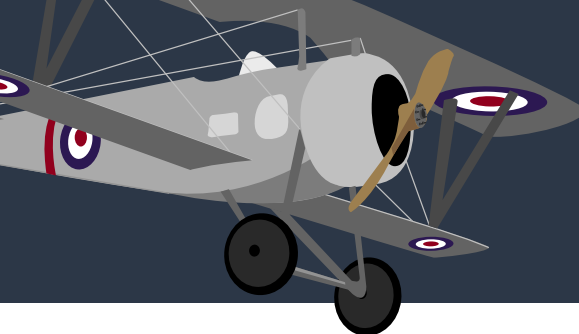


aloft

THE MUSEUM OF FLIGHT MAGAZINE



VOL. 41, ISSUE 1
JANUARY/FEBRUARY 2019



MEMBER EVENTS

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



EXCLUSIVE! MEMBER MOVIE NIGHT: *The Hitchhiker's Guide to the Galaxy*

See it again on the big screen!

Mere seconds before the Earth is to be demolished by an alien construction crew, journeyman Arthur Dent is swept off the planet by his friend Ford Prefect, a researcher penning a new edition of *The Hitchhiker's Guide to the Galaxy*. Join Arthur as he makes his way across the stars while seeking the meaning of life, or something close to it. *Family friendly. Rated PG-13. Snacks provided.*

WILLIAM M. ALLEN THEATER
Friday, Jan. 11 | Movie starts at 6 p.m.
Doors at 5:30 p.m.

RSVP required. To attend, email us at membership@museumofflight.org.

STEM starters

STEM Starters is a monthly program series geared specifically for 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.

ASTRO-LIFE! 4 sessions available!

Our January and February STEM Starters sessions will explore what it takes to become an astronaut!

Mondays, Jan. 14 and Feb. 11
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.

Space is limited to 12 adult/child pairs at each program. 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! MUSEUM MODELERS

During this model plane building workshop, families step into the role of an aerospace engineer and build a model of the Boeing B-17G.

Space is limited to 60 people.

FEE: \$8.35/model
Reserve your model online by Feb. 1 at museumofflight.org/MemberEvents

SOUTH VIEW LOUNGE, 2ND FLOOR
Saturday, Feb. 16 | 11 a.m. to 2 p.m.

NEW! MEMBER TRIVIA NIGHT

Test your aviation, space, and pop culture knowledge at our first ever trivia night! Come with a team or join one and compete for the honor of being a Museum of Flight Trivia Champ!

Questions include pop culture references to aerospace based movies, historical events, and Museum-specific trivia.

Light snacks provided.

SOUTH VIEW LOUNGE, 2ND FLOOR
Friday, Feb. 8 | 5 to 7 p.m.

RSVP required. To attend, email us at membership@museumofflight.org.



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.

NEW TO THE COLLECTION

Friday, Jan. 18 | Noon to 1 p.m.
NORTHWEST AERoclub ROOM
(RED BARN, 1ST FLOOR)

The Museum's Registrar Christine Runte will highlight a selection of donations made during the last half of 2018.

RARE AND UNIQUE ITEMS

Friday, Feb. 15 | Noon to 1 p.m.
NORTHWEST AERoclub ROOM
(RED BARN, 1ST FLOOR)

Our Collection contains a multitude of rare and unique items related to the history of aviation and aerospace, and you have a chance to view rarely seen materials from the Library and Archives.

EXCLUSIVE! *Under the Night Sky* Planetarium Experience

Learn about the Solar System you call home. Presented in our digital portable planetarium, we will explore constellations, planets, moons, and more while learning about the motions and interactions of these amazing celestial objects.

T.A. WILSON GREAT GALLERY
Sundays, Jan. 13 and Feb. 10 | 2 to 3 p.m.
Space limited to 30 participants per session.

RSVP required. To attend, email us at membership@museumofflight.org.

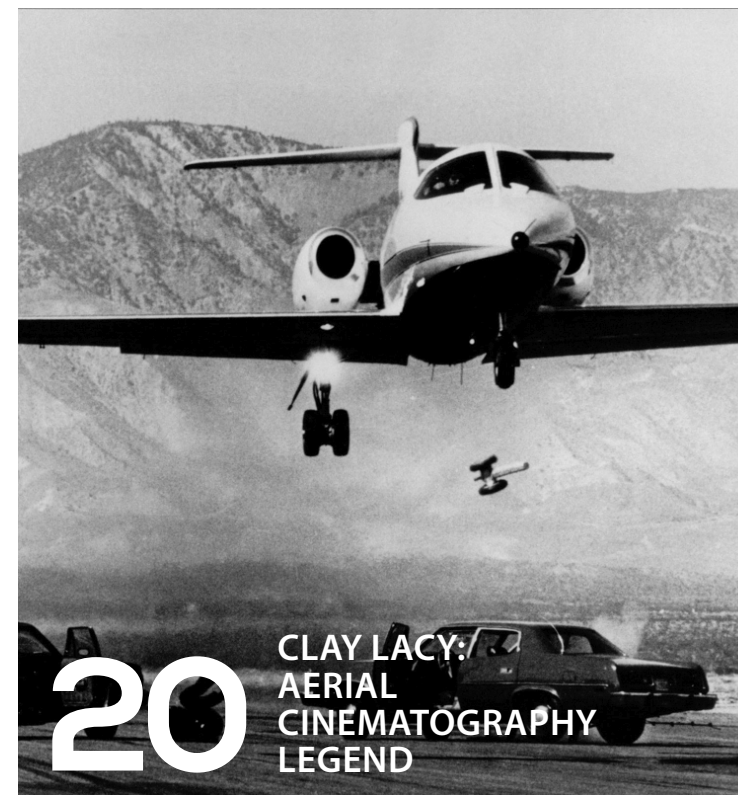
Suitable for ages 5 and up. Children must be accompanied by an adult. Participants must be able to sit on the floor for the duration of the program. Not recommended for those with mobility issues or motion sensitivities.

Contents

THE MUSEUM OF FLIGHT MAGAZINE

JANUARY/FEBRUARY 2019

CONTACT THE MUSEUM
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24-Hour Info Line: 206.764.5720



20

CLAY LACY: AERIAL CINEMATOGRAPHY LEGEND

ALOFT STAFF:

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Art Direction & Design: Julie Wilbert

Columnists: Steve Dennis, Louisa Gaylord, Amy Heidrick, Ted Huetter, John Little, Sean Mobley, Geoff Nunn, Christine Runte

Web Producer: Layne Benofsky

On the cover: In May of 1980, Clay Lacy used Astrovision to capture aerials for the movie, *Enola Gay: The Men, the Mission, the Atomic Bomb*. Here is a photo Clay took of the B-29 in a bank to peel off from his Learjet photo ship. (CLAY LACY AVIATION)

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



8

AND THE OSCAR GOES TO...



14

CENTERFOLD: BOEING 747

2	Member Events	17	January Calendar
4	Through His Lens	18	February Calendar
5	Museum Flashbacks	19	Junior Aviators
6	Curator's Corner	23	Museum News
7	Education Update	25	Volunteer Profile: Dale Thompson
13	Museum Musings: From Sputnik to Pixar	26	Power of Giving: Investing in the Future
16	Museum Musings: Looking Great at Fifty!	27	In Memoriam and Tributes

NOTE: The "Through His Lens" in the November/December issue incorrectly identified the plane in the photo as a Mooney. The plane is in fact a Bonanza.



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THROUGH HIS LENS

THE SCOPE OF WHAT THE MUSEUM COLLECTS and interprets is as broad and deep as the story of aerospace itself. In the last few years, we celebrated commercial aviation during the Boeing Centennial (2016), the amazing current advances in space (2017), and the awesome military machines and the heroic and yet often-forgotten veterans of the Vietnam War (2018). And in 2019, the Museum will display one of the most incredible artifacts humankind has ever created: the Apollo 11 capsule. Last seen in Washington in 1970, the *Columbia* will be at the Museum this summer on the 50th anniversary of the Moon landing.

