December 2023

Corey J Beitler's

"Distelfink Airlines"

An Online Aviation Newsletter

★ Celebrating 10 Years Of Publication! ★

"America's Hangar" Celebrates 20 Years

2023 Holiday Letter

Boeing 757-200

John Jenkins Designs Messerschmitt Me-262B-1a/U1

Aichi M6A1 Seiran (Clear Sky Storm)

Sikorsky JRS-1

A Rare SB-17G Model

The National Air and Space Museum's Lockheed SR-71A Blackbird is displayed as a centerpiece in the Boeing Aviation Hangar at the museum's Steven F. Udvar-Hazy Center. The Blackbird's performance and operational achievements placed it at the forefront of aviation technology during the Cold War. The SR-71 remains the fastest aircraft ever built propelled by air-breathing engines.

FROM THE EDITOR'S DESK

Happy Birthday Udvar-Hazy, Aichi Seiran, Me-262B-1a/U1 Model, Sikorsky JRS-1

Greetings Everyone:

Well, here we are, the December edition of "Distelfink Airlines" and the last edition of the newsletter for 2023 in the newsletter's 10th anniversary year. This year has been an incredible year of growth for the newsletter. "Distelfink Airlines" has set records this year for the number of people that have viewed the newsletter and where it has been viewed. When I began writing this newsletter ten years ago, I never imagined someone would be reading it in another country or that it would allow me to cover airshows with media credentials. I'm incredibly grateful for my success with the newsletter and I am deeply thankful for all of you who continue to read this publication and have helped it grow. Some things are better simply said, so I will say it simply, Thank You!

The feature for this edition is an article in honor of the National Air and Space Museum Steven F. Udvar-Hazy Center's 20th anniversary of being open to the public. This second National Air and Space Museum facility opened in 2003 and is a larger location than the original National Air and Space Museum on the National Mall. The Steven F. Udvar-Hazy Center has an impressive collection of over 170 aircraft, 130 space vehicles and thousands of smaller artifacts and objects. In addition to these aviation and space treasures, the museum has an observation tower that visitors can use to watch airport operations at the Washington Dulles International Airport. I have visited the Steven F. Udvar-Hazy Center many times since its opening, and I am never disappointed with the trip. The feature article in this edition follows the path Smithsonian officials took to build the museum, and briefly features some highlights of the building's collection. This article in no way could discuss every aircraft or space vehicle in the building, so I invite you to visit the museum's website (listed at the end of the feature article) to learn more about the National Air and Space Museum's Steven F. Udvar-Hazy Center. If you are ever in the Washington D.C. metro area, it is definitely worth visiting.

The "Aircraft of the National Air and Space Museum" section features a rare Japanese World War II aircraft that is on display in the Steven F. Udvar-Hazy Center. The Aichi M6A1 Seiran was a floatplane designed to operate off large submarines. The airplane could be folded up and fit inside a special hangar on the submarine's deck. The Imperial Japanese Navy was going to use several submarines and their Seiran aircraft to launch an attack against the Panama Canal late in World War II. The mission changed, and the war ended, resulting in most of the Seirans being scuttled by the submarine crews to avoid capture. The Seiran featured in this section is the only survivor of the 28 that were built.

The "Aircraft Models" section has the John Jenkins Designs Me-262B-1a/U1 night fighter model. This model is simply an incredible replica of the world's first operational jet fighter in a rare two-seat variant. This high-quality model has one of the best renderings of the Luftwaffe mottling camouflage pattern used during World War II.

Finally, the National Air and Space Museum's Sikorsky JRS-1 is featured in the "Aircraft of Special Interest" section. This amphibian is one of the last surviving aircraft that was at Pearl Harbor on December 7, 1941. It is always amazing to see this aircraft on display at the Steven F. Udvar-Hazy Center and be up close with such an incredible piece of aviation history.

Thank you again for supporting my aviation photojournalism efforts and "Distelfink Airlines" this year. "Distelfink Airlines" will be return in early 2024 (most likely February or March) with more great aviation content.

Regards,
-Corey

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2023 Holiday Letter

Greetings Everyone:

The holiday season is here, and along with it are the traditions of time spent with family and friends, great food, making magical moments for children, and giving those special gifts. The holiday season is also often a time when we take time to remember friends and family who are no longer here with us. My grandparents loved the holiday season, and part of me is always sad during this time that they are no longer here. My grandfather loved collecting model airplanes and everything aviation. He enjoyed traveling to airshows and aviation events. My grandmother wasn't interested in aviation but supported my grandfather's interest in it by buying him aviation memorabilia as gifts to display in their home. She never had a set thing to buy, she bought aviation memorabilia she liked, including the Hallmark "Sky's The Limit" airplane ornaments, children's pails, postcards, and toy airplanes. I've been fortunate to inherit most of these items into my collection, and cherish them as memories of them. My grandparents are one of the reasons this newsletter is published, and they would be delighted to know it is enjoyed by so many worldwide. I continue to write this newsletter to honor them and share great aviation content with fellow aviation enthusiasts.

This was the 10th year the newsletter was published, and it was an incredible year for "Distelfink Airlines". This year for the first time, the newsletter reached over 1,000 views in a monthly period and also set a record for views for the year. The newsletter was read by aviation enthusiasts worldwide, reaching countries such as Turkey, Japan, Singapore, Austria, and many more. "Distelfink Airlines" has now been read by aviation enthusiasts in over 40 countries. Highlights this year for me include covering the Mid-Atlantic Air Museum's World War II Weekend, the Atlantic City Airshow, and the Great Pocono Raceway Airshow in the newsletter. I also had the great opportunity to cover two great classic American aircraft, the Curtiss Jenny and the Ford Tri-Motor, in feature articles. Finally, guest contributor Mike Colaner from Aces High Aviation Photography contributed some excellent guest coverage in the newsletter with some great photos of some brand-new F-15QAs headed for the Qatar Emiri Air Force making a stop at the Dover Air Force Base on their way overseas. Mike offering these photographs to me helped ensure that a March edition of "Distelfink Airlines" was published this year.

This year, I had the opportunity to cover several airshows and aviation events representing "Distelfink Airlines" and to work with some incredible aviation photojournalists and aviation photographers. I appreciate all of their friendship and enjoy working with them professionally as colleagues. I always find it fascinating how several people can cover the same airshow and get entirely different photographs and articles from the same event. In the end, we all have the same mission to tell the stories of airshows, aviation museums, aviation history, and aircraft, and to share the passion we have for them with others. I look forward to working with these colleagues in 2024 and continuing to cover airshows and aviation events with "Distelfink Airlines". I also want to thank the numerous volunteers, media coordinators, and public relations personnel I worked at airshows and aviation museums throughout the year. These professionals are instrumental in helping to get access to aircraft and people at airshows and aviation events. Without their assistance, "Distelfink Airlines" would not be the publication it is.

