN, 1ST FLOOR)

This November we commemorate the 100th anniversary of the signing of the Armistice and the end of World War I. As such, this month's Coffee with the Curator will feature a selection from fifty WWI collections that were recently digitized as part of a large-scale grant project. Our Collections team will feature the unique archival materials, objects, and monographs from these personal collections of aviators and soldiers who served during WWI and discuss how these items are now being made available to the public online.

### TOYS, GAMES, AND FUN

**Friday, Dec. 14 | Noon to 1 p.m.**  
NORTHWEST AEROCLUB ROOM  
(RED BARN, 1ST FLOOR)

Running out of ideas for the little aviators on your holiday shopping list? Join us in December for some vintage inspiration! Collections department staff will be sharing some of the unique toys, books, and games in the collection that are geared towards the young, and young at heart.

### NEW EVENT!

## MUSEUM MODELERS

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 the Museum's Fokker Dr. I, one of the most famous and recognizable fighters of World War I.

**Space is limited to 30 families.**

**FEE: \$8.35/model**  
Reserve your model online by Nov. 4 at [museumofflight.org/MemberEvents](http://museumofflight.org/MemberEvents)

**SOUTH VIEW LOUNGE, 2ND FLOOR**  
**Sunday, Nov. 18 | 11 a.m. to 2 p.m.**

## SAVE THE DATE

*Calling all Flight Leader,  
Barnstormer, and  
Barnstormer Gold Members!*

### You Are GO For Lunch!

**Save the date** for a special luncheon with George W.S. Abbey, former director of the Johnson Space Center on **December 8th!** Be on the lookout for a special invitation soon to this inaugural event of our new "You Are GO For Lunch" program series.

## STEM starters

STEM Starters is a monthly program series geared specifically for our youngest Members ages 3 to 5 and their co-pilots! *For the safety and success of your young learner, one adult helper is required to be present and participate.*

### BEE-BOTS

4 sessions available!

Buzz your way over to the Museum to create your very own Bee-Bot! Our November and December STEM Starters sessions will explore the world of robotics and let each participant program their own robot to take home!

**Monday, Nov. 12 and Monday, Dec. 10**

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

All sessions are in the  
**NORTHWEST AEROCLUB ROOM**  
Red Barn, 1st Floor

**RSVP required.** To attend, email us at [membership@museumofflight.org](mailto:membership@museumofflight.org).

**Space is limited to 12 adult/child pairs at each program.** Due to limited space, supplies and age-appropriate curriculum, we are unable to accommodate additional children (such as younger siblings), even if they are not participating. Thank you for your understanding and cooperation!

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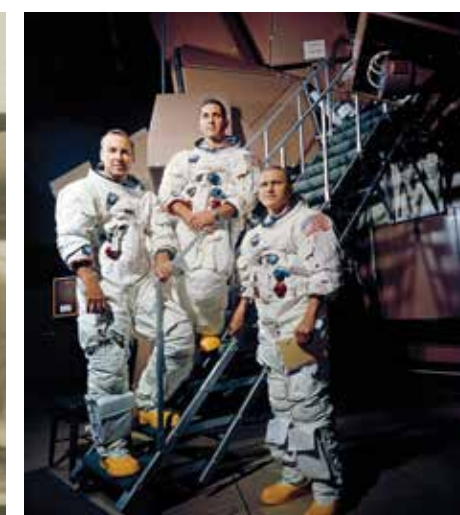
THE MUSEUM OF FLIGHT MAGAZINE

NOVEMBER/DECEMBER 2018

**CONTACT THE MUSEUM**  
[www.museumofflight.org](http://www.museumofflight.org)  
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### ALOFT STAFF:

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**On the cover:** Two pilots standing in front of a Salmson 2 A2 biplane parked by a hangar.

THE NANCY HARKNESS COLLECTION OF WORLD WAR I PHOTOGRAPH ALBUMS/THE MUSEUM OF FLIGHT

**Questions or Comments?**  
Email us at [aloft@museumofflight.org](mailto:aloft@museumofflight.org)

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## THROUGH HIS LENS

MATT HAYES

**WHEN I TOOK THIS EARLY MORNING** shot of a Mooney descending on Boeing Field, I was struck by the majesty of the mountain, the lights, the symmetry, and the color framing this little aircraft. Remarkably, because I'm a pilot, I was not thinking about what was going on in the mind of the person controlling that airplane. They saw what I saw, but this person wasn't just looking; they were also moving, thinking, flying in that spectacular 3D environment. Because they were immersed in that moment, rather than observing it, their experience was so much richer and deeper than mine.

These thoughts remind me of why I am so proud of The Museum of Flight, and especially of the people who work together to make it an immersive experience for our visitors. Instead of being static, our galleries come alive with people and activities, artifacts and interactive exhibits. We provide educational experiences that can last minutes or years. Hundreds of volunteers enthusiastically share their knowledge with visitors of all ages. There is art and architecture, and yes, even places to take selfies. There is an archive and library for deeper study. There is a community to be a part of. And like the Mooney, the Museum is part of a larger landscape; one set in a context of history, innovation, stories, and most importantly, people.

This analogy is a long way of saying thank you to the wonderful team that has evolved the Museum from a simple image to a magnificent, 3D experience that anyone can navigate in and around. It is also an invitation to a world anyone can enjoy and learn from. And finally, it is a chance to become a part of an important community.

It was great to be the photographer of this picture; next time I want to be the pilot. At The Museum of Flight, you can be both.

Season's Greetings!

Matt Hayes, President and CEO



# Museum Flashbacks

**TOP LEFT:** A sold-out crowd of about 1300 had a lively time at the Museum's first summer night party, HangarFest. The music, beer, wine, food truck and game event was spread throughout the Aviation Pavilion and West Campus. Seattle band Spike and the Impalers headlined the music at HangarFest. (JACQIE CALLAHAN) • Cornhole was a popular game at HangarFest. (TED HUETTER) • International news, documentary and travel shows are regular visitors to the Museum, including crews this summer from England, Japan, Turkey and Ukraine. Here Natasha Mazgovaya from the Voice of America speaks Russian in the Red Barn during a full tour of the Museum. The video will be broadcast to Russia as part her series spotlighting notable attractions around the country. (TED HUETTER) • The Museum's second annual Maker Night introduced dozens of young students to the Connections program. Most of the children in attendance were in kindergarten to 2nd grades, and enjoyed over 15 hands-on activities ranging from soldering to sliming! One parent said, "Wonderful staff, thoughtful, kind and informative." (JACQIE CALLAHAN) • A new British video series, "David Jason: Planes, Trains and Automobiles" hosted by one of England's most beloved TV actors, Sir David Jason, visited the Museum to learn more about the Boeing story. Boeing Company Historian Mike Lombardi showed Sir David (himself a pilot) the Red Barn, Model 40B, 247 and especially the 747 prototype, where he engaged in a lively and insightful discussion with Museum trustee emeritus and legendary Boeing test pilot, Brien Wygle. The two are seen here in the cockpit, with Jason in the captain's seat on the left. (TED HUETTER)





# PLUTO, ARE YOU THERE?

QUESTIONS ANSWERED BY: JOHN LITTLE, ASSISTANT CURATOR AND RESEARCH TEAM LEADER AND GEOFF NUNN, ADJUNCT CURATOR FOR SPACE HISTORY



NASA

**Q: ON THE LOCKHEED SUPER CONSTELLATION, DO ALL FOUR OF THE PROPELLERS ROTATE IN THE SAME DIRECTION?**

**A:** Yes. All four propellers rotate clockwise, when seen from the rear, which is typical of American-built engines. Having all four engines rotating in the same direction does generate some torque-steer when the engines are running at full-throttle, such as on takeoff, but the Connie's three rudders have more than enough authority to keep it flying in a straight line, even if an engine fails on takeoff. There have been multi-engined airplanes with contra-rotating propellers, but they are rare. To see an example, look at the propellers on the Museum's Lockheed P-38L Lightning, in the World War II Gallery.