But not to be lost between the 747s, New Shepards, B-52s, and Saturn Vs, is the small stuff that's just as important. The Montgolfier brothers' first balloon—and human flight—started 235 years of serene and tranquil flight like no other. General aviation took off in the 1930s and is the genesis of almost all pilots throughout history. Neil Armstrong didn't magically appear in the cockpit of the F-104 or the X-15; his flying began in high school in the humble Aeronca Champ, a plane similar to our Piper Cub pictured here.

Like Neil and hundreds of thousands of others, I started flying in an underpowered two-seat airplane. And like Neil, I was 16 and flying off of small airstrips surrounded by rural farms, and in planes propelled by 65 horsepower, not 7.5 million pounds of thrust. These humble aircraft are where it all begins in aviation and where it remains for the vast majority of pilots. But this is where the similarities between my flying experience and Neil Armstrong's come to a screeching halt.

So, the next time you are at the Museum admiring the Blackbird and F-4 Phantom, take a moment to gaze up at the Cub or the Fly Baby or Aeroncas overhead. I don't know who the next great pilot or astronaut will be, or what awe-inspiring aircraft or spacecraft they might fly, but I can all but guarantee that she'll start her career in "small stuff" like that.

Remembering the Humble Ones,

Matt Hayes, President and CEO



ARTIFACT IN FILM

Artifact: Air Force One Model

Film: *Air Force One* (1997)

Role: Used in filming the scenes where the modified Boeing 747 is flying the president.

On Display: Not on display

Details: 22 ft. long; wing span - 28 ft.



Credit: The Museum of Flight Collection, Donated by John E. McCaw, Jr.



Museum Flashbacks

TOP LEFT: David Williams showed more than slides at his lecture about famous pilot and hydroplane driver Mira Slovak: he brought a replica of the thunderboat Slovak raced for Bill Boeing, Jr. On display with it was Slovak's Bucker Jungmann biplane, flown from Spokane for the occasion by its owner Mark Schafhausen. • *First Man* author James Hansen captivated the audience with his lecture about "the astronaut as icon," while busting some popular myths about Neil Armstrong. • The 2018 Space Expo surely inspired new generation of space travelers. • Archivist Sarah Frederick documents the LEM model used in the movie *First Man*, and sent to the Museum for our *Behind the Scenes of First Man* exhibit. • An enthusiast crowd watched live Mission Control coverage of NASA's InSight Mars spacecraft when it successfully landed on the Red Planet in November. • Pilot Linda Finch was happy to be reunited with the Electra 10-E she flew around the world in 1997. She was here for an upcoming special Amelia Earhart edition of Travel Channel's *Mysteries at the Museum*, and had not seen the plane after she sold it decades ago. • NASA Chief Historian, Bill Barry, delivered a lively lecture about 60 years of NASA, with a focus on "things you might not know about NASA."

All photos by Ted Huetter.

A PLANE BY ANY OTHER REGISTRATION

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



THE MUSEUM OF FLIGHT

Q: DO ASTRONAUTS CREATE WATER IN SPACE? IF NOT, HOW DO THEY GET IT?

A: The answer is both yes and no. There are several processes that do create water in space, but the water is not currently sourced from space. During the Space Shuttle era, water was created as a byproduct of the Shuttle's fuel cells. Hydrogen and oxygen were used to generate electricity for the Shuttle's systems, and this process also created heat and water. During the early days of the International Space Station, excess water could be transferred from a visiting Shuttle for use aboard the station. Another way water is created in space is through regenerative environmental control systems. Aboard the International Space Station, waste water from washing and even astronauts' urine is recycled into clean drinking water. As we move to longer duration spaceflights, scientists and engineers are researching ways to source water from space in a process known as In Situ Resource Utilization, or ISRU. Basically, water ice could be collected from asteroids, the surface of the Moon, or Mars, and melted to produce drinking water, or split into hydrogen and oxygen to purify air, and provide rocket fuel. So far, no practical examples of ISRU have been conducted in space yet, but we are getting very close.

Q: DOES THE MUSEUM'S FOKKER DR.I TRIPLANE DEPICT THE MARKINGS OF ANY GERMAN PILOT?

A: The Dr.I's black-and-white markings do not appear to depict the aircraft of any particular German pilot. Even the dramatic Croix Pattée on the upper surface of the horizontal stabilizer appears to be purely hypothetical. Several years ago, one of the Museum's docents, Dr. Dieter M. Zube, Ph.D., sent photographs of the Museum's Dr.I reproduction to the Luftwaffenmuseum, in Berlin, where experts determined that the builder of the Museum's Dr.I, Dr. P. Richard Coughlin, D.D.S, of New York, probably combined the markings from several Dr.Is to mark his reproduction. Unfortunately, Dr. Coughlin passed away before we acquired his Dr.I reproduction from the Champlin Fighter Museum, so we couldn't ask him about the markings.

Q: I HAVE TWO PHOTOGRAPHS OF WHAT APPEARS TO BE THE SAME AIRPLANE, BUT THE AIRPLANE HAS A DIFFERENT REGISTRATION IN EACH PHOTOGRAPH. CAN THAT BE POSSIBLE?

A: First, a registration is to an aircraft what a license plate is to a car or a truck: it is the aircraft's official identification and is issued by the national government of the country in which the aircraft is registered. With that said, aircraft registrations can, and often do, change.

What's new in the collection?

BY: CHRISTINE RUNTE, REGISTRAR

WALT SOBOL WAS the father of donor Shirley Nelson. He was an aircraft welder for CAMCO, the Central Aircraft Manufacturing Company in China in the 1930s. Starting in 1933, CAMCO assembled aircraft at a factory in Hanzhou, China. Walt Sobol also worked at Loiwing on the China-Burma boarder and later in India. The collection consists of over 1,300 2.5 by 3.5 inch photographs and negatives. The collection is well organized in envelopes with additional information. The photographs include not only aircraft, but the people, region and activities of his time with the company, which provides an important context to the collection. This photograph collection illuminates a time and area not well documented in our current collection.



THE MUSEUM OF FLIGHT COLLECTION

For example, if an aircraft is sold to an owner in a different country, the aircraft must be re-registered in the new owner's country. If an aircraft is sold within a country, the new owner may elect to keep the current registration, or to re-register the aircraft. The aircraft that prompted this question was the Museum's Boeing 247D, which has carried the following registrations during its long life: NC-13347 (1933-1940); CF-BTD (1940-1941); CF-BTB (1941-1945); NC-13347 (1945-1951); T1-011 (1951-1954); N3977C (1954-1966); N13347 (1966-present).

HAVE A QUESTION?

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

The Museum in Japan

EDUCATORS FROM the Museum once again crossed the Pacific in partnership with Boeing, the Japanese Science Foundation, and this year also in collaboration with Flight of Dreams at Centrair Airport in Nagoya.

Our educators traveled to five sites throughout Japan over several weeks, bringing the Museum's STEM programming to rural communities, like a village in the Chiba prefecture an hour away from the closest train station. The Museum's informal learning approach provided the students with a contrast to their normal formal learning environment with the goal of inspiring young people to pursue careers in aerospace. Our Flying Gizmo show proved particularly popular. Robots and drones transcend language barriers, especially big drones shaped like the Millennium Falcon that go zooming over heads of excited school children.

Educators also spent time at Flight of Dreams at Centrair Airport, a new exhibition and retail space surrounding Boeing's first 787 (the Museum is home to the number three Boeing 787). Museum educators trained local Japanese educators on Boeing Academy for STEM Learning programs and teaching techniques which Centrair's own educators will conduct in their new "The Museum of Flight Learning Center," named in honor of our close collaboration.



Students in Japan crowd around as they participate in the Suited for Space program./THE MUSEUM OF FLIGHT

Michael P. Anderson Program Grows

THE MICHAEL P. ANDERSON MEMORIAL Aerospace Program, a Museum initiative to spark interest in STEM careers in middle school students from underserved communities named for Space Shuttle *Columbia* astronaut Michael P. Anderson, wrapped up a very successful season. Over 100 students from Cascade Middle School in White Center, Wash., took part in the new classroom branch of the program, where teachers and educators implement Museum-designed curriculum within their own classes at their own pace then visit the Museum for a capstone trip. Applications closed recently for the individual branch of the program, with students from 27 school districts across Washington State, from the Puget Sound region to Spokane, already submitting their paperwork to participate in the 2019 event.