Looking ahead to next year, the 2024 editions of "Distelfink Airlines" will feature a new section themed "Aviation Memorabilia". This section will be replacing the "Flying Colors" section that has run in the newsletter for the past two years and feature a selected piece or pieces of aviation memorabilia each month. Much of the featured memorabilia are items that have been inherited from or were given to me by my grandparents. I feel this new section is the perfect way to honor them while also sharing some of the many interesting aviation items they acquired through years of antiquing and collecting. Feature articles will cover airshows, aviation museums, aviation events., and select aircraft. At this early stage of planning, I am looking at doing eight to ten editions of "Distelfink Airlines" for 2024, with the first edition of the year being ready for either February or March. I will not be publishing a newsletter in January to give myself a much-deserved break after doing the10th anniversary year with a fully compliment of 12 editions.

Thank you again for supporting my aviation photojournalism efforts and for taking the time to read "Distelfink Airlines". I wish all of you a very safe and wonderful holiday season with your family and friends.

Best Wishes & Happy Holidays!
Corey


MERRY CHR TMAS

Boeing 757-200

A United Airlines Boeing 757 -200 on approach to the Washington Dulles International Airport after a flight from Dublin, Ireland. Since its introduction in 1983, the Boeing 757 has been a popular aircraft with airlines because of its speed, payload capacity, and range. Despite Boeing ending 757 production in 2004, over 660 Boeing 757s remain in service today as commercial airlines, freighters, or in specialized roles such as VIP government transports.

The Boeing 757-200 is a variant of the narrow-body Boeing 757 twinjet commercial airliner manufactured by Boeing Commercial Airplanes from 1983 to 2004. Variants of the 757 include the 757-200, the stretched 757-300, the 757-200PF freighter, and the C-32, a government VIP transport variant operated by the U.S. Air Force.

The 757 was envisioned as a successor to the 727 trijet and was designed concurrently with the wide-body 767 during the 1970s. The 757 and 767 share avionics, computer systems, flight decks, electric power systems, and hydraulic parts. This operational commonality reduces costs for airlines that operate both types and allows pilots to obtain a common type rating to fly both aircraft. Boeing designed the 757 as a twinjet aircraft for improved fuel efficiency over three and four-engine aircraft. Two engine options were offered for the 757 , the Rolls-Royce RB211-535C turbofan and the Pratt & Whitney PW2037 turbofan. A performance target for the 757 was a higher thrust-to-weight ratio to improve takeoff performance from short runways and at airports with hot climates. The prototype completed its maiden flight in 1982, and launch customer Eastern Air Lines began operating the 757-200 variant in 1983. The package freighter (PF) variant entered service in 1987, followed by the stretched 757-300 variant in 1999. The 757-200 was the most popular variant of the Boeing 757, seating 200 passengers in a two-class layout and having a range of 3,900 nmi. The 757-300 typically seats 240 passengers and has a range of 3,400 nmi. The freighter variants of the Boeing 757 can haul 72,000 lb of cargo and have a range of 3,000 nmi.

The Boeing 757 was popular with U.S. mainline airlines, European charter airlines, and cargo airlines. Boeing ended production of the 757 in 2004 with no direct replacement in passenger capacity and range, the Boeing 737 NG variants being the closest successor. Currently Delta Air Lines is the largest 757 operator, with 127 aircraft in its fleet. FedEx Express and UPS Airlines are the largest operators of freighter variants of the 757.

The Boeing 757 seen here is a 757-200 operated by United Airlines. United Airlines operates 61 Boeing 757s in its fleet, 40 757-200s and 21 757-300s. United Airlines is the world's largest operator of the 757-300. This 757-200 was arriving at the Washington Dulles International Airport after a flight from Dublin, Ireland.


UNITED


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John Jenkins Designs Messerschmitt Me-262B-1a/U1

John Jenkins Designs 1/30 scale Messerschmitt Me-262B-1a/U1 is a stunning replica of the two-seat night fighter variant of the world's first operational jet fighter. The model is painted to replicate "Red 12", a Me-262B-1a/U1 assigned to 10./NJG 11 based at Reinfeld in May 1945. John Jenkins Designs did an excellent job reproducing the complicated "mottling" camouflage pattern used on the actual aircraft. This camouflage pattern was used by the Luftwaffe in the later years of World War II and is very difficult to replicate on models.

The Messerschmitt Me-262 was one of the most advanced combat aircraft of World War II. Known as the Schwalbe (German: Swallow) in fighter variants and the Sturmvogel (German: Storm Bird) in fighter-bomber variants, the Me-262 was designed and produced by German aircraft manufacturer Messerschmitt. The Me-262 holds the distinction of being the world's first operational jet fighter aircraft.

Messerschmitt began design work on the Me-262 in 1939 before World War II began. The aircraft made its first flight using a piston engine on April 18, 1941, and its first flight using jet power on July 18, 1942. Progress on the aircraft was delayed by reliability problems with its Junkers Jumo 004 turbojet engines and political interference from Luftwaffe chief Herman Göring and Adolf Hitler. The German leader insisted that Messerschmitt redesign the Me-262 as a fighter-bomber, rather than the defensive interceptor the aircraft was intended to be. The Me-262 finally became operational with the Luftwaffe in mid-1944. In addition to its roles as a fighter and fighter-bomber, the Luftwaffe also employed the Me-262 in small numbers in reconnaissance and night fighter roles.

The Me-262 was heavily armed and faster than any fighter aircraft available to the Allies. When flown by experienced pilots, the Me-262 was an effective fighter, with German fliers using the aircraft's high top speed and heavy armament in hit-and-run attacks on enemy fighter and bomber formations. In the short time the Me -262 was operational before World War II ended, German pilots shot down 542 enemy aircraft while flying the jet. Allied fighter pilots countered the Me-262 by attacking the aircraft when they were most vulnerable, landing or taking off from their bases. Allied bombers also attacked the facilities producing the special fuel used by the jets, severely reducing Me-262 flight operations due to fuel shortages. In addition to the fuel shortages, the Me-262 suffered from reliability problems with its engines due to shortages of strategic materials. The reliability of the Junkers Jumo 004 turbojet engines was so poor that some engines needed replacement after only a few hours of operation.

Although approximately 1,500 Me-262s were built during World War II, usually less than 200 were available operationally at any one time due to a lack of fuel, spares, and pilots. The small number of operational Me-262s meant that the aircraft made little impact overall on the war. The Me-262 and its design innovations had more of an impact in the postwar world. Captured examples of the Me-262 were flight-tested and evaluated by the United States, Great Britain, and the Soviet Union. The evaluation of the captured Me-262 influenced the designs of early jet fighter aircraft, such as the North American F-86 Sabre and MiG-15 produced in the United States and the Soviet Union.

John Jenkins Designs manufactures toy soldiers, vehicles, and diorama accessories in 1/30 scale using mixed medial materials. The company has product lines covering all eras of history, from the Revolutionary War to World War II. John Jenkins Designs is known for its exceptional World War I aircraft models, part of their "Knights of the Sky" product line covering World War I aircraft and pilots. In recent years, John Jenkins Designs has expanded its product offerings to include a small lineup of World War II aircraft, vehicles, and figures. One of the company's latest World War II aircraft releases is a model of the Messerschmitt Me-262b-1a/U1 night fighter.