**Q: WHAT IS THE DEADLIEST BOMBING RAID IN HISTORY?**

**A:** Surprisingly, neither of the two atomic attacks qualifies as history's deadliest bombing raid. That grim distinction belongs to Operation Meetinghouse, which was carried out against Tokyo by 334 Boeing B-29s of the United States Army Air Force's Twentieth Air Force on the night of March 9-10, 1945. Instead of dropping high-explosive bombs from dense, high-altitude formations in broad daylight, Meetinghouse used incendiary bombs, dropped at night from altitudes ranging

from only 5,000 to 8,000 feet, with each B-29 navigating its own course to and from the target. The raid lasted about three hours, completely destroyed some sixteen square miles of Tokyo, killed (officially) 88,000 people (and probably well over 100,000), and left 1.2 million people homeless. On only its second operational mission, the B-29 that is on display in the Museum's Aviation Pavilion, T Square 54, participated in Operation Meetinghouse.

**Q: IS PLUTO A PLANET AGAIN?**

**A:** As you may know, in 2006, Pluto got demoted. The International Astronomical Union (IAU) established a definition for planets that describes them as celestial bodies that (a) orbit the Sun, (b) have sufficient mass to form a nearly round shape, and (c) have cleared the neighborhood around their orbit. Because Pluto orbits among a crowded field of asteroids called the Kuiper Belt, it did not meet the new definition, and was relegated to dwarf planet status. In 2017, a group of astrophysicists and planetary scientists published a paper in the journal *Lunar and Planetary Science* which proposed a new definition based on internal geophysics rather than external orbital properties. They identify several flaws in the IAU definition. It excludes planets in orbit around stars other than the Sun, and includes or excludes bodies based on whether they got a lucky orbit. The paper

## What's new in the collection?

BY: CHRISTINE RUNTE, REGISTRAR

**TERRE THOMAS IS** the daughter of Nancy Nordhoff Dunnam, a WWII WASP (Women Airforce Service Pilots). Nancy made a donation of her WASP material in 1993 and Terre is making the final donation of Nancy's WASP collection. Nancy started taking flying lessons at the age of 16 and later received her pilot's license. She was attending the University of Washington in 1944 and left to join the WASP volunteer program in Sweetwater, Texas. Nancy was also one of 300 surviving WASPs who traveled to Washington, D.C. in 2010 to receive the Congressional Gold Medal. This donation includes Nancy's copy of the Congressional Gold Medal as well as additional WASP uniforms and insignia. Nancy died in 2017. Nancy Nordhoff Dunnam's previously donated WASP uniform is on display in the J. Elroy McCaw Personal Courage Wing. As part of this donation, Terre has also included material from her grandparents, who served in WWI. This includes photographs and a WWI Signal Corp bracelet.



THE MUSEUM OF FLIGHT COLLECTION

argues that even the Earth wouldn't be able to clear the neighborhood if it orbited where Pluto does. The paper puts forth a simpler definition, which it summarizes as "round objects in space that are smaller than stars." If adopted, this new definition would increase the number of planets in our solar system to over 100, and would include bodies like Earth's Moon, and the moons of several other planets.

**HAVE A QUESTION?**

Submit it to aloft@museumofflight.org and it could appear in the next issue of *Aloft!*

## Aeronautical Science Pathway

BY: REBA GILMAN, VICE PRESIDENT OF EDUCATION



The 2018/2019 Aeronautical Science Pathway Year 1 class./THE MUSEUM OF FLIGHT

**NOW IN ITS THIRD YEAR OF OPERATION,** the Aeronautical Science Pathway (ASP) program has doubled in enrollment since its inaugural year in 2016, with 51 students from 14 school districts participating in the program this year. Students travel from Seattle and Highline to districts as far away as the Peninsula and Olympia—to attend this late-day program from 3:45-6:00 p.m., with hopes of earning up to 60 free college credits. ASP guides them in earning an Associate or Bachelor degree in Aeronautical Science and enjoying a high-demand career as a pilot, air traffic controller, unmanned aerial systems specialist, dispatcher, or an airport or airline manager. Last year's students earned over 800 college credits through Green River College and are now attending various aviation colleges across the country, some on scholarships earned through The Museum of Flight. Several students are also engaged in flight training to earn their private pilot license or advanced ratings, thanks to the generosity of Museum investors.

The ASP program operates in partnership with Green River College and Puget Sound Skills Center, located in the Highline School District. Highline was recently recognized as a District of Distinction for its role in helping create an innovative program that requires collaboration among institutions and the aviation industry to prepare students for high demand careers in aviation. **Interested high school juniors and seniors can learn more at [museumofflight.org/ASP](http://museumofflight.org/ASP).**

## Applications Now Open!

**Applications are now open for two of the Boeing Academy for STEM Learning's most popular programs—Western Aerospace Scholars (WAS) and the Michael P. Anderson Memorial Aerospace Program (MPA).**

**WAS** is open to high school sophomores and juniors curious about human space travel. It consists of two phases; PHASE 1 - an online distance learning course, and PHASE 2 - a summer experience. WAS allows students interested in science, technology, engineering, and math (STEM) to plan a mission to Mars and get hands-on experience with engineering for space.

**Applications Due: October 30, 2018**  
**Learn more at [museumofflight.org/WAS](http://museumofflight.org/WAS)**

**MPA** inspires underserved middle school youth throughout Washington State to participate in the Academy's exciting educational programs while being mentored by professionals in the aerospace and aviation industry. It includes interactive online learning activities and several events from January through July.

**Applications Due: November 30, 2018**  
**Learn more at [museumofflight.org/MPA](http://museumofflight.org/MPA)**



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



## GIRLS TAKE FLIGHT

**AMELIA'S AERO CLUB (AAC)**, an educational initiative that nurtures middle school girls from across Washington State hosted its annual First Time Fliers event on Sunday, September 9. The event was a way to inspire young women to continue pursuing their dreams of aviation and aerospace. AAC members, and girls from programs such as Aeronautical Science Pathway and Western Aerospace Scholars, were invited to the Museum to take a seat in a small propeller aircraft for their first introductory flights. In one day, 99 girls put on headsets, buckled in, and witnessed piloting in action, thanks to the hard work of both volunteer pilots, gate managers, and Museum staff.



MARK YOUR DANG CALENDAR!  
Saturday, February 23<sup>rd</sup>, 2019

2019



# HOPS & PROPS

THE MUSEUM OF FLIGHT · 17<sup>th</sup> ANNUAL

*Tickets go on sale November 14<sup>th</sup>*

*Member Presale at 10 a.m. · General Admission at 3 p.m.*

For more information

[museumofflight.org/hops](http://museumofflight.org/hops)



# AIR WAR ONE

featuring photographs from the Museum's World War I Collection

BY: DAN HAGEDORN, CURATOR EMERITUS





An unlabeled aerial image of a battlefield and trenches in France, circa 1918./ THE MARC A. LAGEN COLLECTION/THE MUSEUM OF FLIGHT PREVIOUS PAGE: Lieutenant P. Brindle of the Royal Air Force from the Edward I. Sproull Photograph Album./ THE EDWARD I. SPROULL PHOTOGRAPH ALBUM/THE MUSEUM OF FLIGHT



A group of German soldiers in Pickelhaube helmets posing with rifles and a Maschinengewehr 08 (MG 08) machine gun from the Hans Eibl photograph album. THE HANS EIBL COLLECTION/THE MUSEUM OF FLIGHT



Two pilots standing in front of a Salmson 2 A2 biplane parked in front of a hangar. THE NANCY HARKNESS COLLECTION OF WORLD WAR I PHOTOGRAPH ALBUMS/THE MUSEUM OF FLIGHT

After a century of phenomenal change since the events of 1914-1918, comprehending it all retrospectively requires the services of a good atlas, a bit of empathy and, certainly not least, respect for forms of courage, nationalism and commitment that we only dimly appreciate here in the world of 2018.