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.

Alaska Airlines Aerospace Education Center Update

VISITORS TO THE ALASKA AIRLINES AEROSPACE Education Center, nestled by the nose of the MD-21 Blackbird in the Museum's T.A. Wilson Great Gallery, will find new interactive activities designed with curious learners in mind. Education staff teamed up with high school volunteers through our Museum Apprentice Program to bring more context to the activities in the AAAEC. The "Airplane Part Petting Zoo" is now part of a game which teaches players about the items on the touch table. The volunteers also designed a logic tree for a collection of touchable materials used to construct airplanes to help younger learners use reasoning to identify the materials by their characteristics.



Museum educators pose with Japanese Science Foundation staff./THE MUSEUM OF FLIGHT

AND
THE
OSCAR
GOES TO...

BY: AMY HEIDRICK, DIRECTOR OF COLLECTIONS

PHOTOS: THE DAVID D. HATFIELD COLLECTION,
THE PETER M. BOWERS COLLECTION AND THE MUSEUM OF FLIGHT



In February, Hollywood's finest will gather for the film industry's biggest event: The Academy Awards®, and the Best Picture winner will be the subject of countless debates. Ninety years ago this spring, the first Best Picture award went to *Wings*, a film about WWI that was released in 1927.

It tells the story of two American fighter pilots whose relationship transforms during the war, first becoming rivals vying for the affections of the same woman, and then reestablishing a friendship only to be tragically separated after a deadly aerial battle and a case of mistaken identity.

TOP: Actor Buddy Rogers in the cockpit of a Boeing-built Thomas-Morse MB-3 fuselage, which was affixed to a cart on a track in order to film a controlled crash scene.



THE DAVID D. HATFIELD COLLECTION/THE MUSEUM OF FLIGHT

LEFT: Famed stunt pilot Dick Grace flew many of the aircraft in *Wings* and was responsible for piloting the aircraft intentionally crashed in the movie. After the scene in which he crashed a Fokker on a set built near Leon Springs, Texas, it was discovered that Grace had broken his neck in three places during the crash!



THE PETER M. BOWERS COLLECTION/THE MUSEUM OF FLIGHT

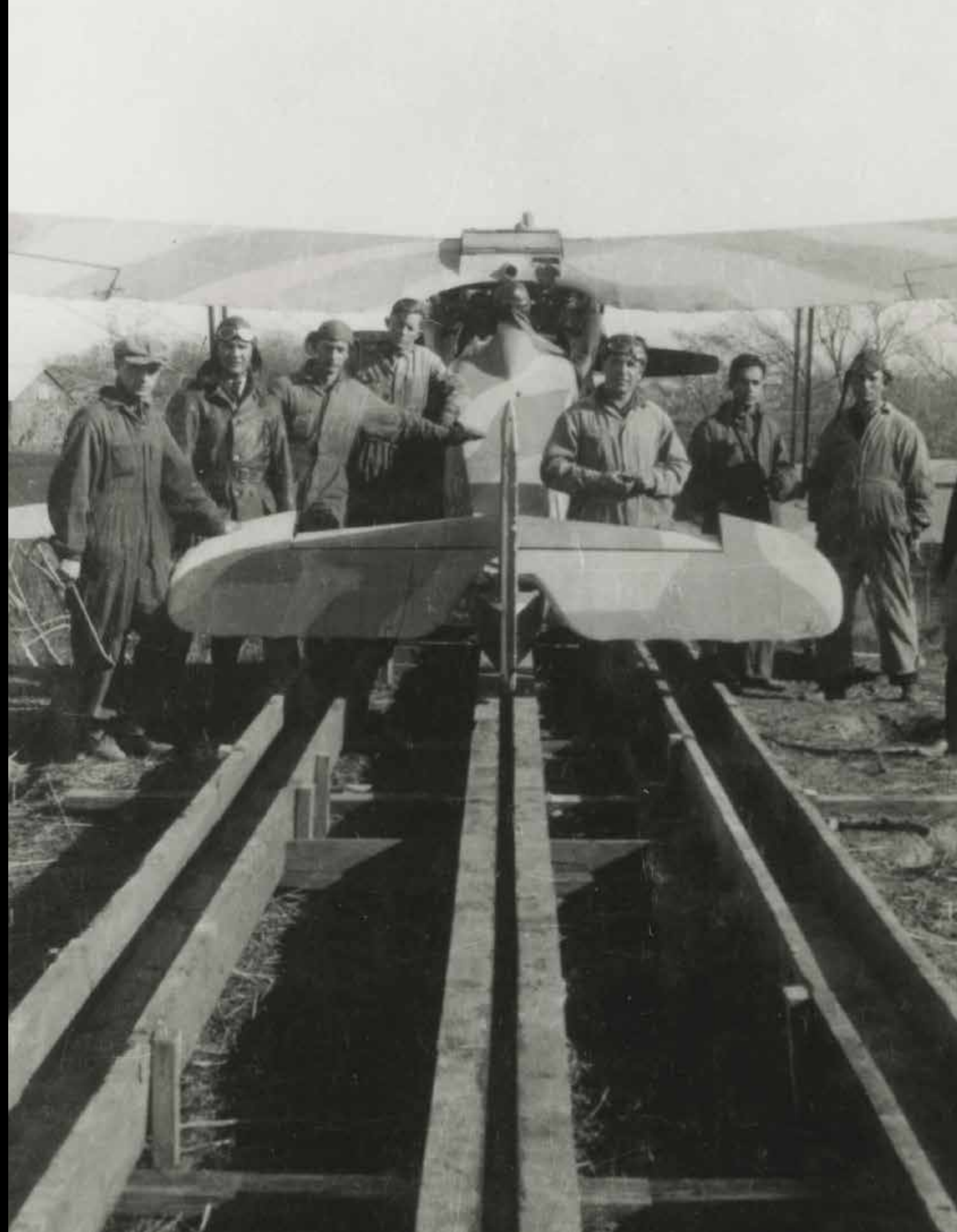
BELOW: Movie still of character Jack Powell (actor Buddy Rogers) after coming upon the wreck of best friend David Armstrong's (actor Richard Arlen, not shown) aircraft, and realizing that he was responsible for shooting his friend's plane down, after David stole an enemy aircraft.

OPPOSITE: Cast and crew of *Wings* surrounding a Boeing-built Thomas-Morse MB-3A, made to look like a French SPAD. The aircraft was mounted on a track to film a controlled crash sequence. (The David D. Hatfield Collection/The Museum of Flight)

PREVIOUS: Silent film stars Buddy Rogers and Clara Bow. (The David D. Hatfield Collection/The Museum of Flight)



THE DAVID D. HATFIELD COLLECTION/THE MUSEUM OF FLIGHT





THE PETER M. BOWERS COLLECTION/THE MUSEUM OF FLIGHT



THE PETER M. BOWERS COLLECTION/THE MUSEUM OF FLIGHT



THE PETER M. BOWERS COLLECTION/THE MUSEUM OF FLIGHT

Filmed just eight years after the end of the war, *Wings* captures realistic aerial combat scenes and crashes, the likes of which had yet to be successfully captured on film. Directed by William A. Wellman and shot over the course of nine months, *Wings* features nearly 300 pilots, actual war veterans, Boeing-built Thomas-Morse MB-3s and Curtiss P-1s painted in French and German markings, along with appearances by Curtiss JN-4 Jennys, De Havilland D.H-4s, and SPAD VIIIs. The film also includes a massive re-creation of the St. Mihiel battlefield, in which Wellman coordinated a ground battle with 3,500 local troops, with over 150 planes swooping overhead and a number of impressive coordinated explosions. *Wings* was an instant success, with the public and aviators alike dazzled by the realistic aerial combat and the heartbreaking story of friendship and love during the war.

It was the first—and only—silent film to receive the Best Picture award, until the mostly silent French film *The Artist* won in 2012.