Since the Me-262 handled much differently than conventional piston-engine fighter aircraft, Messerschmitt built a two-seat trainer variant of the aircraft. The two-seat variant was created by removing one of the center fuselage fuel tanks, adding a second seat, and fitting a lengthened canopy. The Luftwaffe planned to have 65 two-seat Me-262 training aircraft built, but only 15 examples were built.

From the very beginning of the Me-262's development, a night fighter version of the aircraft was planned. However, the fighter and fighter-bomber variants were given production priority. In September 1944, the German Luftwaffe had virtually no aircraft capable of intercepting RAF de Havilland Mosquito fighter-bomber raids over Germany at night. While waiting for the official night fighter variant of the Me-262 to be produced, the Luftwaffe decided to convert some of the Me-262 trainers into night fighters. These aircraft were equipped with the FuG 218 Neptun radar and the Hirschgeweih (German: antler) eight-dipole antenna array and designated the Me-262B-1a/U1. As strategic materials were in short supply, only six Me-262B-1a/U1s were built.

The John Jenkins Designs Messerschmitt Me-262B-1a/U1 model has a number of working features for added realism. The nose gun bays can be opened and closed. The leading edge slats open and close on the wings, and the engines have removable covers to show the internal details of the engines. The cockpit canopies also open and close on the model, revealing a detailed cockpit with seats and seat belts, flight instruments, and the control stick all faithfully replicated.

Unfortunately, the John Jenkins Designs Messerschmitt Me-262B-1a/U1 model does not include any pilot figures for the cockpit. Fortunately, a pilot figure made by John Jenkins Designs for their Supermarine Spitfire model in the same scale fit inside the cockpit of the Me-262 model. The figures need to be repainted in appropriate Luftwaffe uniform colors for a more authentic look, an easy task with some model paint and a little patience.

The Me-262B-1a/U1 replicated by the model from John Jenkins Designs is *Red 12*, an aircraft assigned to 10./NJG 11 and based at Reinfeld in May 1945. On May 6, 1945, Lt. Herbert Altner surrendered this aircraft to the Allies. The British recovered the Me-262B-1a/U1 and displayed the aircraft in several exhibitions after the war. Unfortunately, during one of these exhibitions, the Me-262B-1a/U1 was destroyed in a bad storm.

The John Jenkins Designs Me-262B-1a/U1 is an impressive model. Unlike most model aircraft made by toy soldier companies, the John Jenkins Designs models often have a lot of functionality built into them. This Me-262B-1a/U1 model is no exception. On this model, the forward gun bays open and close, and the top engine covers on each of the Junkers Jumo 004 engines are removable, revealing some of the internal engine details. The canopy also opens on the model, showcasing a finely-detailed cockpit with painted instrument gauges and pilot seats. Finally, the leading edge slats on the model open as they would have on the actual aircraft. Other detailed parts on the model include the external fuel tanks mounted under the nose of the aircraft, the night radar antennas that are inserted into the nose, and detailed engine fan blades in each of the engine nacelles.

Another strong point of this model is the design of the landing gear components. The model has the option to be displayed with its landing gear extended or retracted. To display the model in flight, a display stand not included with the model can be purchased separately from John Jenkins Designs. The landing gear parts are attached to the model using concealed magnets in the model and on the landing gear parts themselves. The use of magnets eliminates the use of any plastic tabs to insert the landing gear parts that often break over time. The landing gear parts are solid and support the model's weight with no issue.

A final strong point of the model is the paint scheme. A photograph of the Me-262B-1a/U1 *Red 12* exists, clearly showing the aircraft's camouflage patterns and markings. John Jenkins Designs did an incredible job replicating the mottling camouflage pattern used by the Luftwaffe on the actual aircraft. All national markings and stenciling on the model are clear and sharp as well. John Jenkins Designs also finished the model with appropriate levels of weathering, illustrating that the aircraft showed use with replicated paint chipping along some of the panel lines and exhaust stains where they would be found on the wings and around the engines.

As with any model aircraft, there are always some areas that could use some improvement. Although the John Jenkins Designs Me-262B-1a/U1 is an excellent model of the German fighter jet, it does have some minor shortcomings. One of the most significant shortcomings of the model is that no pilot figures are included for the cockpits. Without pilot figures, the model looks out of place if displayed as if it were in flight. Fortunately, John Jenkins Designs made some Royal Air Force pilot figures for the cockpits of their Supermarine Spitfire models that were released a few years back. These seated pilot figures, if repainted to look like German pilots, look the part and do fit inside the cockpits of the Me-262B-1a/U1 with a little customization work.

Another shortcoming of the model is that no type of display stand is included. This is a premium model at a premium price point, and most aircraft model manufacturers that sell models in this price range have display stands included. As the Me-262B-1a/U1 is a fairly large model in 1/30 scale, a display stand allows the model to be displayed as if it were flying and saves space on a bookshelf or desk. John Jenkins Designs does offer display stands in several sizes for their model aircraft, but as an additional purchase. These display stands have not been restocked at dealers in quite some time, making them very hard to find through the John Jenkins Designs dealer network on the retail market.

Finally, although John Jenkins Designs offers several product lines of 1/30 scale figures, the company has not offered any Luftwaffe ground crew figures to display with their German aircraft models. The Me-262B-1a/U1, with its removable engine covers and opening gun bays, makes an excellent model to feature in a diorama. If a collector wants to display the Me-262B-1a/U1 in a diorama, they have to source ground crew figures and airfield accessories from other manufacturers of toy soldiers, such as Thomas Gunn and W. Britain.

The John Jenkins Designs Me-262B-1a/U1 is an excellent model of one of the rare versions of the revolutionary Messerschmitt Me-262 jet fighter. The model is well-researched, with an accurate paint scheme and superb detail. The functionality of some parts of the model, such as the removable engine covers and opening leading-edge slats, add a sense of realism to the model and offer several display possibilities in a diorama or on a bookshelf or desk. This superb model of the Me-262B-1a/U1 will be a conversation piece in any World War II model airplane collection.

When paired with some diorama accessories from other toy soldier manufacturers, the John Jenkins Designs Messerschmitt Me-262B-1a/U1 looks fantastic displayed in a diorama. In this diorama, the Me-262B-1a/U1 is on a World War 2 German hardstand display base from Thomas Gunn Miniatures. Other items in the diorama from Thomas Gunn Miniatures include crates, fuel drums, and rolled-up tarps. The standing Luftwaffe pilot figure is from the manufacturer W. Britian.

"America's Hangar" Celebrates 20 Years

Since its opening in 2003, the Steven F. Udvar-Hazy Center has welcomed millions of visitors to see thousands of rare aviation and space artifacts.