Conventional historians of the WWI-era described the cataclysmic events of the “War to End All Wars” through overwhelmingly ponderous expositions on grand strategy, royal politics, social forces, economics and nationalism. And so it is perhaps not surprising that aeronautics, an infant science during the conflict, received but scant and rather dismissive examination.

However, scholarship dedicated to the actual role of aviation between 1914 and 1918 eventually surfaced, and while many highly respected tomes, still quoted today, almost invariably diminished that contribution, it does not require exhaustive investigation to conclude, as I have, that aviation did, in fact, leave its mark on the world during and after WWI.

The British Royal Flying Corps sent several squadrons to France, including 5 Squadron, equipped with fragile Henri Farman pushers and Royal Aircraft Factory B.E. 8s, entering the fray as early as August 16, 1914, just 12 days after Britain declared war. Number 5 Squadron, RFC, and its sister units most certainly deserve credit for ensuring that the British Expeditionary Force (BEF)—essentially the cream of the British Army crop—was not surrounded and annihilated by sheer weight of numbers and material when the Germans, to the surprise of everyone, made their main thrust through neutral Belgium. It was their aerial reconnaissance that first showed the strength of the German forces and the attempts they were making to outflank the BEF. To the eternal credit of the BEF ground forces commanders, they actually listened to these nascent aviators.

Needless to say, if that had happened, the First World War as we now know it may well have ended much differently—and sooner—than we can possibly know, with resounding repercussions. The BEF may have had to attempt a 1914 version of the “miracle at Dunkirk” the French would

have been completely exposed on their entire left flank, with ominous consequences for Paris, the unrestricted submarine warfare of 1916-1918 would not have happened – and, not least, the U.S. would not have entered the war.

But the BEF did survive, mainly due to aerial reconnaissance, and so the war soon turned into a massive, convulsive trench conflict with the relief of but two elements: submarine and surface naval warfare, and the air above.

Almost immediately, both the Allies and the Central Powers scrambled to exploit the new science. It didn't take long for the aviation entrepreneurs of France, Britain, Germany, Austria-Hungary, Russia and Italy to recognize that fortunes were to be made, and with astonishing speed, some of the most outrageous contraptions to ever attempt flight were being sold to governments poorly equipped to understand real-world requirements, since nearly everyone alive in 1914 possessed only the foggiest notion of what aeroplanes could really do.

The conflict itself soon dictated the nature of requirements. The French were, initially, wedded to the notion of biplane “pusher” designs, mimicked at the start by many of the leading British designs. The Germans and Austro-Hungarians, likewise, had their own pusher designs – some of them clearly knock-offs of French designs – as did the Italians.

But as engine technology started to catch up with the evolution of ever larger aircraft, capable of lofting significant bomb loads and machine guns, the appearance of huge, purpose-built bombardment aircraft commenced. By 1916, the Germans had organized the deployment of significant numbers of multi-engine Friedrichshafen, Gotha and A.E.G. bombers and, with some of these, commenced the first truly international daylight bombing raids in aviation history against England, bringing the war and its horrors home to the previously impervious citizens of the Sceptered Isles. Aces and “fighters” emerged as a genre, relegating the plodding but vital observation aeroplanes to “also-rans.”

The storied, huge Zeppelin airships of WWI, with all of their inherent flaws, struck fear of “strategic bombing,” as it came to be known, into the hearts of even the most remote elements of society, while the courage and discipline of their crews—especially those “fighting top” gunners out in the slipstream—is now all but forgotten, a form of aerial warfare never repeated.

When all is said and done, the militarists who had been actively preparing for the European conflict which they flung onto the world in August 1914 had envisaged a short campaign designed to overcome, fairly easily and quickly, a largely unprepared enemy. In truth, with but 246 aircraft of all kinds, the actual German use of aircraft had scarcely been considered.

But when the Germans' initial, spectacular advances were halted, then stubbornly resisted—an achievement to which the intelligent use of aerial reconnaissance by the Allies had contributed in no small measure—some members of the German Imperial Staff finally started to think seriously about their rather casual organization of air power.

The Germans' more serious thinking resulted in aviation legacies like the Eight Air Combat Maxims, which can be examined in our J. Elroy McCaw Personal Courage Wing. And as I walk through our Personal Courage Wing, I remember my grandfather. He did not think badly of the aviators swirling over his head in 1918—indeed, he was thankful they were there. He had very little comprehension of how they did it all. But he did envy them their clean sheets (he was sure they had nice beds), tidy uniforms, and successes with the fairer sex in Paris at the end of the day. Some things never change.

To see more archival images from the Museum's Digital Collection visit: [mof.omeka.net](http://mof.omeka.net)



Soldiers attaching an aerial reconnaissance camera to a Farman F.40 biplane (labeled “13” on its fuselage). The camera is roughly five feet long and has a special mount on the front of the aircraft. France, circa 1918. THE MARC A. LAGEN COLLECTION/THE MUSEUM OF FLIGHT



Oblique aerial image of the HMS Furious painted in razzle dazzle camouflage. A SSZ (Sea Scout Zero)-class airship is tethered to the aft deck and a Sopwith Camel 2.F.1 Ship Camel biplane (fuselage number XZ4) parked on the foredeck. THE JOHN SYLVESTER WHEELWRIGHT COLLECTION/THE MUSEUM OF FLIGHT



A group of American and French pilots in front of a Voisin 3 Type LA biplane, photo from the Edward I. Sproull Photograph Album. THE EDWARD I. SPROULL PHOTOGRAPH ALBUM/THE MUSEUM OF FLIGHT



# 2018 SPACE EXPO

FRIDAY & SATURDAY  
NOVEMBER 2-3

SPACE  
ART &  
TECH

EXPLORE THE  
INTERSECTION  
BETWEEN SPACE, ART  
AND TECHNOLOGY

LEARN MORE AT  
[MUSEUMOFFLIGHT.ORG/  
SPACEEXPO](http://MUSEUMOFFLIGHT.ORG/SPACEEXPO)

## SCHEDULE

FRIDAY, NOV. 2 - 5:30 TO 9 PM

### EVIDENCE OF SPACE EXPLORATION...ON EARTH

Join us for a cocktail reception, lecture and book signing with photographer and author Michael Soluri as he presents his series "Evidence of Space Exploration...On Earth." Michael will reveal the context of the craft, labor and humanity of the New Horizons mission to the Pluto system, the sun-bound Parker Solar Probe and the last space shuttle astronaut crew to train and repair the Hubble Space Telescope. **TICKETS: \$15 GENERAL | \$10 MUSEUM MEMBERS**

SATURDAY, NOV. 3 - 11 AM TO 3 PM

### SPACE EXPO ACTIVITIES, DEMOS, VR AND PANEL LECTURES

Meet top names in the arts and sciences of space to celebrate all things out of this world. Learn about space exploration from those who do it, those who photograph it, and experience it for yourself. **INCLUDED WITH MUSEUM ADMISSION**