TOP: Movie still from *Wings*.

MIDDLE: Movie still from *Wings*.

LEFT: A Curtiss P-1 flying over the re-created battlefield of St. Mihiel in *Wings*.



MUSEUM MUSINGS

GELTOOB



ARTIFACT IN FILM

Artifact: Gemini Capsule Model
Film: HBO miniseries *From the Earth to the Moon* (1998)
Role: Background piece for the Alan Bean Moon flight scene in Episode 7.
On Display: APOLLO Exhibit
Details: Boeing-built model; used in the Rogallo wing paraglider program for NASA.



Credit: The Museum of Flight Collection, Purchases

from SPUTNIK to PIXAR

BY: SEAN MOBLEY, DOCENT SERVICES SPECIALIST

PIXAR'S MUCH BELOVED FILMS, like *Toy Story* and *Finding Nemo*, may never have been made were it not for a few beeps from a Russian satellite in October 1957. As the 1950s wound down, the United States fell behind in the Space Race. More than a decade had passed since both the U.S. and U.S.S.R initiated their respective space programs, and when Sputnik launched in 1957 only the Soviets had visible success.

The launch reignited political interest in the U.S. space program and President Eisenhower injected creativity by introducing the Advanced Research Projects Agency (ARPA) in direct response to Sputnik. ARPA poured money into universities to create tech incubators to counter the Russian advances.

Jump ahead to the 1960s, when the University of Utah's Computer Science Department received funding from ARPA to focus on computer-generated (CG) graphics. Edwin Catmull, one of the first students in this program, found solace in Utah's computer graphics program, figuring his perceived modicum of artistic ability could still find an outlet in the fledgling world of CG.

After school, Catmull took a job as a programmer for The Boeing Company in

Seattle. His interest piqued in computer graphics; he finagled after-hours time on Boeing's robust computer banks to create some of his earliest CG projects. The early 1970s were not kind to Boeing, and the resulting layoffs swept Catmull out of the company.

Catmull pursued more ARPA-funded computer graphics during his masters and doctorate research and work on very experimental CG projects until, in 1979, he met one of the biggest advocates for computer graphics: George Lucas. Lucas' *Star Wars* film was only the second feature film ever to use 3D CG, the basis of which was a wire-frame depiction of the Death Star plans.

Lucas liked Catmull's ideas and set up Catmull's team at Lucasfilm, where they recreated hardware that kept pace with filmmakers' imaginations and the growing demand for computer visualization tools in scientific fields. The result: a rig they called the "Pixar Image Computer."

The computer flopped. Its massive \$135,000 price tag put off even the high-end labs they hoped to woo. Lucas sold the Pixar Image Computer business, headed by Catmull, to Apple Computers who changed the group's name

to Pixar. Pixar focused on hardware but created demonstrative animations of its own. The business' animation component grew arduously as companies contracted with Pixar to create commercial animations.

The company remained insolvent. Steve Jobs nearly sold off Pixar but in the early 1990s Catmull secured a deal with Walt Disney Feature Animation, who had bought some of the earliest Pixar computers. The deal, for a completely computer-generated feature length film about toys coming to life, was an incredible gamble on using new animation techniques to tell a story. Many feared audiences would reject entirely computer-generated characters.

Pixar got \$373,000,000 worth of acceptance from enthralled ticket buyers. The film, *Toy Story*, topped the box office and spawned multiple sequels and a film empire for Pixar. Thanks to Sputnik, computer animation was launched to infinity and beyond.

ABOVE: The Pixar Image Computer created by Edwin Catmull and his team at LucasFilm.



BOEING 747

747

MUSEUM MUSINGS



RA001's arrival at the Museum in 1990./THE MUSEUM OF FLIGHT

Looking Great at Fifty!

BY: TED HUETTER, SENIOR PR MANAGER

AN ICON IS an object of uncritical devotion, and iconic being something widely recognized and well-established. Maybe more than any plane in the Museum's collection, our Boeing 747 prototype fits the definition. On February 9, the Queen of the Skies turns fifty. She made her maiden flight during a cold morning on that day in 1969. Boeing bet the farm on a jet that was twice the size of any other airliner, and some wondered if the gigantic plane could even fly. Thousands watched anxiously as pilot Jack Waddell, co-pilot Brien Wygle and flight engineer Jesse Wallick—the only souls onboard the first Jumbo Jet—taxied into place on Paine Field's main runway and began the takeoff. Because of its size it seemed to be moving impossibly slow as it left the ground. The flight was a success, and as they say, the rest is history.

The Museum will be celebrating the plane's birthday. Check our website for details as they become available, and we will see you there!



#3 ARTIFACT IN FILM

Artifact: Granville Brothers Gee Bee Z "City of Springfield" Reproduction
Film: *The Rocketeer* (1991)
Role: Cliff flies the plane in the opening scene.
On Display: T.A. Wilson Great Gallery
Details: Built in 1978 by Ed Marquart and Bill Turner of Repeat Aircraft, with assistance of the Granville Brothers. Disney purchased it for the movie; then in 1994, the Museum purchased it from the Museum of Flying in Santa Monica, Calif.



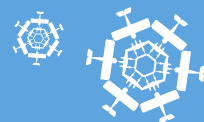
Credit: The Museum of Flight Collection. Purchased from...



Mid-Winter Warmup open to grades K-5!

Registration opens January 7!

Mid-Winter Warmup



February 18-22

It's cold outside, but the warm history throughout the Museum will awaken your imagination and fly you to a new world! Join us for hands-on activities in rocketry, engineering, astronomy, robotics, and more!

REGISTER ONLINE AT MUSEUMOFFLIGHT.ORG/ACE

Camp details, registration and fee information is available online.

CALENDAR OF EVENTS

January



FLIGHT PATH PROJECT

FREE Honey Tasting!

SPECIAL EVENT

Honey Bees and Airplanes: SeaTac's Flight Path Project

SeaTac Airport is home to several hundred thousand honey bees, and the Flight Path project encompasses wild bee surveys, habitat restoration and honey bee research. Beekeeper Bob Redmond will discuss parallels among honey bees and human flight, from communication systems, flight operations and aerodynamics. Presentation to be followed by a honey tasting with honey from the airport!

WILLIAM M. ALLEN THEATER
 Saturday, Jan. 19 | 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. & Feb.** in the Charles Simonyi Space Gallery.



LECTURE

Astronaut Remembrance

Remember the fallen astronauts of Space Shuttles *Challenger* and *Columbia*, as well as Apollo 1, and explore the risks and successes of space travel.

Presented by Museum Adjunct Curator for Space History and NASA JPL Solar System Ambassador Geoff Nunn.

CHARLES SIMONYI SPACE GALLERY
 Saturday, Jan. 26 | 2 to 3 p.m.



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, Jan. 3 | 5 to 9 p.m.



DISPLAYS

Astronaut Remembrance

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

CHARLES SIMONYI SPACE GALLERY
 January 25 to February 3

WEEKEND FAMILY WORKSHOPS

The Bees Knees!

Explore the world of natural flight through the life of bees!

T.A. WILSON GREAT GALLERY
 Saturday and Sunday, Jan. 5-6, 12-13, 19-20, and 26-27
 11 a.m. and 1 p.m.

February

Surprise Guest Speaker!



LECTURE

Michael P. Anderson Memorial Aerospace Program Special Lecture

In honor of Black History Month, and in conjunction with the Michael P. Anderson Memorial Aerospace Program—an annual event that gives underserved students the chance to participate in the Museum's educational programs—the Museum will hold an empowering lecture featuring a special guest. For more information, check our website.

WILLIAM M. ALLEN THEATER
Saturday, Feb. 2 | 2:30 to 4 p.m.

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



SPECIAL EVENT
Popsicle Bridge Contest

Passions run high as teams of high school students 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.

T.A. WILSON GREAT GALLERY
Saturday, Feb. 9 | 10 a.m. to 2 p.m.

SPECIAL EVENT
Puget Sound Engineering Council Fair

Students interested in engineering can learn about exciting career opportunities by talking to professionals in local engineering societies, colleges and businesses. Featuring hands-on activities and demos.