The Space Shuttle Discovery is the featured space artifact in the Steven F. Udvar-Hazy Center's James S. McDonnell Space Hangar. In addition to the Discovery, the hangar contains preserved space capsules, astronaut suits, satellites, missiles, and other space artifacts. The Discovery was donated to the Smithsonian and added to the space hangar following its retirement by NASA in 2011.

The north side of the National Air and Space Museum's Steven F. Udvar-Hazy Center. Visible in this picture are the IMAX theater, Donald D. Engen Observation Tower, and the north side of the Boeing Aviation Hangar. This hangar, which is over 980 feet long, displays all of the aircraft and aviation artifacts in the museum's collection.

When its doors open to the public each day, the National Air and Space Museum's Steven F. Udvar-Hazy Center in Chantilly, Virginia, tells the story of aviation and space exploration through over 170 aircraft, 130 space vehicles, and thousands of smaller artifacts on display. Visitors to the museum can admire the sleek lines of the Concorde, the world's first supersonic commercial airliner, and the massive size of the Space Shuttle *Discovery,* which flew 39 missions and spent 365 days in space. Thousands of smaller artifacts are just as intriguing, such as a collection of space suits worn by astronauts and a showcase of memorabilia commemorating Charles Lindbergh's New York to Paris flight with the *Spirit of St. Louis*.

The National Air and Space Museum's Steven F. Udvar -Hazy Center's long road to reality began shortly after the National Air and Space Museum's flagship location opened in 1976 on the National Mall in downtown Washington D.C. The new building was large, the length of three city blocks, with the largest aircraft on display being a Douglas DC-3 commercial airliner from 1936. As museum curators moved aircraft and space vehicles into this new building, they realized at some point that a second, even larger facility would be needed to display the larger aircraft and space vehicles in the National Air and Space Museum's growing collection.

As the flagship location on the National Mall was being planned in the 1960s, National Air and Space Museum supporters were already advocating for a second facility. These supporters believed the newly-built Washington Dulles International Airport would be an ideal location. The airport's runways were long enough to support the arrival of large aircraft and the airport was only an hour's drive from downtown Washington D.C. Unfortunately, funding from Congress to the Smithsonian Institution was limited, and museum officials only supported building an air and space museum as part of the Smithsonian Institution's museum complex on the National Mall. At this location, the National Air and Space Museum became one of the world's most visited museums, with over nine million tourists passing through its doors each year.

When the location on the National Mall opened in 1976, many of the National Air and Space Museum's aircraft and space vehicles were left behind. Some were stored in a large hangar at Washington Dulles International Airport, and others at a facility known as "Silver Hill" in Suitland, Maryland. This facility, later named the Paul E. Garber Facility, consisted of about 30 metal buildings in a swampy marshland. Unfortunately, many of these storage buildings lacked the climate controls and insulation needed for long-term storage of aircraft and artifacts. Some larger aircraft were stored outside under plastic wrap in the elements. As the National Air and Space Museum's collection of artifacts continued to grow in the 1980s, a renewed interest developed in building a second, larger museum building.

Throughout the 1980s, National Air and Space Museum officials lobbied Congress for funding for a second National Air and Space Museum facility. They felt it was essential to display larger aircraft in their collection and preserve the collection for future generations. In 1984, the Washington Dulles International Airport and the Federal Aviation Administration set aside over 170 acres of land at the airport for a future second museum building and promised their support of the project. After nearly a decade of discussions with Smithsonian officials, Congress approved $8 million in funding in 1993 for the museum to design the "Dulles Extension" of the National Air and Space Museum. Three years later, with a promise of financial support from Virginia for the project, Congress authorized the Smithsonian to proceed further with design studies for the museum.

Unfortunately, there was a catch. Congress stated that no public funding could be used or would be authorized to support building a second National Air and Space Museum facility. The only money authorized by Congress for the Smithsonian Institution each year is an annual operating budget. Most Smithsonian projects are funded by donations. If a second museum building were to be constructed, the Smithsonian would have to raise the money by conducting a massive fundraising campaign.

The Boeing 367-80 "Dash 80" prototype on display in the Boeing Aviation Hangar at the Steven F. Udvar-Hazy Center. This prototype aircraft was developed into the 707 commercial airliner and the KC-135 Stratotanker aerial refueling aircraft for the U.S. Air Force. When the National Air and Space Museum began adding aircraft of this size to their collection, officials with the museum realized they would need a second museum building with dimensions to display large aircraft.

The Space Shuttle Discovery on display in the James S. McDonnell Space Hangar at the National Air and Space Museum's Steven F. Udvar-Hazy Center. When designing the new museum, National Air and Space Museum officials wanted a space-themed hangar large enough to display a Space Shuttle as part of the new facility. In addition to Discovery, the space hangar has examples of satellites, missiles, space capsules, and astronaut space suits and tools on display.

To help the Smithsonian Institution design the new facility, the museum contracted with the architectural firm Hellmuth, Obata & Kassabaum (HOK). HOK had helped the Smithsonian design and build the original location on the National Mall in the early 1970s. The firm worked closely with museum curators, collections experts, and exhibit designers to define the new facility in terms of size, structural requirements, site and access needs, and environmental impacts.

One of the key differences with the new facility compared to the flagship location on the National Mall was that the new building needed to be able to display larger aircraft and space vehicles. HOK and the Smithsonian agreed upon a design that was a large, vaulted space similar in appearance to an airship hangar that would fit the environment of a modern airport. This hangar would be over 900 feet long, accommodate 200 aircraft on display, and feature a large access door on one side so aircraft could be moved into the hangar without being taken apart. To get the most out of the display space, National Air and Space Museum curators wanted to hang many smaller aircraft from the ceiling as if they were flying. Elevated walkways running along the roof of the hangar would allow visitors to see aircraft on display from multiple angles.

Connected to the large aviation hangar would be a separate hangar large enough to hold a Space Shuttle and smaller space vehicles. Another part of the new museum building would be a restoration hangar and conservation lab for museum curators to restore aircraft and space vehicles and preserve smaller artifacts. Unlike the substandard facilities at Silver Hill, these new buildings would feature proper climate controls and lighting designed to preserve artifacts. The restoration hangar would have large windows and would be able to be viewed from inside the new museum. These windows allow museum visitors to watch museum curators restore aircraft. In addition, the new museum would have an IMAX movie theater, classrooms, restrooms, a food court, and a gift shop for museum visitors.

The view from the Donald D. Engen Observation Tower looking north toward the Washington Dulles International Airport. From the initial planning stages for the new museum, National Air and Space Museum officials wanted an observation tower for the facility so visitors could watch flight operations at the nearby airport.

Finally, the new museum building would feature a large observation tower, allowing visitors to watch airport operations at the nearby Washington Dulles International Airport. This 164-foot tall tower was named for Admiral Donald D. Engen, USN (Ret.), a former FAA Administrator and Director of the National Air And Space Museum who was an advocate for the need for a second National Air And Space Museum building. Engen contributed many design ideas for the new museum and traveled nationwide to gather support and solicit funding for the project. Sadly, Engen lost his life in a glider crash in 1999 and was unable to see his dream of a second facility become reality.