SATURDAY, NOV. 3 - 5:30 TO 8 PM

### MARS DIRECT: HUMANS TO THE RED PLANET WITHIN A DECADE

In the 1990s, Dr. Robert Zubrin proposed the "Mars Direct" mission architecture, using conventional rockets and Mars in situ resources to establish a sustained human presence on Mars. Now with interest in Mars at an all-time high, the "Mars Direct" plan is more relevant than ever! Learn about this cost-effective approach that is possible to achieve with current technology. Also featured will be demos of the MarsVR Program, a virtual reality tool for serious research and advancement of the exploration of Mars. **TICKETS: \$15 GENERAL | \$10 MUSEUM MEMBERS**

## MUSEUM MUSINGS

# 50 years SINCE APOLLO 8

BY: GEOFF NUNN, ADJUNCT CURATOR FOR SPACE HISTORY



**50 YEARS AGO THIS DECEMBER**, the crew of Apollo 8 became the first people to fly around the Moon and the first to look back at the Earth from another celestial body. Cmdr. Frank Borman, Command Module Pilot Jim Lovell, and Lunar Module Pilot Bill Anders launched aboard the Saturn V rocket on December 21, 1968. Their six-day journey carried the astronauts to lunar orbit where they circled the Moon 10 times before returning to Earth on December 27.

Apollo 8 was viewed by many as a globally unifying accomplishment at the end of a very tumultuous year. The United States was embroiled in the Vietnam War. In January, the North Vietnamese launched the Tet Offensive, beginning one of the bloodiest periods of the conflict. U.S. troop deployments peaked at 541,000 individuals. Students around the world demonstrated for social reform, clashes between police and demonstrators were common, and often turned violent. The assassinations of Martin Luther King Jr. and Senator Robert Kennedy punctuated the sense of division and despair shared by so many around the globe.

Despite the endless chaos on the nightly news, the Space Race moved steadily on. After

losing three astronauts in the tragic Apollo 1 fire the year before, NASA was getting the space program back on track. Apollo 8 was originally supposed to be a test flight of the lunar module in Earth orbit. Then U.S. Intelligence began hearing reports that the Soviet Union might try to send cosmonauts around the Moon late in the year. The reports, combined with delays in the design and construction of the lunar module, and a desire to boost morale at NASA prompted the agency to switch to the more ambitious trip to lunar orbit.

Apollo 8 reached lunar orbit on December 24, 1968. There, the astronauts took photos of the surface, and delivered a live Christmas Eve television broadcast from the Moon. Mission Commander Frank Borman recalls that they received little instruction for the program other than to "do something appropriate." The crew decided to take turns reading the Christian version of the creation story from the book of Genesis. They made the selection because versions of the story can also be found in the texts of the other Abrahamic religions, Judaism and Islam. The crew recognized that they were representing the whole world in their achievement, and offered

a message that would resonate beyond the United States. *TV Guide* reported that one-in-four people worldwide watched or heard the astronauts' broadcast from above the Moon.

This year, the Museum will dedicate our annual holiday tree to the 50th anniversary of Apollo 8, and the many achievements that followed in the years to come as the astronauts of Apollo first set foot on the Moon.

## ICONIC EARTHRISE

The famous photo "Earthrise" taken during the mission provided an image of our planet from deep space, without borders. The frame captures the location of every event in human history, and of every human then alive, except the three astronauts of Apollo 8.

Turn the page to see this iconic image.

ABOVE: The crew of Apollo 8 (left to right) James A. Lovell Jr., Command Module Pilot; William A. Anders, Lunar Module Pilot; and Frank Borman, Cmdr. (NASA)





THE APOLLO 8 CREW TOOK THIS INFAMOUS PHOTO, "EARTH RISE" AROUND 10:40 A.M. HOUSTON TIME ON THE MORNING OF DEC. 24, 1968. (NASA)





**MUSEUM MUSINGS**

During the early 1990s Armstrong hosted the cable series, *First Flights*, where he traveled to airports large and small to fly airplanes of all types. At left he's at a California gliderport, eager to begin a flight in an ASK-21 sailplane that's not too different from the Museum's DG-500 Perlan.

TED HUETTER

# The First Man Was a Pilot First

BY: TED HUETTER, SENIOR MANAGER PUBLIC RELATIONS AND PROMOTIONS



NASA

AS WE APPROACH THE 50TH anniversary of Apollo 11 and wonder how in the world we got to the Moon, let's erase the lines between the histories of aviation and spaceflight. The Apollo astronauts were all pilots. It was a NASA rule back then. Pilots flew the Mercury, Gemini and Apollo missions. The Neil Armstrong biography, *First Man: the Life of Neil A. Armstrong*, and now its movie adaptation, make it clear that the "first man" was a pilot first—and foremost.

Flying was Neil Armstrong's passion, and he brought all of his experience to the surface of the Moon. With that in mind, we can see that the Museum's history of the Moonshot doesn't begin in the space galleries, it only culminates there. The rest of the story is all around you.

Armstrong's descent to the surface of the Moon began with his first solo flight. It was 1945 and he was 15, flying an Aeronca Champ, a 65 hp two-seat, tube and fabric plane not very different from the Museum's World War II Aeronca L-3B. He became a naval aviator in 1950 after training in the North American SNJ, which is the Navy's name for the T-6 Texan

(our own Texan is at the Restoration Center). During the Korean War, he flew combat missions in Grumman's first jet fighter, the F9F Panther. The Panther was the straight-wing version of the Museum's F9F-8 Cougar.

In 1955 Armstrong moved to the Mojave Desert to be a test pilot with NASA's predecessor, the National Advisory Committee for Aeronautics (NACA) at Edwards Air Force Base. Perfect timing. The skies of the Right Stuff were filled with a breathtaking variety of new supersonic fighters and experimental research aircraft. NACA and NASA research pilots (the agency's preferred term for test pilots) were expected to be proficient in them all, including the support planes.

The NACA became NASA on Oct. 1, 1958, and the research flights didn't miss a beat.

Still in his twenties, Armstrong flew the agency's modified P2B-1S mothership (Navy variant Boeing B-29; see our B-29 in the Aviation Pavilion), Douglas RF-4D (Navy variant DC-3 in our Great Gallery), North American F-51D (P-51D, Personal Courage Wing), plus the North American F-86 and Lockheed F-104 (Great Gallery). And those were

just the planes used to support research flights!

Armstrong's research flights put him in the cockpits of jets like the Boeing B-47 (Aviation Pavilion) and McDonnell F-4 (Great Gallery). He also had some time in the X-5, a swing-wing experimental plane that paved the way for the Grumman F-14 (Aviation Pavilion).

At age 30, Armstrong became the seventh pilot to fly the greatest rocket plane of them all—the North American X-15. He logged seven flights during the next 20 months, with missions over 200,000 in altitude and nearly 4,000 mph. In the meantime he flew really low and slow with NASA's pioneering parawing hang glider, Paresev (ultralights, Restoration Center). And using a Douglas F5D, he developed emergency glide-flight profiles for the proposed Boeing X-20 Dyna-Soar spaceplane (X-20 wind tunnel models, APOLLO and Tower exhibits). Speaking of soaring, in his spare time Armstrong was an avid glider pilot (the Museum's modern gliders are similar types).

In 1962 Armstrong left Edwards to be an astronaut. And then he flew spacecraft, too.