SIDE GALLERY
Saturday, Feb. 9 | 10 a.m. to 4 p.m.



LECTURE

Thunderbolts Triumphant

Chris Bucholtz's book, *Thunderbolts Triumphant: P-47s of the 362nd Fighter Group in WWII* describes how the 362nd busted dams, sank a battleship, disrupted multiple German attacks, dropped supplies to cut-off troops, and destroyed over 5,000 trucks and 3,500 rail cars. This lecture and book signing is presented in conjunction with the American Fighter Aces Association.

J. ELROY McCRAW PERSONAL COURAGE WING
Saturday and Sunday, Feb. 16-17 | 1 to 2 p.m.



SPECIAL EVENT

2019 NorthWest Scale Modelers Show

Explore the world in miniature at the 2019 NorthWest Scale Modelers Show. See hundreds of detailed scale models of all types at the largest model show in the Northwest! Featuring special displays, modeling seminars and free make-and-take activities for families.

T.A. WILSON GREAT GALLERY
Saturday and Sunday, Feb. 16 and 17
10 a.m. to 5 p.m.

WEEKEND FAMILY WORKSHOPS

Long-Distance Valentines

Learn about the early days of airmail and then send your loved ones over the moon with a sweet valentine made by you.

T.A. WILSON GREAT GALLERY
Saturday and Sunday, Feb. 2-3 and 9-10
11 a.m. and 1 p.m.

Pushing the Envelope: The X-15!

In the early 1960s, a new generation of pilots tested the limits of human endurance by going to space in the X-15 experimental aircraft. Learn about this breakthrough project that paved the way for all future space travel and then design your own X-15 aircraft.

T.A. WILSON GREAT GALLERY
Saturday and Sunday, Feb. 16-17, 23-24
11 a.m. and 1 p.m.

Junior Aviators

Movie Jumble

Unscramble these five jumbles, one letter to a square, of five words related to film and movies. Then rearrange the five circled letters to find the answer to the cartoon's riddle!

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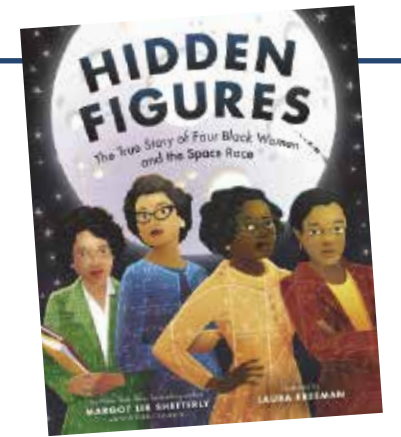


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Answers on page 24.

TOY FROM THE COLLECTION

Estes Model Rocket Kit, Star Wars Robot Hero R2-D2, c. 1979

This is the model rocket droid you've been looking for! In 1979, Estes Models released a series of rocket kits based on characters and spacecraft from the 1977 *Star Wars: A New Hope*. The rocket kits featured the T.I.E. Fighter, the Proton Torpedo, R2-D2, and three versions of the X-Wing—one the same size as the effects props used in the movie! It is revealed in the prequel, *Attack of the Clones* (2002), that R2-D2 does have full flight capability. If you delve deep into the *Star Wars* canon, you will find that R2's rocket boosters are broken prior to the timeline of *A New Hope*, which is why he does not fly in the early films. Despite being marketed with a 300-ft. launch range, the R2 rocket was reported to not fly particularly high or particularly fast, though it surely helped introduce many young *Star Wars* fans to the hobby of model rocketry. This model rocket kit is a part of the Harry G. Stine Model Rocket Collection and was donated to The Museum of Flight in 2013 by George W. "Bill" Stine. The other *Star Wars* Estes rocket kits can also be found in this collection.



BOOK RECOMMENDATION

Hidden Figures: The True Story of Four Black Women and the Space Race

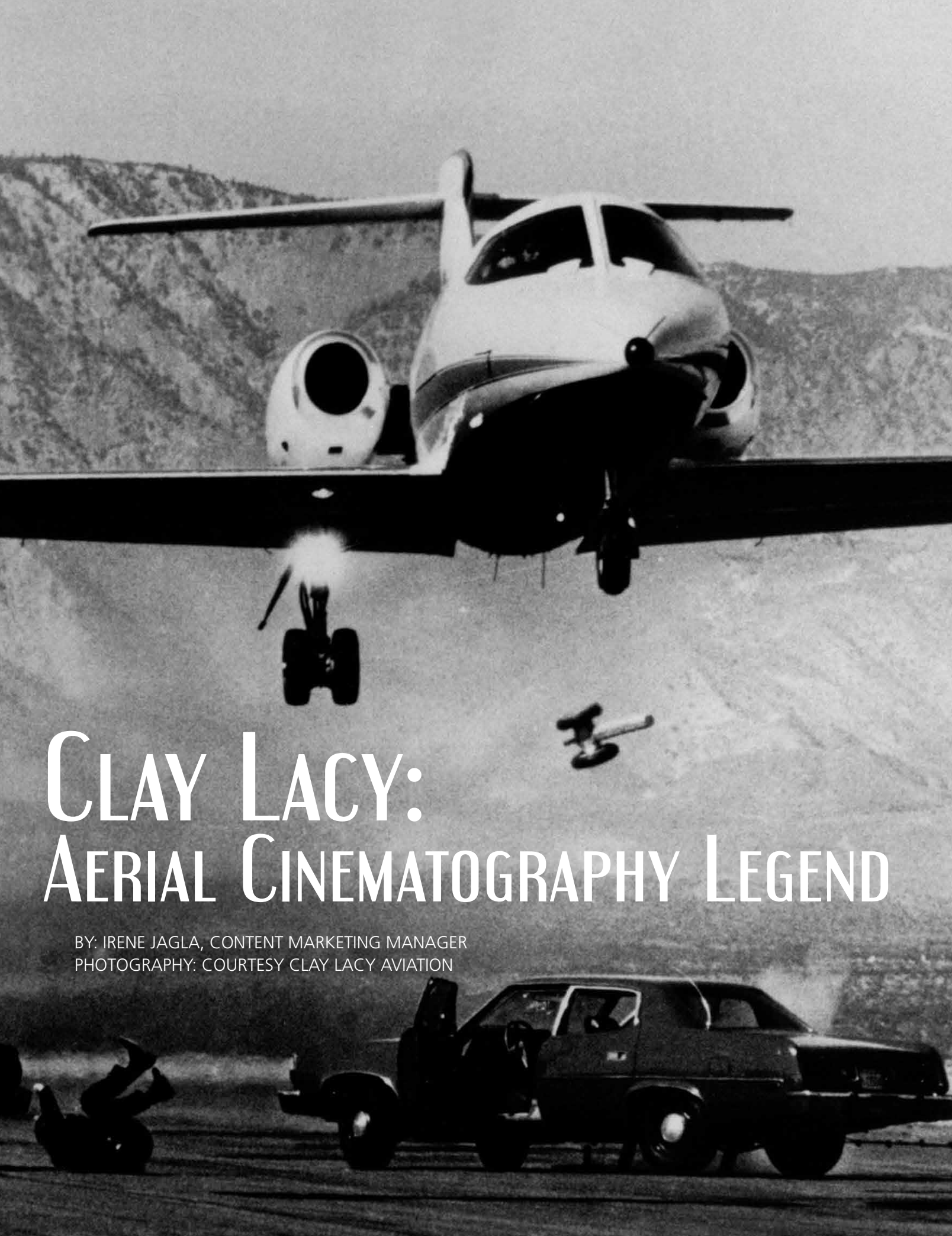
BY: MARGOT LEE SHETTERLY
ILLUSTRATED BY: LAURA FREEMAN

Dorothy Vaughan, Mary Jackson, Katherine Johnson, and Christine Darden were good at math...really good.

They participated in some of NASA's greatest successes, like providing the calculations for America's first journeys into space, during a time when society placed limitations on what people of color and women could do. But they worked hard and used their genius minds to change the world. In this beautifully illustrated picture book edition, we explore the story of four female African-American mathematicians at NASA and how they overcame gender and racial barriers to make space exploration history.