When HOK completed the preliminary design work in 1999, the new complex totaled 706,000 sq. ft. The new building would be the largest of the Smithsonian buildings and also the first Smithsonian museum to be built entirely with private funding. Although National Air and Space Museum curators could have used even more space, the design chosen for the new building prioritized their most immediate needs and reflected the fact an enormous fund-raising task lay ahead to fund the project.

Work began on the site of the new building in 2000. A contractor team from the Virginia Department of Transportation cleared the land for the "Dulles Center". The site set aside for the new museum building had been bought by the Washington Dulles International Airport in the 1950s for an expansion project that never came to fruition. It was ideally located next to major highways for easy access and had room for future growth. When the airport bought the property, it planted the fields full of pine trees. These trees were ready for harvesting when the contractors came to the site. In the fall of 2000, the National Air and Space Museum officially broke ground on the new building. The new building would be named the Steven F. Udvar-Hazy Center. Steven F. Udvar-Hazy, a Hungarian-American billionaire and businessman, gave a $66-million grant to the Smithsonian Institution to build the new museum and was the project's largest benefactor.

In the spring of 2001, the Smithsonian Institution awarded the building contract for the new facility, worth over $125 million, to the Hensel Phelps Construction Company. As this contract was finalized, the Virginia Department of Transportation sent a second contractor team to complete utility installation, pave roads and the 2,000-car parking lot, and a taxiway linking the museum to Runway 1R-19L at the Washington Dulles International Airport. As part of the generous financial contributions made by the Commonwealth of Virginia to the project, the state funded all of the site's infrastructure needs.

Since the Smithsonian was raising funds for the project as construction was ongoing, the museum phased the project. Hensel Phelps would first build the main aviation hangar, the space hangar, and the east wing. The east wing was a critical part of the first phase of the project because it contained the food court, IMAX theater, restrooms, and other amenities needed by the millions of visitors expected each year. If the first phase of the new building was completed, the Smithsonian could open the museum to the public. It was hoped that the new museum being open to the public would help the museum raise the additional funding needed to complete the rest of the facility. The second phase of the project would include the construction of the restoration hangar and artifact conservation lab.

Hensel Phelps and its subcontractors used two teams during the construction of Phase I. One team worked on the aviation hangar, and one worked on the east wing and the observation tower. A mild winter in 2001 with dry weather allowed the contractor teams to work ahead of schedule on the building. ADF International, the subcontractor that fabricated the massive arched steel trusses used for the hangar roof, was able to erect them in less than six months. In April 2002, work began on the space hangar, and by the fall, the new museum building was over three -quarters completed. The architectural theme of the new museum, with its large hangar and extensive collection of aircraft, gave it the nickname "America's Hangar" among Smithsonian officials.

Visitors to the National Air and Space Museum's Steven F. Udvar-Hazy Center check out aircraft on the museum floor of the Boeing Aviation Hangar. From the early planning studies for the new museum, National Air and Space Museum officials wanted a large building and the ability to hang several aircraft from the ceiling. Elevated walkways throughout the museum provide visitors the opportunity to see the hanging aircraft up close.

As Hensel Phelps construction crews and their subcontractors put the finishing touches on the Steven F. Udvar-Hazy Center, National and Space Museum curators were busy as well. Curators assembled aircraft and moved them into display positions in the building. Aircraft were shrink-wrapped in plastic to protect them from dust and damage as construction crews finished their work. Museum exhibit designers were also busy preparing signage to showcase aircraft and space vehicles on display and smaller exhibits for displaying the smaller artifacts. By the time the Steven F. Udvar-Hazy Center was ready to open in late 2003, more than 80 aircraft were in place within the museum building.

The National Air and Space Museum was able to time the opening week of the Steven F. Udvar-Hazy Center to coincide with the 100th Anniversary of the Wright Brothers first flight at Kitty Hawk. The museum officially opened to the public on Monday, December 15, 2003. Critical reception of the new facility was positive, with over 10,000 people visiting the museum on opening day. In the weeks following the opening, hundreds of thousands of visitors passed through the Steven F. Udvar-Hazy Center's doors. After only 11 weeks of operation, the new museum had been visited by over 500,000 people.

Although not completed in time for opening day, Hensel Phelps and museum curators were able to open the 246,000 sq. ft. James S. McDonnell Space Hangar in November 2004. After raising additional funding over the next few years, the National Air and Space Museum was able to contract with Hensel Phelps to build the Mary Baker Engen Restoration Hangar in October 2008. Construction was completed on the restoration hangar in October 2010. In 2019, construction crews began a project to repair the Steven F. Udvar Hazy Center's roof. During this time, the museum's food court was renovated and remodeled, with fast food chain Shake Shack taking over the contract for food court operations from McDonald's. The museum remained open to the public while these roof repairs and the food court remodeling project were completed.

The Mary Baker Engen Restoration Hangar in the National Air and Space Museum's Steven F. Udvar-Hazy Center provides museum curators with a large space to restore and assemble aircraft for museum display. The Martin B-26 Marauder "Flak Bait" has been a long-term restoration project for museum curators. "Flak Bait" holds the record for the most missions flown by an American bomber during World War II.

Two of the aircraft part of the World War II German Aviation Exhibit in the National Air and Space Museum's Steven F. Udvar-Hazy Center are this Focke-Wulf Fw-190F-8/R-1 and this Heinkel He-219A-2/R4 Uhu (Eagle-Owl). The Fw-190 was used by the Luftwaffe as a fighter and fighter-bomber, while the He-219 was operated as a purpose-built night fighter.

Today, approximately 80 percent of the National Air and Space Museum's collection of aircraft, space vehicles, and smaller artifacts are on display inside the Steven F. Udvar-Hazy Center. The museum is home to over 170 aircraft, 160 space vehicles, and thousands of smaller aviation and space artifacts. In addition to the treasures within the museum, the Steven F. Udvar-Hazy Center hosts special events throughout the year to further connect visitors to the history of aviation and space flight. These special events include guest speakers, presentations, author book signings, and visits from current and historic aircraft for display on the museum taxiway outside the main hangar.

The aircraft and space vehicles on display in the Steven F. Udvar-Hazy Center are divided into over 15 different themed exhibits. Although the Steven F. Udvar-Hazy Center is famous for some of its larger aircraft and space vehicles on display, such as the Concorde, the Lockheed SR-71A Blackbird, the Boeing B-29 Superfortress *Enola Gay*, and the Space Shuttle *Discovery*, there are many other aircraft in the exhibits at the Steven F. Udvar-Hazy Center that are historically significant and cannot be seen anywhere else in the world.