**CALENDAR OF EVENTS**

# November

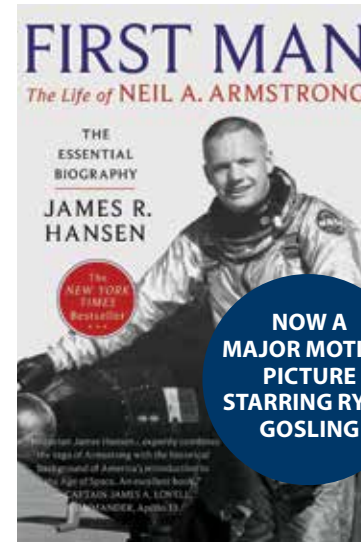
**SPECIAL EVENT**

## First Man: The Life of Neil A. Armstrong

Join us for a reception, lecture and book signing with James Hansen, who wrote *First Man*, the only authorized biography (now a major motion picture) on the life of America's most famous astronaut, Neil Armstrong—the man whose "one small step" changed history. And see the *Behind the Scenes of First Man* exhibit on display until Dec. 20.

**TICKETS: \$20 GENERAL | \$15 MEMBERS**  
Purchase online at [museumofflight.org](http://museumofflight.org)

**T.A. WILSON GREAT GALLERY**  
Thursday, Nov. 29 | 5:30 to 9 p.m.



**FAMILY EVENT**

## Wells Fargo Free First Thursday Astronomy Night

This month's Free First Thursday is all about space and astronomy! Join us for all kinds of fun, themed activities like creating the first Mars habitat using 3D printing pens and learn about the effects of lower gravity all hosted by our Challenger Learning Center. Local science and astronomy clubs will share their knowledge of the heavens with viewing opportunities through their telescopes (weather permitting). And so much more! Remember, admission is FREE!

The Museum Store and Wings Café will also remain open for extended hours.

**MUSEUM-WIDE**  
Thursday, Nov. 1 | 5 to 9 p.m.



**SPECIAL EVENT**

## NASA Mars Insight Landing Livestream

Come watch the landing of NASA's Mars Insight spacecraft via livestream, with live commentary from our own Space Curator and NASA Solar System ambassador, Geoff Nunn.

**CHARLES SIMONYI SPACE GALLERY**  
Monday, Nov. 26 | 11 a.m. to 12:30 p.m.

**WEEKEND FAMILY WORKSHOPS**

## Fanciful Rockets

We will look at some of the elements that have inspired real life rocket design. Afterwards, help us demonstrate how they work by sending a turkey flying!

**T.A. WILSON GREAT GALLERY**  
Saturday and Sunday,  
Nov. 3-4, 10-11, 17-18, 24-25  
11 to 11:45 a.m. and 1 to 1:45 p.m.

**SPECIAL EVENT**

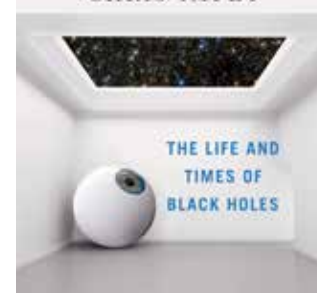
## Hobby Day Expo

Explore the world of hands-on hobbies as the NW Scale Modelers, the National Historic Miniature Gaming Society, and The Lake Sawyer Hawks Radio Controlled Airplane Club show off their creations.

**T.A. WILSON GREAT GALLERY**  
Sunday, Nov. 18 | 10 a.m. to 5 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 Nov. & Dec.** in the Charles Simonyi Space Gallery.



**SPECIAL EVENT**

## Town Hall Seattle & The Museum of Flight present Einstein's Monsters: The Life and Times of Black Holes

Distinguished Astronomer Chris Impey discusses *Einstein's Monsters*, his recent book that explores black holes and their historical role in theoretical physics from confirming Einstein's equations for general relativity to testing string theory. The discussion will be followed by a book signing.

**TICKETS: \$5 GENERAL**  
Purchase at [TownHallSeattle.org](http://TownHallSeattle.org) and at the door.

**WILLIAM M. ALLEN THEATER**  
Thursday, Nov. 15 | 7:30 to 9 p.m. (Doors at 6:30 pm)

BEHIND THE SCENES OF  
**FIRST MAN**  
OCTOBER 12 to DECEMBER 20

LEARN MORE ABOUT THE EXHIBIT ON PAGE 24



# December



**LECTURE**

## Native Vision

Learn about the experiences of Native Americans in the 1930's and 1940's through the eyes of Alice Benally, a young Navajo girl. This presentation includes a dynamic solo performance from Living Voices and archival film and sound to illustrate how Alice maintains ties to her culture while living in a government-run boarding school.

QUONSET HUT, FIRST FLOOR  
J. ELROY McCAW PERSONAL COURAGE WING  
Saturday, Dec. 1 | 11:30 a.m. and 1:30 p.m.



**SPECIAL EVENT**

## Lindbergh Electric Aircraft Flight (LEAF) Fly-Off

This engineering competition features students designing, building and flying electric aircraft. The LEAF Challenge is sponsored by Powering Imagination, Starfish Education, and the Pacific Northwest chapter of the American Institute of Aeronautics and Astronautics. Event takes place during Free First Thursday.

SIDE GALLERY  
Thursday, Dec. 6 | 5 p.m. to 9 p.m.



**LECTURE**

## Astronaut Maker

Join us for a conversation with George Abbey, former director of the NASA Johnson Space Center, and his biographer as they discuss the 39-year career of a largely unknown figure who made essential contributions to the Apollo missions and the Space Shuttle. A book signing follows the presentation. *Astronaut Maker: How One Mysterious Engineer Ran Human Spaceflight for a Generation* will be available for purchase in the Museum Store.

WILLIAM M. ALLEN THEATER  
Saturday, Dec. 8 | 2 to 3:30 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 Simonyi Space Gallery, Aviation Pavilion and more from 5 to 9 p.m., courtesy of Wells Fargo. The Museum Store and Wings Café will also remain open for extended hours.

MUSEUM-WIDE  
Thursday, Dec. 6 | 5 to 9 p.m.

**WEEKEND FAMILY WORKSHOPS**

## First Flight

They are the most famous brothers in the history of aviation: Wilbur and Orville Wright - inventors of the airplane. Come hear about their first airplane flight in December of 1903, and make a model of the Wright Flyer!

T.A. WILSON GREAT GALLERY  
Saturday and Sunday,  
Dec. 1-2, 8-9, 16  
11 to 11:45 a.m. and 1 to 1:45 p.m.

## Winter Family Fun

Gliders, flying snowmen, robots or rockets - what will it be? Join us for winter themed aerospace and aviation activities during the holiday break. \*The Museum will be closed on Dec. 25.

T.A. WILSON GREAT GALLERY  
Saturday through Sunday,  
Dec. 22-30 | 10 a.m. to 2 p.m.



**SPECIAL EVENT**

## Santa's Landing Party

Our annual holiday party begins with Santa and Mrs. Claus arriving in an airplane at 9:45 a.m.! They will hear children's wishes in the Museum while the Boeing Concert Orchestra and Boeing Band provide holiday music. Enjoy festive family workshops, too!

PARKING LOT AND T.A. WILSON GREAT GALLERY  
Saturday, Dec. 15 | 9 a.m. to 2 p.m.