CREDIT: THE MUSEUM OF FLIGHT/GEORGE W. STINE COLLECTION



CLAY LACY: AERIAL CINEMATOGRAPHY LEGEND

BY: IRENE JAGLA, CONTENT MARKETING MANAGER
PHOTOGRAPHY: COURTESY CLAY LACY AVIATION



Clay Lacy, Museum of Flight trustee emeritus, leans back in a leather office chair and smiles. He's sitting across from me at a board room table looking relaxed and ready to chat, despite the fact that he's just finished a three-hour recording session with our oral history team.

The aviation legend—who has more than 50,000 flying hours under his belt—and groundbreaking aerial cinematographer certainly has a lot to brag about. But Lacy's humble Midwestern roots show through, making him seem less like a Hollywood icon and more like a grandpa preparing to tell a good story. And he has many.

Growing up in Wichita, Kansas, Lacy started flying when he was only twelve years old. At 19, he followed his passion for aviation to Los Angeles and started flying for United Airlines. Lacy took leave from that position in 1954 to attend USAF pilot training under the Air National Guard where he flew the F-86 Sabre, and returned to United Airlines in 1955. In 1964, Lacy became manager of Learjet sales and then acquired his own Learjet in '65. Lacy, ever the entrepreneur, saw a business opportunity in the Learjet,

which could cruise at Mach 0.8 and climb quickly up to 40,000 feet. In 1968, Lacy opened his own private jet charter company, Clay Lacy Aviation, and elite travelers started lining up to book flights on his Learjets.

During this time, Lacy began doing air-to-air photography for airline companies from inside of the Learjet. Lacy's burgeoning Hollywood connections introduced him to aviation enthusiasts and aerial cinematographers, such as Rex Metz, who told Lacy that the plane most often used for filming jets, the B-25, didn't have the speed to keep up with the faster planes. Lacy saw this as an opportunity to approach Douglas Aircraft, which had been using B-25s to photograph its planes.

"With the B-25, when a 707 or DC-8 peeled off, it took 20 minutes to get joined up again and stage another shot, but with the Lear I could join up with them immediately," recalls Lacy. He convinced Douglas that it needed a more efficient way to photograph its planes. At that point, Lacy was using a tripod and shooting through the window, but Douglas was so impressed that they ditched the bumbling B-25 and started to use Lacy and his Lear for

photography work. However, the camera setup on the Lear still needed improvement.

Enter Bob Nettmann, John Carroll, and their crew of British engineers who came to the U.S. from England in the 1960s. They gained notoriety building camera mounts for helicopters. "Nettmann knew about the camera mounts and ended up getting one or two—they were surplus at that point—and created Astrovision," Lacy explained. He talked to Bob about developing Astrovision to use for air-to-air photography. "Bob did a great job of developing it into a movie device by putting it out of the top and bottom of the Lear. It revolutionized photography."

What Lacy describes as revolutionary involves a complex choreography between the cameraman and the pilot. The cameraman sits in the back of the Learjet with a 12-inch TV monitor and a console with a stick that makes the periscope rotate and move up and down. There are seven mirrors inside that transmit images up through the 2.5-inch diameter periscope. Lacy illustrates this dance with sweeping hand gestures: "When I [the pilot] go up, the cameraman tilts the periscope down; when I go down, the cameraman tilts



the camera up. And when I go around, the cameraman has to pan all around.”

The cameraman’s skill level is critical in these intricate aerial dances, so Lacy swears by using people he’s trained himself. “There’s a real thought process, too,” Lacy continues. “The cameraman needs to feel what I’m doing and understand what’s going to happen next.” The camera system itself is very sensitive, so it doesn’t take much force to move the device, and an expert camera operator knows the exact amount of pressure needed to rotate and pan the camera. Once Lacy had perfected Astrovision and started using it in 1975 he never looked back.

One of Lacy’s most notable achievements with Astrovision is *Top Gun*, and he chuckles as he remembers the two weeks he spent filming those heart-pounding aerial sequences. “It was a good movie, box-office wise. I still get residuals off of that thing!” He also looks back fondly on working with visionary director Tony Scott, who rode on the Learjet with Lacy during most of the flights. “A couple of times Tony started giving directions,” recalls Lacy. “‘Have him break left, break right,’ he would try to direct the planes. I had to shut him off the radio once—he was mad!”

As much as Lacy loves reminiscing about the fun he had doing aerial cinematography for classics like *Firefox*, *Armageddon*, *Cliffhanger*, and *Octopussy*, he’s equally pleased when speculating about the future of his field.

“Equipment is getting better all the time. People are using radio-controlled models to do everything. A few weeks ago, I saw the latest radio-controlled helicopter. There’s only

two in the world—one in Japan and one here. I watched them fly it. They’re using it in a new movie coming out. It takes two people to operate it—the guy flying the airplane, and the guy running the camera,” says Lacy. He was impressed by how well it flew and how stable it was. “It was pretty big, too, and could carry a full blown 35mm camera.”

Besides bearing witness to these advances in aerial cinematography, Lacy is also excited about the technology he now has in the palm of his hand. One of his new favorite toys is an app called Flight Tracker, which allows users to follow the flight paths of planes all over the world at any given moment. “You can see the airplanes that fly all over Asia, the Middle East, Japan, Europe. Back when I started flying to Honolulu with United there weren’t so many. There were maybe 1,000 airliners flying worldwide, and today there are hundreds of thousands.”

Although Lacy has slowed down a bit after a leg injury he sustained four years ago, he’s just as passionate as ever about the field of aviation and remains humble about his role in it. He contends that he’s only worked a day in his home town when he was a teenager—and he’s grateful for the many years that the aviation industry has given him.

“I’m happy that I’ve been in aviation and met so many great people. I’ve been able to work with organizations like this Museum and all the great people who are here. Being around airplanes and aviation is far better than anything else I could have done.”



TOP LEFT: One of the more interesting and well-known movies Clay worked on was part of the James Bond series titled *Octopussy*. Shooting in early 1983, Clay utilized yet another platform from his aerial arsenal, his Pilatus PC-6 Porter, shown here flying behind the actors thousands of feet in the air. The cameraman, David Nowell, can be seen perched in a small platform lift that extends down from inside the cabin of the Porter.

TOP RIGHT: A view from the Astrovision cabin. The system is shown equipped with 35mm film cameras, but HD & 4k video have been used in addition to 65mm, 70mm and IMAX.

BOTTOM RIGHT: Astrovision isn’t just used in Learjets! Pictured here is Clay flying his Jet Ranger III, Clay used this setup to film a number of movies and TV shows when the Learjet wasn’t the right tool to get the shot he wanted.

PREVIOUS PAGE: Astrovision was contracted to film aerials for *Capricorn One* which was shot in February 1977. In addition to a faked gear up landing with a Learjet, Clay provided and some thrilling aerials, the Learjet pictured here was taking off with the practical effect of a slight “gear problem.” • Clay shows the lower Astrovision periscope tube to a colleague.

MUSEUM NEWS

Celebrating Our Veterans

VETERANS DAY 2018 MARKED THE 100TH ANNIVERSARY of the end of World War I on November 11, 1918. The Museum commemorated this historic event with a weekend of thoughtful programming for veterans and their families, and admission was free for veterans and current military. At 11 a.m. local time on Veterans Day, we joined thousands of other organizations across the country participating in ringing a bell 21 times in remembrance of those who have served and sacrificed. Documentary filmmaker Ray Sullivan, Jr. hosted a screening of his movie *PAC 6: A General’s Decision* about his father Air Force Brig. Gen. Glenn R. Sullivan and the role he played in bringing an end to the Vietnam War in 1972. Veterans Day ceremonies included speeches from local city and Museum officials, keynote speaker and Museum Trustee Lt. Col. Ron Limes, and a performance by the Boeing Employee Concert Band. Visitors also enjoyed informative programs like living history performances and an in-depth look at American Fighter Ace pilots.