The Steven F. Udvar-Hazy Center has a large collection of World War II aircraft, the rarest being the ones displayed in the museum's *World War II German Aviation* exhibit. Two of the German aircraft on display in this exhibit are the world's only remaining examples. The Dornier Do-335 Pfeil and the Arado Ar-234 Blitz now on display at the museum were captured and evaluated at the end of World War II by the Allies. The Do-335 Pfeil was designed as a heavy fighter and was the fastest piston-engine German fighter of World War II. The Arado Ar-234 Blitz was the world's first operational jet bomber. Unfortunately for the Luftwaffe, both aircraft were built in small numbers due to engine problems and production delays and saw only limited operational use towards the end of the war. As a result, these technologically advanced aircraft could not make any impact on the outcome of World War II.

An Air Tractor AT-400A agricultural aircraft on display in the Commercial Aviation exhibit at the Steven F. Udvar -Hazy Center. At the request of Disneytoon Studios, Rusty Lindeman painted this aircraft in the colors of the character "Dusty" from the 2013 Disney animated film, "Planes". Lindeman flew this AT-400A at airshows in 2013 to promote the animated film for Disney. This airplane is very popular with the museum's younger visitors.

The aircraft that might be the highlight of the German World War II Aviation Exhibit in the museum is the Heinkel He-219 Uhu (Eagle-Owl) night fighter. The He-219 was an sophisticated airplane, featuring an advanced radar system and was the first military aircraft to be equipped with ejection seats. The He-219 was the fastest piston-engine night fighter available to the Luftwaffe during World War II and one of the only German aircraft capable of catching the Royal Air Force de Havilland Mosquito fighter-bombers. Despite its high speed and excellent handling characteristics, the He-219 was a complicated and expensive aircraft to build, and less than 300 were built during World War II, too few to make a significant impact in the German war effort.

The He-219 on display in the museum was secretly brought to the United States after World War II. Along with the other German World War II aircraft on display in the museum, it was flight-tested and evaluated before being donated to the Smithsonian Institution. National Air and Space Museum curators have spent several years restoring the rare He-219 and fabricating missing parts for the aircraft so it can be displayed in this exhibit.

In the *Commercial Aviation* exhibit within the museum, an aircraft on display is instantly recognizable by visiting children. An Air Tractor AT-400A on display is painted to match the colors of "Dusty" from the *"Planes"* and "*Planes: Fire and Rescue"* animated films from Disney. Owned by Rusty and Lea Lindeman, the Air Tractor AT-400A was painted to match Dusty's colors from *"Planes"* at the request of Disneytoon Studios. Rusty Lindeman then took the airplane to various airshows throughout the United States in 2013 to promote the film for Disney. Lindeman donated the AT-400A to the Smithsonian Institution when he retired the AT-400A from agricultural operations with his firm, Rusty's Flying Service. In the films, "Dusty" demonstrates the value of agricultural and utility aircraft to children. Today, this AT-400A, painted to look like "Dusty", is a huge hit with children at the museum and is often a stopping point in the museum for a family photo.

Another popular area with museum visitors in the Steven F. Udvar-Hazy Center is the *Modern Military Aviation* exhibit. This exhibit contains a diverse group of modern military aircraft, including an example of a Northrop Grumman EA-6B Prowler and a Grumman F-14D(R) Tomcat. Also on display in this exhibit is the prototype Lockheed Martin X-35B. The development and flight testing of this prototype eventually led to the production of the Lockheed Martin F-35 Lightning II, also known as the Joint Strike Fighter.

A recent addition to this exhibit is an aircraft in a color scheme that is very familiar to many visitors to the Steven F. Udvar-Hazy Center. In 2020, the Smithsonian Institution received a McDonnell Douglas/ Boeing F/A-18C Hornet as a donation from the U.S. Navy. This F/A-18C was donated to the museum by the U.S. Navy "Blue Angels" Flight Demonstration Squadron. At the time of the donation, the "Blue Angels" were transitioning to the newer Boeing F/A-18 E/F Super Hornets and retiring the older F/A-18Cs. The F/A-18C now on display within the Steven F. Udvar-Hazy Center flew in many airshows throughout the United States as part of one of the world's most storied military flight demonstration teams. Now on exhibit in the Steven F. Udvar-Hazy Center, the F/A-18C Hornet is still painted in its iconic "Blue Angels" color scheme of blue and gold. The addition of this aircraft to the collection helps the National Air and Space Museum tell the story of military flight demonstration teams to museum visitors.

For those aviation enthusiasts who like early airplanes, the Steven F. Udvar Hazy Center has several of those on display as well. The *Pre-1920 Aviation* exhibit in the museum features aircraft from the Pioneer Era and World War I. Some of the aircraft on display in this exhibit include an example of a Bleriot IX monoplane from the Pioneer Era and a Sopwith F.1 Camel, Halberstadt CL.IV, Nieuport 28C.1, and a Spad XVI from World War I. Perhaps the rarest airplane in the exhibit is the Caudron G.4, a rare surviving example of a light bomber and reconnaissance aircraft from World War I.

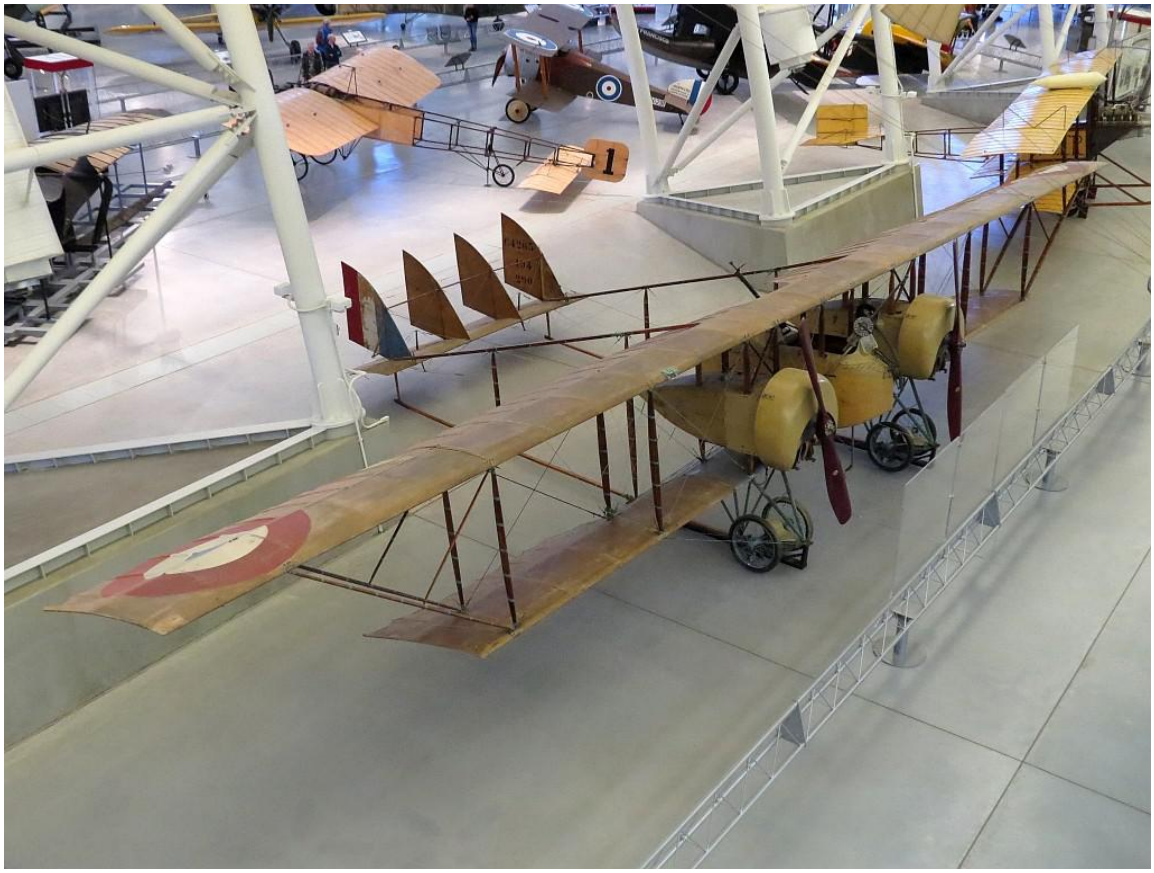
A McDonnell Douglas/Boeing F/A-18C Hornet on display in the Modern Military Aviation exhibit at the National Air and Space Museum's Steven F. Udvar-Hazy Center. This F/A-18C Hornet was a part of the U.S. Navy "Blue Angels" Flight Demonstration Squadron when it was donated to the museum, and still wears the team's iconic blue and gold paint scheme.