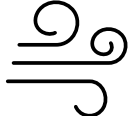
Outdoor event FREE, indoor events included with Museum admission



# Junior Aviators

## Air Travel Rebus

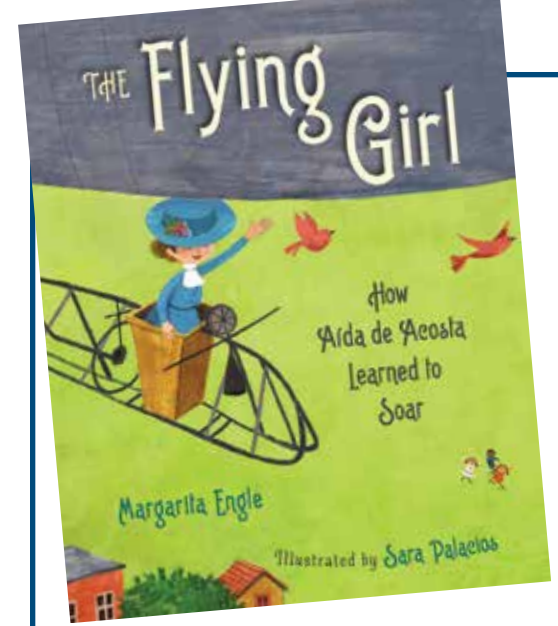
A rebus is a puzzle in which words are represented by combinations of pictures and letters. Try to decipher what words are represented below. Can you solve all 7? Answers on this page.

-  +  = \_\_\_\_\_
-  +  = \_\_\_\_\_
-  +  + **R** = \_\_\_\_\_
-  +  = \_\_\_\_\_
- D** +  = \_\_\_\_\_
-  +  = \_\_\_\_\_

**TOY FROM THE COLLECTION**

## Little Miss American Airlines Stewardess Set, circa mid-1950's

**WELCOME ABOARD!** The Little Miss American Airlines Stewardess kit gave children the chance to dress up and play pretend while learning about air travel. With the growth of commercial aviation in the 1950's, there were more opportunities for young women to become stewardesses. Released by American Airlines and Venus Paradise, the kit contains an American Airlines Stewardess hat, ring and wings pin, in-flight service items, and a "certificate of qualification." The set also includes a booklet, "Welcome Aboard" which is about how planes fly, along with a "How to Play Little Miss Stewardess" instruction manual. The manual provides a narrative to re-enact, which begins with helping passengers to board the plane, then serving them lunch, and finally arriving safely in sunny California. This playset was donated to the Museum in 2004 by Dan R. Stumpf.



**BOOK RECOMMENDATION**

## The Flying Girl: How Aida de Aeosta Learned to Soar

BY: MARGARITA ENGLE  
ILLUSTRATED BY: SARA PALAEIOS

**DON'T EVER LET ANYONE** tell you what you can't do! Aida, a young girl growing up on a lively Paris street, sees something that would change her life forever: an airship flying in the sky. From that day on, she knew she wanted to fly. When Alberto, the inventor of the airship, invited her to be a passenger, Aida refused—she would rather be flying the air ship. Although no woman or girl had ever flown before, she was not discouraged.

Available for purchase in the Museum Store and online at [museumofflightstore.org](http://museumofflightstore.org).

Answers to Air Travel Rebus: seatbelt, runway, dreamliner, engineer, delay, train/ind.



THE MUSEUM OF FLIGHT COLLECTION



# Behind-the-scenes of Air Traffic Control at Boeing Field

BY: IRENE JAGLA, CONTENT MARKETING MANAGER



◀ The Standard Terminal Automation Replacement System (STARS) is the radar feed for Boeing Field's airspace. It's been a critical tool in the Tower for over seven years and allows controllers to locate aircraft when they land, depart, or transition within a 60-mile radius of BFI airspace.

The steady hiss of air conditioning and murmur of fuzzy radio transmissions filled the air as tiny blue blips—planes flying within the Boeing Field's airspace—danced across two large radar screens in the Tower's air traffic operations center. On this hazy August afternoon, you could see Beacon Hill to the east, the Seattle skyline to the north, and traffic crawling along I-5.

But the five air traffic controllers (ATCs) on duty weren't interested in the views. They were too busy monitoring air space and intoning strings of letters and numbers over headsets to incoming and outgoing planes, occasionally using a pair of binoculars to get a closer look at what's happening on the runway.

"That's Warren Buffet," one of the controllers announced.

"How do you know?" I asked.

"There's only a few people in the world who can afford that," he responded, pointing to the \$60 million Bombardier Global Express that just touched down on the runway underneath us.

Aside from these quick, quiet conversations, the scene inside the Boeing Field/King County International Airport (KBFI) Tower cab was unexpectedly serene, and worlds away from the chaos you may have seen depicted in *Pushing Tin*, a 1999 dramedy featuring fast-paced dialogues and action sequences on airport runways. Rodney Lindbeck, air traffic control manager at Boeing Field, demystified some of these misconceptions when he took my colleague and I behind the scenes at KBFI (Boeing Field Air Traffic Control Tower) to explain what it's like being an ATC and how their work ensures that your travel plans go smoothly this holiday season.

During our tour, we learned that the 85-foot Boeing Field tower was built in 1952 and its design mirrors that of many other air traffic control towers: administrative offices on the lower floors, breakrooms and quiet areas on the middle floors, and an operational control tower

at the very top where all the action happens. This is where radar screens of all sizes display data that the controllers constantly monitor: distance between true north and magnetic north; levels of fog, which determine the location of the clearest, safest points on the runway; the location and speed of incoming and outgoing planes. All of these operations are made possible by machines that are, to put it mildly, outdated. But the clunky, beige legacy systems are getting the job done and Lindbeck has navigated through the FAA's bureaucratic approval processes to replace some of the outdated technology with newer, digital systems like the Surface Weather System (SWS) automated wind indicators along with altimeter readings, and a Standard Terminal Automation Replacement System (STARS) radar display that tracks weather and aircraft.

This modernization process is part of why Rodney loves what he does, and his ability to move such projects forward stems from a passion for air traffic control and a dedication to his team. "I wanted to be able to make changes and help younger people come along in this career field. I have so much passion for this job," said Rodney, who has been working in air traffic control since he was eighteen years old. "I love to develop these younger people who will take over my position one day. The best part is growing and building a team."

So, who are the young ATCs that constitute his team? On the day I visited, the men behind the controls seemed super laid back, and I asked Rodney if this is indicative of the kinds of people who are drawn to air

*"That's Warren Buffet."*

*"How do you know?"*

*"There's only a few people in the world who can afford that."*



TEST1	1547	KBFI	+ TOAMA SEA146051 KLAX+		
GLF5/L	P1940		KBFI TAOMA J5 SUMMA KLAX		
757	150				

▲ This is an example of a flight progress strip, used to track a flight.

traffic control. “It’s a spectrum of personality types,” he replied. “Mainly type A, but some can be laid back. The people who succeed are those who are on their game and love adrenaline. They are focused, passionate and can take constructive criticism.”

And yes, they are good at math. “It’s the math they told you that you’d never use after high school,” joked one of the controllers. Rodney’s team routinely predicts a plane’s landing time based on its speed and distance from the tower—no calculators needed.

In addition to math skills, ATCs need to have excellent memories in order to internalize all the information necessary to talk to airplanes. The source of this information is FAA Order 7110.65 version X, what Rodney jokingly calls “the Bible” of air traffic control because of its immutable rules. “Between two 737s you always need 3 miles of separation, that will never change,” said Rodney. This consistency is helpful for controllers who relocate to other towers. “Once you have the book down, it’s down to deleting what you previously knew, in terms of airspace and airport dimensions, and rewiring your memory for your new place.”

This process of deleting old information and learning anew can be made more difficult based on the kind of traffic that an airport monitors. SeaTac, for example, has a fairly homogenous repertoire of large commercial and cargo jets entering and exiting its airspace; KBFI,

on the other hand, deals with both incredibly large planes and smaller private planes. “We have lots of different kinds of airplanes to blend in,” said Rodney. This complexity means that you need more separation between aircraft. “If you put a Cessna 152 behind a 737, you will need more spacing because there’s going to be turbulence. A Cessna 182 coming into Boeing Field normally only does 70-80 knots on final; but, if you have a Gulfstream behind that airplane, they normally do 200 knots, so you have to space them out and make sure to move them to smaller runways or be more creative.”