SOME LOCAL BOY SCOUTS AND THEIR TROOP LEADER POSE WITH SGT. JOE DUFFIE, FORMER TUKWILA CITY COUNCIL MEMBER./IRENE JAGLA



OLD GLORY FLIES PROUDLY FROM TUKWILA FIRE LADDER 54 TO GREET MIDNIGHT EXPRESS./FRANCIS ZERA PHOTOGRAPHY

A Great Year With The City Of Tukwila

THE MUSEUM HAS ENJOYED a wonderful partnership with the City of Tukwila for more than 15 years, and 2018 continued this great relationship. In the early morning of June 3, the Museum coordinated the delivery of its restored B-52G *Midnight Express* from Paine Field in Everett to our Boeing Field campus. The Tukwila permitting department assisted with the tricky route approval (it’s not simple to move a 100-ft. long airplane fuselage down the interstate), while Tukwila police and fire departments made the transport as smooth and safe as possible. Tukwila once again supported our Halloween-themed Museum of Fright, Veterans Day weekend activities and perennial favorite Santa’s Landing Party. The Museum is one of the key tourist attractions within Tukwila and is grateful for a excellent partnership with the city.

Playing The Past Girl Scout Program

Step back in time to the world of the Women’s Airforce Service Pilots (WASP), brave women who served the United States during World War II. During this 4-hour program, you will take on the character of a real WASP, learn about her life, and create a costume piece to take home. Participants will also plan a flight for the airplane flown by their WASP and pilot that flight in our professional-grade flight simulators. Playing the Past Girl Scout badge, program materials, and Museum admission included.

January 26 and 27, 2019

Registration fee is \$18/participant. Offered 10 a.m. to 2:30 p.m. Minimum 12; maximum 25 participants per session. 1:5 chaperone-to-participant ratio required. Registration closes one week before the program date. Additional dates available, please inquire.

For more information or to book, contact 206.764.1384 or educationreservations@museumofflight.org.



DESTINATION MOON INSTALLATION

WITH THE START OF THE NEW YEAR, the Museum will begin the process of preparing the Bill and Moya Lear Gallery and Side Gallery to receive the traveling exhibit *Destination Moon: The Apollo 11 Mission* from the Smithsonian. The exhibit, which celebrates the 50th anniversary of the Apollo 11 Moon landing, will take the place of the Museum's APOLLO exhibit for the majority of 2019. The conversion will include expanding the exhibits space south into the Side Gallery and temporarily converting the Flight Zone into a space theme. 2019 will be an exciting year full of new experiences for regular Museum visitors, but make sure to check them out while they are here, because the APOLLO exhibit and Flight Zone will return this fall. *Destination Moon: The Apollo 11 Mission* will run from April 13 to September 2, 2019. Tickets go on sale in January. See ad on back cover.



ARTIFACT IN FILM

Artifact: NASA Full Fuselage Trainer
Film: *Space Cowboys* (2000)
Role: The Air Force Pilots who are called out of retirement to repair a malfunctioning satellite use the trainer in the movie.
On Display: Charles Simonyi Space Gallery
Details: The Museum acquired the Trainer in 2012 when NASA retired the Space Shuttle program.



Answers to the Junior Aviators Movie Jumble on page 19:
 SCRIPT, ACTOR, ACTRESS, DIRECTOR, CAMERA
 Riddle Answer: OSCAR

VOLUNTER PROFILE

Dale Thompson and the B-29

BY: STEVE DENNIS, VOLUNTEER

THE ICONIC BOEING B-29, on display in the Aviation Pavilion, was not always the shining artifact that visitors enjoy today. After completing 37 missions during World War II, it was converted to an aerial refueling tanker for the Korean War. After the war, it spent over 30 years in desert storage in California. Arriving in Seattle in 1995, the B-29 began a volunteer staffed restoration that has put new life in the weathered airframe.

Dale Thompson joined the restoration crew in 2002 and for the past five years has served as Crew Chief for the 14-person volunteer team. After devoting over 8,000 hours to the restoration effort, Thompson is retiring.

“Dale has been a workhorse, keeping the restoration on track. He’s been a joy to work for, directing with a soft hand and letting us work on projects at our own pace,” said Rich Heasty, who is stepping in as the new B-29 crew chief.

From the exterior the restoration appears complete but that’s not the case, according to Thompson. “We have the original Boeing drawings and our goal is to restore the interior to its 1945 appearance. We have a long way to go. That doesn’t mean everything will work—though some systems do—but the interior ‘look’ will match the original drawings. If you can see it, it will be correct.”

To achieve that goal, Thompson maintained an extensive list of projects, like snaking wiring bundles throughout the interior and installing a heater duct to the rear gunner position. He tried to match the list with the skills and interests of the volunteers so they would enjoy the work and keep coming back for more.

Thompson is known for his ability to locate needed materials and parts—radios, switches, instruments and wire—and to convince the owners to donate their items or services to the aircraft.

Thompson’s own list of accomplishments is extensive, with many focused on his interest in radios and electronics. He and the team restored the high frequency radios, used for short range plane-to-plane communications, and put them in working order. “We located two pilots who’d flown the B-17s and B-29s, put them in their respective aircraft, fired up the radios on the HAM band and let them communicate as they had on missions 70



years ago.”

Perhaps Thompson’s most noteworthy technical accomplishment was leading the team that restored the Central Fire Control, or CFC system. On the B-29, the CFC gunner sat in an elevated “barber’s chair” in the middle of the aircraft where he could look out of a top blister. From that position he could direct the fire of all the aircraft’s defensive turrets or pass control to other gunners who might have a better sight line. The system utilized mechanical and computer controls that were revolutionary at the time. Thompson’s efforts brought the system back to life.

“Restoring the CFC system was an amazing feat,” said Tom Cathcart, Director of Aircraft Collections and Restoration. “Due to Dale’s efforts, our B-29 has the only operating fire control system in the world. As a volunteer, Dale is clearly a 10 on a 1 to 10 scale!”

At one time, Thompson had the system linked to a sound recording of .50-caliber machine guns firing. When the trigger was pulled the guns “sounded” off. “We decided that wasn’t a good idea in the Pavilion,” Thompson offered, with a smile.

While the interior of the plane is not available to the public, Thompson always made an exception for veterans and their families. One former CFC gunner, 95-year-old Bob Comstock, sticks in his mind. “I helped him into the barber’s chair and watched as he moved and ‘fired’ the guns as he’d done decades before. When finished, he asked if he could just sit there for a while, and when he came down there were tears in his eyes.”

THE MUSEUM OF FLIGHT

Thompson and the restoration team have been recognized for their efforts outside the Museum. At the 2011 annual awards event for the King County Historical Organization, Dale Thompson received the Willard Jue Memorial Award as a volunteer who “made outstanding contributions, provided exceptional leadership, and demonstrated excellence in ... quality or spirit of service.”

The entire B-29 restoration team received the Long-Term Project Award “for an outstanding landmark restoration.”

Why did Dale Thompson choose to dedicate over 8,000 hours of his life to the Museum and the B-29?

“It was an honor to work on such a famous aircraft and meet veterans who flew them. And it was a privilege to work with such a skilled and dedicated group of volunteers. I will miss them.”

“We will miss him, as well,” echoed Rich Heasty and Tom Cathcart.

ABOVE: The Museum’s B-29 shining in the early light. Dale Thompson posing for a picture in the B-29 cockpit.

SCHOLARSHIPS AVAILABLE IN 2019

APPLICATION PERIOD OPENS JANUARY 1 | DEADLINE: JANUARY 31

THE MUSEUM'S BOEING ACADEMY FOR STEM LEARNING is offering pilot flight training and college scholarships for students who have participated in programs supported by The Museum of Flight. In addition to these scholarships, \$1,000 education awards are also available to high school seniors who have participated in one or more Boeing Academy educational programs.