The Caudron G.4 on display in the museum is one of the oldest surviving bombers in the world and one of the few surviving twin-engine aircraft from World War I. A French-built aircraft, the Caudron G.4 saw widespread use with the Allies as a light bomber and reconnaissance aircraft when introduced into service in 1916. The G.4 was a primitive aircraft in many ways, using wing-warping technology for lateral flight control and having a top speed of only 80 miles per hour.

In 1917, the Caudron G.4 was withdrawn from use as a light bomber. Aviation technology was advancing rapidly during the war, so much so that the aircraft was now obsolete for frontline service. The surviving G.4s were used as training aircraft for the remainder of the war, where their excellent handling characteristics made them easy to fly for pilot trainees. Over 1,300 G.4s were built during World War I. Today, this rare surviving example helps the Steven F. Udvar-Hazy Center tell the story of early reconnaissance and bomber aircraft to museum visitors.

Another rare aircraft in the collection of the National Air and Space Museum's Steven F. Udvar-Hazy Center is located in the *Inter-War Aviation* exhibit. Aviation changed dramatically in the years between the two world wars, with airplanes evolving from wood and fabric biplanes to metal monoplanes. Advancements were also made in the technology of aero engines, allowing aircraft to fly faster and for longer distances. During this period of aviation history, some innovative concepts in aviation led to dead ends. The museum's Curtiss F9C-2 Sparrowhawk, the only surviving example of its type, and represents one of those innovative but flawed concepts.

In the 1930s, the U.S. Navy built two giant rigid airships, the *U.S.S. Akron* and the *U.S.S. Macon*. The U.S. Navy had an imaginative concept for using these airships for long-range reconnaissance. The U.S. Navy envisioned these airships as being airborne aircraft carriers, having their own fighter aircraft that could be used to scout enemy fleets and report their position. Each airship had a specially designed hangar to accommodate these aircraft.



The Caudron G.4 on display in the National Air and Space Museum's Steven F. Udvar-Hazy Center is one of the world's oldest surviving bombers and reconnaissance aircraft.

The world's only remaining example of the Curtiss F9C-2 Sparrowhawk parasite fighter on display in the National Air and Space Museum's Steven F. Udvar-Hazy Center. The insignia of "The Men On The Flying Trapeze" was a nod to the way the pilots launched and returned to the U.S. Navy airships, by attaching and releasing from a special trapeze hook on the bottom of the airship.

The Curtiss F9C Sparrowhawk was initially designed as a carrier-borne fighter aircraft but had poor flight deck handling characteristics, tending to bounce when landing. When the U.S. Navy needed a small aircraft to operate from the airships as a parasite fighter, the diminutive Sparrowhawk, being only 12 feet high, 20 feet long, and having a wingspan of 25 feet, met the requirements. Eight Sparrowhawks were built for use aboard the two airships.

When operating from the airships, the Sparrowhawks could be launched and recovered using a special trapeze hook mounted on the underside of the airship. The Sparrowhawks were stored inside a hangar inside the bottom of the airship. The U.S. Navy tried several concepts with the airships and the Sparrowhawks, including locating and scouting surface ships. Unfortunately, the small size of the Sparrowhawks limited their range and the armament they could carry. The slow speed and large size of both airships made them easy to find by enemy aircraft in simulated war games.

The U.S. Navy's interest in the concept ended when both airships were lost in crashes, the *U.S.S. Akron* in 1933 and the *U.S.S. Macon* in 1935. The three Sparrowhawks that survived after the loss of the two airships were relegated to utility aircraft as they had no airship to operate from. By 1939, only one Sparrowhawk remained in airworthy condition. The U.S. Navy, recognizing the importance of the little aircraft in naval aviation history, rebuilt it using the best parts from the surviving F9C-2s and donated it to the Smithsonian Institution. In 1974, the Potomac Chapter of the Antique Airplane Association restored the F9C-2 Sparrowhawk for the National Air and Space Museum.

The National Air and Space Museum's Steven F. Udvar-Hazy also has an extensive collection of Korean and Vietnam War aircraft in their *Korean and Vietnam Aviation* exhibit. These aircraft, especially the examples from the Vietnam War, have become more popular with museum visitors in recent years as interest in this war grows as the population who fought in it ages.

The National Air and Space Museum's Steven F. Udvar-Hazy Center has an extensive collection of aircraft from the Vietnam War on display. This McDonnell Douglas F-4S Phantom II was used by the U.S. Navy for combat missions during the Linebacker II bombing campaign in 1972. The F-4S was later transferred to the U.S. Marine Corps, where it finished its combat career.

One of the aircraft on display in the exhibit is a McDonnell Douglas F-4S Phantom II. The F-4 is one of the most successful multirole combat aircraft in aviation history and has been adaptable to many roles throughout its career, including reconnaissance, ground attack, and air superiority. The F-4 on display in the exhibit saw service during the Vietnam War with the U.S. Navy, flying missions during the Linebacker II bombing campaign in 1972.

Also on display in this exhibit is a Soviet-built Mikoyan-Gurevich MiG-21F. The small, fast, and nimble MiG-21 was the standard Soviet interceptor during the 1960s and 1970s. Widely exported, the MiG-21 saw service in 60 nations across four continents. Upgrades to radar, armament, and engines allowed the MiG-21 to be developed into a multirole aircraft later in its career. Over 60 years after its introduction, a few countries still operate the MiG-21 as a frontline combat aircraft.