During their busiest seasons, Boeing Field sees about 700 to 750 operations (either a take-off or a landing) each day and SeaTac boasts over 1,400 operations daily. But no matter where ATCs are based, it’s their creativity and ability to stay cool under pressure that allows us to travel safely and efficiently. And wherever you’re flying this holiday season, Rodney and his team—along with air traffic controller everywhere—are looking out for you. “Know that when you’re flying to see loved ones that we are in control and we will keep you safe,” said Rodney. “Have confidence in us and we will get you where you need to be.”

PREVIOUS: A south view of Boeing Field from the Air Traffic Control tower. BELOW: Three of the four ATCs working the daytime shift.



THE MUSEUM OF FLIGHT



THE MUSEUM OF FLIGHT

◀ Library volunteers Ed Davies (left) and Steve Ellis (right) perform a myriad of tasks, like examining acquired books, periodicals, and technical material, and screen for duplicates and screen before Museum staff catalog them.

## VOLUNTER PROFILE

# The Library Volunteers

BY: STEVE DENNIS, VOLUNTEER

**THE MUSEUM OFFERS VISITORS** a world class collection of historically significant air and space artifacts. But there is more to our collections than meets the casual visitor’s eye.

Tucked away near the Charles Simonyi Space Gallery is the Harl V. Brackin Memorial Library, home to over 90,000 books and periodicals and 18,000 aircraft manuals and technical reports. While not as flashy as the Great Gallery, the library makes an important contribution to the Museum’s mission as a resource for researchers, aviation enthusiasts, students, model makers and authors.

With a small staff, the library depends on volunteers to perform a myriad of tasks. Volunteers, like Ed Davies and Steve Ellis, examine acquired books, periodicals and technical material, screen for duplicates and forward them for cataloging by Museum staff. The more detail they can input, the better the search results for library users. It is important work because the library is not just about collecting “stuff”—it’s about making the collection accessible.

85-year-old Ed Davies has volunteered

in the library for 20 years. With an interest in aviation history, Ed describes working in the library as being like a “kid in a candy store.” Ed’s early interest in the Douglas DC-3 (aka C-47) has made him the local expert for researchers interested in the venerable plane and its variants.

“Every day I learn new things working with the other volunteers and people like Dennis Parks and Dan Hagedorn, our former Curators,” says Ed.

Volunteer Steve Ellis, who boasts 16 years in the library, agrees: “Every day is a learning day.” Steve believes he’s handled over 20,000 books during his library time, shelving returned items and “shelf-reading” books to ensure that the catalog descriptions are correct. He is currently filing miscellaneous items in the aircraft and technical files. Some of the magazine and newspaper articles date back to World War I.

Steve likes to share his knowledge with Museum visitors outside the library as well by working as a Sunday docent and an interviewer with the Oral History program.

Between them, Steve and Ed have contributed 11,700 volunteer hours: Davies with 4,600 and Ellis with 7,100.

John Little, Assistant Curator, recognizes the value of seasoned volunteers like Steve and Ed. “We are not a lending library. When we receive a research request the staff and volunteers gather relevant material and make it available for review in our research center. The knowledge volunteers have of our collection means our guests see the right material,

delivered quickly,” says Little.

Chris Stanton, Supervisory Librarian, believes the library wouldn’t be able to provide the same level of service to library users without the efforts of the volunteers. “They help us to care for the collection and share our resources and knowledge with Museum visitors, researchers and the wider public. They are a critical part of the library team.”

Steve, Ed and the other library volunteers are an important part of the Museum’s cadre of volunteers, working behind the scenes to make the Museum a world class organization.



THE MUSEUM OF FLIGHT



THE MUSEUM OF FLIGHT



# BEHIND THE SCENES OF FIRST MAN



DANIEL MCFADDEN/UNIVERSAL PICTURES AND DREAMWORKS PICTURES

ON OCT. 12, THE MUSEUM PREMIERED A SPECIAL COLLECTION of costumes and properties used in the making of Universal Studio's blockbuster movie *First Man*. The Museum has been associated with *First Man* filmmakers and distributor Universal Studios since production started in 2017, and our new exhibit is a result of this partnership. *First Man* opened in theaters nationwide on October 12, 2018.

*First Man*, the movie based on James R. Hansen's book *First Man: The Life of Neil A. Armstrong*, is the first Hollywood feature about the global hero whose dangerous mission to the Moon and "small step" forever changed humanity's bonds with Earth and space.

Neil Armstrong developed a close kinship to the author of his biography, who serves as a co-producer on the film, which allowed the production to move forward. "Neil thought that as long as we followed the blueprint that Jim provided, he was comfortable with us making this film," says *First Man* producer Wyck Godfrey.

Academy Award winning director (*La La Land*) Damien Chazelle, Academy Award winning screenwriter (*The Post*, *Spotlight*) Josh Singer and *First Man's* stellar production team, cast and crew collaborated with Armstrong's family, his biographer, NASA, Apollo engineers and Apollo astronauts to make an authentic and gripping portrayal of the astronaut's personal and immeasurably public journey. The film stars Ryan Gosling and Claire Foy. *Behind the Scenes of First Man* runs through December 20. See it before it's gone!

## BLACKBIRD TIP-TO-TAIL TOURS

The holidays mark the return of a perennial favorite: Blackbird Tip-to-Tail Tours. Explore stories and technical details of the Museum's remarkable M/D-21 in these special hour-long tours offered only during the week between Christmas Day and New Year's Day.

December 26 through January 1, 2019  
11 a.m. and 2 p.m. daily

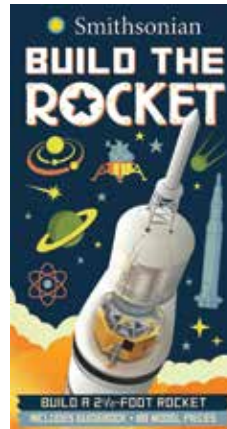


MUSEUM STORE SUNDAY BE A PATRON



ENJOY 25% OFF ALL STORE PURCHASES

NOV. 25



25% OFF

ANY MUSEUM MEMBERSHIP LEVEL

DEMOS & FREE GIFT WRAPPING!

# AIRFIELD NOISE

The Museum's **BOEING FIELD LOCATION** is considered ideal for plane spotting, but this wasn't always the case. 50 years ago, putting a museum on a working airfield was considered an inappropriate use of valuable property. The Museum's founders were understandably faced with delays, financial hurdles and official red tape. But early Museum proponents had an ambitious vision of incorporating airfield dynamics into visitors' experiences on the site where the region's first flight occurred. Ultimately, former Governor John Spellman and other King County officials decided to take a chance, resulting in a new model of immersive aerospace education that impacted museums across the U.S. When asked how to deal with noise at an airfield, a Museum representative simply said, "We have no issue, as the **SOUNDS OF THE AIRFIELD ARE PART OF THE REAL-WORLD AVIATION DYNAMIC.**" Read the full story in *For Future Generations*, available at the Museum Store and online at [museumofflightstore.org](http://museumofflightstore.org)



## GIFT THE MOON AND THE STARS

Purchase a gift membership to The Museum of Flight this holiday season, featuring exclusive access to the traveling exhibition *Destination Moon: The Apollo 11 Mission* (coming April 2019) and receive \$10, \$15, or \$20 off!\*

\*Receive \$10 off Navigator level, \$15 off Aviator level, and \$20 off Captain level. Offer valid Nov. 1-Dec. 31 2018. Orders must be placed by December 15th for guaranteed holiday arrival. Purchase online at [museumofflight.org/Membership](http://museumofflight.org/Membership), in person at the Museum, or by calling the Membership office 206.764.5711



## SOARING INTO TOMORROW

Make an Impact For Future Generations

Join the Museum's Legacy Challenge and make a bigger impact than you ever thought possible.