The following scholarships are available:

- Alaska Airlines Flight Training Scholarship - \$10,000**
- Frank “Sam” and Betty Houston Flight Training Scholarship - \$10,000**
- Frank “Sam” and Betty Houston Post-Secondary Aviation Education Scholarship - \$29,500/yr (for 4 years)**
- Jim and Sue Johnson Post-Secondary Aviation Education Scholarship - \$4,500/yr (for 4 years)**
- Steve and Hazel Eastman and The Stuart Knopp Memorial Scholarships - \$1,000**

If you need assistance or have questions, please email scholarships@museumofflight.org.

Opens January 1
 For applications and more information, please visit:
MUSEUMOFFLIGHT.ORG/SCHOLARSHIPS

Investing in the Future

BY: LOUISA GAYLORD, DEVELOPMENT COMMUNICATIONS COORDINATOR

HERE AT THE MUSEUM OF FLIGHT, we like to plan ahead. Our team is always thinking about the next big exhibit to unveil, the next school year's educational opportunities or what the aerospace community will look like in five years. By planning ahead, we can ensure that our programs continue to grow and engage our visitors into the foreseeable future. The Museum's Frequent Flyers program allows donors to set up an automatic monthly gift that we can plan around, like adding more Aerospace Camp Experience sessions for students during their spring break or doubling our Western Aerospace Scholars enrollment to serve both high school sophomores and juniors.

Ron Limes, a trustee on the Museum's Board of Directors and chair of the Michael P. Anderson Memorial Aerospace Program, spoke at the October A.M. Flight Breakfast about how sustainable funding benefits everyone who walks through our doors: "Our mission is to expose underserved children to STEM activities with an aviation emphasis. And these activities come at a cost. But all the programs here at the Museum never pass that cost on to the students and their families. Often that's the barrier between desire and achievement, and we aim to break down that barrier."

The Museum's educational impact has been steadily growing for the past several years, both in Washington and around the world, and we don't plan on slowing down anytime soon. "What better investment than in the future of our region and our nation?" asked Ron Limes during the A.M. Flight Breakfast. "It excites me to think how many dreams we can launch and support, and your giving can and will make a difference in the life of a young man or young woman."

The Museum strives to provide as many opportunities as possible to future engineers, pilots and computer programmers, and being able to depend on funding year after year plays a big part of it. The Frequent Flyer giving program is a convenient way to support the Museum and our plans to exponentially grow our education programs.

You choose a monthly donation amount that fits your budget. Once the automatic donation is set up, you can be confident that your monthly support will add to making a big difference at The Museum of Flight! Plus, Frequent Flyers get benefits like a subscription to our *Aloft* member magazine, invitations to exclusive events and recognition for their generosity.

When we think of frequent flyers at the airport, we imagine someone who is efficient, prepared and has mastered the art of flying. At the Museum, Frequent Flyers are donors who have mastered the art of philanthropy. We invite you to join them and be part of the future of aerospace. Investing in the Museum will help us prepare the diverse STEM workforce of the future to explore the world around them, continue to preserve and restore iconic aircraft, and make sharing the stories and wonder of aerospace easier than ever before.

To learn more about the Frequent Flyer program, visit museumofflight.org/Giving/Frequent-Flyer.



ARTIFACT IN FILM

Artifact: B-17F Flying Fortress

Film: *Memphis Belle* (1989), *The Thousand Plane Raid* (1969), *Tora! Tora! Tora!* (1970)

Role: Played the role of C-Cup in *Memphis Belle*, used to portray other planes in the films, and numerous interior scenes as well.

On Display: Aviation Pavilion

Details: The Museum's B-17F was built in 1943 and was also featured in an episode of *Mysteries at the Museum*. It is nicknamed the *Boeing Bee*.



Ron Limes speaks at the annual A.M. Flight Breakfast that was held in October. /JACQIE CALLAHAN

Tribute Gifts

In Memory

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

In memory of Donald D. Archer
Dave and Wendy Welch

In memory of Walter A. Babinski
Gregory Babinski

In memory of Warren E. Beecroft
Kelli Drouet

In memory of John I. Beaudreaux, Jr.
Paula Clark

In memory of Michael S. Bixel
Patricia and Wendell Frost

In memory of Stan Brewer
Mariale Brewer

In memory of Victor N. Cabas
Paula Clark

In memory of Phelon H. Cole
Jay Stern

In memory of Don Davis
James and Patricia Davis

In memory of James A. Duensing
Jay Stern

In memory of C. Donald Filer
Bruce R. McCaw Family Foundation

In memory of Frank L. Gailer, Jr.
Paula Clark

In memory of Hisako T. Guest
Frank Scholz

In memory of Ben W. Hall
Dana Dilgard

In memory of Roy E. Haviland
Jay Stern

In memory of Sandra (Sandy) E. Higgins
David and Catherine Colby
Marc Manzo

In memory of Sidney L. Hutchison
Judith Hutchison

In memory of Dennis L. Jeppesen
Mary Miller
George and Babs Reich
Suzanne Spano

In memory of Mary-Jane Krie
Harold Krie

In memory of Barbara A. Lindamood
Doug and Heather Buchanan

In memory of George C. Martin
Edith Martin Shreeve

In memory of Alan D. Mason
Terry and Marsha Mason

In memory of Jean Mauser
James Mauser

In memory of Terrence (Terry) M. McCosh
Theresa Mitchell

In memory of Eugene J. Monahan
Virginia Monahan

In memory of Theodore (Dale) Moors
Jeanne Larson
Lorraine M. and Don Veach

In memory of Paul S. Ostrander
Donald Ries

In memory of Eugene M. Parsons
Ruth Carlson
Linnea Osborne

In memory of Raymond P. Pennock, Sr.
John Purvis and Nancy Wright

In memory of Nathaniel S. Penrose, Jr.
Poo Penrose

In memory of Anton (Tony) B. Schmelzer
Joel and Marilyn Nemerever

In memory of Yori Tsunoda
Charlie and Kathleen Moles

In memory of John J. Wagner
Doris Wagner

In memory of Ridley C. Wilson
Paula Clark
Jim and Linda Gough
Richard Paynton

In memory of John A. Zink
Paula Clark

In Honor

In honor of Katy Ahrens
Anne Melton

In honor of John G. Bowen
R. Graham Daniell Family

In honor of Tom Cathcart
Steven Pennington

In honor of Iris Cummings Critchell
Loveday Conquest and Fred Kleinschmidt

In honor of Patrick DeRoberts
Ted and Donna Steudel

In honor of Paul R. Harvey
Margi A. Harvey

In honor of Clay Lacy
Chuck and Maggie Kluenker

In honor of Peter M. Morton
John Purvis and Nancy Wright

In honor of Veterans
Gary Wright

In honor of David C. Wellman
Buck and Sofie Dissel

In Memoriam

Paul G. Allen

Sarah Barbour

Stuart D. Barker, Jr.

James E. Bauman

David S. Belvin

Kent R. Bishop

Sarah C. Black

John L. Boudreaux, Jr.

Kathryn Bowman

Malcolm L. Campbell

Dave M. Carver

Georgia Caviezel

Donald G. Chaney

Shirley I. Conrad

Donald J. Covey

Geary A. Cutting

Ayleen A. Erickson

Virgil Fassio

Ronald W. Floyd

Maxine Fogelman

Frank L. Gailer

Myrtle V. Groom

Donald C. Hawley

Edward Heineman, Jr.

John W. Hensey

Sandra L. Hertz

John R. Hiltensbrand

Donald A. Houck, Sr.

Nancy A. Irion

Dennis L. Jeppesen

Earl D. Keller

Juanita M. Lavalley

Frank D. Leathley

Tove L. Lund

Betty Meaders-Lynch

Elizabeth Menzel

John T. Moon

Teo J. Morellato

M. J. Moughtin

Ivar W. Nelson

Richard T. Nishioka

Eugene M. Parsons

Frank C. Radford

Robert R. Sansing

Lawrence H. Shaw

Walter J. Shields

William Stavig

Jennifer Walls

Ellen M. Winters

Arnold O. Wolf

Harold Zebert

John A. Zink

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206.764.5720 | museumofflight.org

DESTINATION MOON

THE APOLLO 11 MISSION

Tickets
on sale in
January!



Coming April 2019!

The only West Coast appearance of Apollo 11's command module Columbia!



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