Leave a gift in your will or living trust (and let us know).



A \$5,000 matching gift is made in your honor to the area of your choice.



Impact future generations today.

Help secure the future of the Museum by notifying us of your intention today. Contact Sandra Dolese at 206-768-7199 or [sdolese@museumofflight.org](mailto:sdolese@museumofflight.org).



## Attention All King County Employees!

Did you know that the Museum is part of the **KING COUNTY EMPLOYEE GIVING PROGRAM?** By reading *Aloft Magazine*, you've already shown you're interested in all the awesome action that happens at the Museum. Want to help make your Museum even MORE AWESOME? Grab your KCEGP materials and pledge the Museum with the **FOUR DIGIT CODE 9582**. Thank you for making the Museum a truly inspiring experience!





**POWER OF GIVING**

# Helping Amateur Aviators Take Flight

BY: JEAN PICHA-PARKER, MAJOR GIFTS OFFICER

*Brothers Ben and Marty Ellison have been a familiar sight at the Renton Airport for more than three decades, and their company, Ellison Fluid Systems, was based in one of the airport's hangars. As they look to conclude their era of business at their long-time home, the Ellisons remain invested in aviation's future and look to the Museum as a way to continue making a difference in their local aviation community.*

**B**oth are members of the Museum where Marty, who flew the Grumman A-6 Intruder in the Navy during the Vietnam War, has supported the Museum's project to build the *Vietnam Veterans Memorial Park*, set to open next year. "Project Welcome Home is of particular significance to me," says Marty. "Jim Farmer, a B-52 pilot, and I flew during Linebacker II, the last major battle of the Vietnam War. Together we 'serenaded' John McCain, Joe Crecca and other POWs with percussion instruments that helped bring peace in Vietnam and brought the POWs home."

After the war, the brothers' passion for aviation led them to establish their own company to build Ben's patented fuel injection device for small, amateur-built aircraft. The Ellisons also rented out 24 tee-hangars at the

Renton Airport for other aviation enthusiasts. "Ben has always been passionate about small airplanes and the people who fly them," says Marty, a pilot who flew with Western/Delta Air Lines for 28 years. Ben, a mechanical engineering graduate from Washington State University, became a propulsion engineer at Pratt & Whitney and Garrett AiResearch. He later developed products for amateur aircraft builders.

Renton Airport has also been the home of Ben's innovative creation, the well-known amphibious aircraft the "Gweduck," named after a Pacific Northwest clam. Teaming up with Ross Mahon and his father Bryan Mahon, Ben set out to build a composite reproduction of the Grumman G-44 Widgeon, a twin-engine amphibious aircraft used by the U.S. Navy and Coast Guard during World War II. Ben



ABOVE: The Gweduck in flight over Puget Sound. LEFT: Brothers Ben Ellison (left) and Marty Ellison (right) pose in front of the Gweduck created by Ben. The Gweduck is named after the famous Pacific Northwest clam. (COURTESY MARTY ELLISON)

designed this state-of-the-art Gweduck with the Mahons, talented aviation craftsmen - and Charter Members of The Museum of Flight. Together, they used modern technology, materials and methods. After 19 years, from conception to the first flight, the Gweduck took off on May 2, 2009 over the Puget Sound. Today, it flies the skies of the Pacific Northwest, frequently pressed into action ferrying friends and family to wherever the Ellisons have dropped their boat's anchor.

With all his years of experience building and maintaining aircraft, Ben knows how valuable hands-on experiences can be, especially for students interested in pursuing careers in aviation. As the Gweduck transitioned into flight testing, he engaged engineering students from Washington State University and the University of Washington to create an onboard data acquisition package to capture data channels during the flight test program. The collaborative team evaluated the Gweduck's flying qualities using computational fluid dynamics and studied water handling qualities.

By engaging students in immersive projects with real-world aviation, Ben shares his extensive knowledge with the next generation of inventors, aviators and engineers. "One of the most rewarding things I do today is to mentor students at the Raisbeck Aviation High School on the Museum's campus," says Ben. "Together with the Boeing Academy for STEM Learning, The Museum of Flight is a magnet for attracting students interested in engineering, aviation, and technical fields. They learn by doing practical experiments in aircraft takeoff performance, thermodynamics, and aerodynamics. It's just amazing."

## Tribute Gifts

### In Memory

**In memory of Robert C. Akers**  
*Steven and Linda Wilhoit*

**In memory of Walter A. Babinski**  
*Gregory Babinski*

**In memory of Robert C. Bale**  
*John and Nancy Bates*

**In memory of J.W. Bowman**  
*Mr. and Mrs. Jon Galt Bowman*

**In memory of Carson S. Buttles**  
*Kemp and Marsha Richardson*

**In memory of C. Donald Filer**  
*Denise and David Baker*  
*The Filer Family*

**In memory of Ronald W. Forrester**  
*Karl Eschmann*

**In memory of Frank A. Gould**  
*D. Bruce Kordenbrock*

**In memory of Clayton (Kelly) Gross**  
*Ramona Gross*

**In memory of Mary (Maebeth) E. Hanley**  
*G. William and Marjorie McCutcheon*

**In memory of Willis E. Hardy**  
*Marilyn Hardy*  
*Sandra Hardy-Reigel and Family*

**In memory of Sandra (Sandy) E. Higgins**  
*Financial Resources Group*

**In memory of Linda G. Hissong**  
*Dana Flanegin*

**In memory of Lowell Houtchens**  
*Marlene Taylor Houtchens*

**In memory of George M. Kau**  
*Peggy A. Kau (Margaret A. Kau)*

**In memory of Theodore (Dale) Moors**  
*Jeanne Larson*

**In memory of Kyren G. Richardson**  
*Dana Flanegin*

**In memory of Mr. and Mrs. Walter Anderson and Mr. and Mrs. Arnold Schwenk**  
*Estate of Beverly J. Schwenk*

**In memory of Leonard E. Sinisgalli, Sr.**  
*Leonard Sinisgalli*

**In memory of Edward W. Wells**  
*Laurie Jo and Roger Watt*

**In memory of Ridley C. Wilson**  
*Alan Cooper*  
*Dana Flanegin*  
*Bruce Florsheim*  
*Catherine Hall*  
*G. William and Marjorie McCutcheon*  
*John Purvis and Nancy Wright*  
*John and Sarah Roger*  
*Paul Stajduhar*

**In memory of Robert Worley**  
*Janet Worley*

### In Honor

**In honor of George C. Blood**  
*George Blood*

**In honor of Philip M. Condit**  
*Herbert Kelleher*

**In honor of William Deller**  
*First Baptist Church*

**In honor of The Detail Mafia**  
*Marlene Taylor Houtchens*

**In honor of David C. Temby's marriage to Peggy Van Hemert**  
*Ann vonPham*

## In Memoriam

Darlene A. Adams  
Frederick M. Aesquivel, Jr.  
Robert C. Akers  
Robert C. Bale  
William E. Baxter  
Donald G. Blasse  
Peter F. Bowen  
Charles L. Butler  
Carson S. Buttles

Victor N. Cabas  
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\*Card will be sent within three business days.



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On November 11  
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those who served and  
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# VETERANS DAY WEEKEND CELEBRATION

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### Events include:

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- An in-depth look at WWI Aviation Technology
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**Saturday and Sunday  
Nov. 10 & 11**

Join us for film screenings,  
presentations and musical  
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the sacrifices of war  
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