Another aircraft on exhibit from the Vietnam War is a Republic F-105D Thunderchief. The F-105 was designed as an all-weather, supersonic, fighter-bomber capable of delivering conventional or nuclear weapons. Nicknamed the "Thud" by its pilots and maintainers, the F-105s were a key part of the bombing campaign of the Vietnam War, flying over 20,000 missions during the conflict.

The exhibit also includes an example of a Grumman A-6E Intruder. Developed as an all-weather strike aircraft for the U.S. Navy and Marine Corps, the A-6 also saw significant service in the Vietnam War, attacking high-value targets at night and in adverse weather conditions. The A-6 Intruder had a long career with the U.S. Navy, with the last examples finally being retired after the 1991 Gulf War.

In addition to the aircraft and space vehicles on display, the National Air and Space Museum's Steven F. Udvar-Hazy Center also has thousands of other aviation and space artifacts on display. These artifacts include models, artwork, flight suits, aviation memorabilia, and other objects that tell the story of air and space flight.

One of the new additions to the Steven F. Udvar-Hazy's collection of artifacts is an Oshkosh T-3000 Rescue Truck located in the *Commercial Aviation* exhibit. These heavy-duty rescue trucks are specifically designed to respond to aircraft accidents. These vehicles carry large tanks that can hold water, foam, and dry chemicals to extinguish fires from aircraft accidents. The foam is used to smother burning jet fuel. Often called "crash trucks", these vehicles are equipped with large tires and powerful diesel engines. These features allow the trucks to drive over all types of terrain at high speed and respond quickly to an emergency.

The T-3000 rescue truck on display has a unique place in history. During the September 11, 2001, terrorist attack on the Pentagon, the airliner that was flown into the Pentagon had nearly 20 tons of aviation fuel on board. The Pentagon's foam truck for its helipad was severely damaged in the attack, leaving emergency personnel no way to extinguish the large aviation fuel fire burning at the Pentagon's destroyed Navy Command Center.

An emergency call was put out to the Ronald Reagan National Airport for assistance, and this crash truck, "Foam 331", was one of the first vehicles to respond to the scene along with "Engine 335", a conventional fire pumper from the airport. Shortly after "Foam 331 and " Engine 335" arrived, "Foam 335", a second crash truck from Ronald Reagan National Airport, was called to the scene. The fire was so intense that both crash trucks quickly ran out of the foam. A tanker from the airport was called to the Pentagon to resupply the vehicles. The efforts of these two crash trucks and their crews succeeded in suppressing the fire, limiting further damage, and preventing further loss of life. The T-3000 was retired by the Washington Metropolitan Airport Authority (WMAA) in 2016. In 2021, retired WMAA firefighter Bill Stewart and the Aircraft Rescue & Firefighting Rescue Working Group worked with Oshkosh Airport Products to restore "Foam 331" to how it appeared during the 9/11 attacks and donate it to the National Air and Space Museum.

"Foam 331", an Oshkosh T-3000 Foam/Crash Truck, on display in the National Air And Space Museum's Steven F. Udvar-Hazy Center. This foam truck played an important role in extinguishing the massive at the Pentagon caused by the airliner crashing into the building during the 9/11 attacks.

Visitors to the National Air and Space Museum's Steven F. Udvar-Hazy Center currently have the opportunity to see several aircraft on display that usually are not part of the museum's aircraft collection. These aircraft are normally on display at the flagship National Air and Space Museum location on the National Mall. That museum is undergoing a renovation project, and to allow for construction crews space to do the renovation work, several aircraft, such as the North American P-51D Mustang located in the museum's *World War II Aviation* exhibit, had to be relocated out of the building. While these aircraft are at the Steven F. Udvar-Hazy Center, they are getting restoration work from museum curators if needed. Because of space limitations, some aircraft, such as the Hughes H-1 Racer, are displayed in sub-assemblies and will be fully reassembled when they are returned to the National Mall location.

One aircraft from the National Mall location that is on display fully assembled is the Bell X-1 "Glamorous Glennis" flown by Chuck Yeager. Yeager made history flying this aircraft when he broke the sound barrier with it on October 14, 1947. The Bell X-1 is being displayed near another rocket-powered aircraft, the museum's Messerschmitt Me-163 Komet from World War II. An excellent aspect about the Bell X-1 on display at the Steven F. Udvar-Hazy Center is that where aircraft hangs on display in the museum at the National Mall, it is far away from a close-up view by museum visitors. The Bell X-1 is currently on floor display at the Steven F. Udvar-Hazy Center, allowing museum visitors to get close to the aircraft and see it at eye level.

Another new addition to the Steven F. Udvar-Hazy Center is the Boeing B-17G Flying Fortress "Shoo Shoo Shoo Baby". This aircraft was recently shipped to the museum from the National Museum of the United States Air Force in Dayton, Ohio. Currently, the B-17G is in various pieces and sub-assemblies on the museum floor of the Steven F. Udvar-Hazy Center. Museum curators plan to fully assemble the B-17G to display on the museum floor within the next year.

The Bell X-1 "Glamorous Glennis" flown by Chuck Yeager on display in the National Air and Space Museum's Steven F. Udvar-Hazy Center. The Bell X-1 is usually on display at the National Air and Space Museum's flagship location on the National Mall but is temporarily at the Steven F. Udvar-Hazy Center as the National Mall location undergoes a renovation project.

With its position right near the museum's main entrance, the Vought F4U-1D Corsair is a popular photo opportunity for visitors at the National Air and Space Museum's Steven F. Udvar-Hazy Center. Introduced in 1943, the Corsair was one of the best naval aircraft of World War II, useful as both a fighter and fighter-bomber. Upgraded variants of the Corsair were also used in the Korean War.

For the past 20 years, visitors to the National Air and Space Museum's Steven F. Udvar-Hazy Center have been awe-struck by the aircraft and space vehicles on display. Visitors from military veterans to school children to families on vacation have gasped at a Vought F4U-1D Corsair from World War II hanging from the ceiling as if it was approaching an aircraft carrier deck and posed for a picture next to the massive Space Shuttle Discovery. Exploring the elevated walkways, visitors have viewed the Concorde and appreciated its sleek lines from several different angles. From the Donald D. Engen Observation Tower, museum visitors have watched some of the largest commercial aircraft in the world, such as the Boeing 747 and Airbus A380, land at the Washington Dulles International Airport.

As aviation and space flight continues to technologically advance in the future, new aircraft and space vehicles will take their place in the museum to continue the story of air and space flight for museum visitors. There is little doubt that 20 years from now, visitors of all ages will still come through the National Air and Space Museum's Steven F. Udvar-Hazy Center's doors by the millions each year. They will not only be fascinated by the aircraft and space vehicles on display but also the thousands of smaller space and aviation artifacts and the building's stunning architectural design that fits the ambiance of the airport environment where it is located.

The National Air and Space Museum's Steven F. Udvar-Hazy Center nickname is "America's Hangar". The museum is just that, a hangar full of aviation and space treasures preserved for current and future generations of not only Americans, but people from around the world to learn about the history of aviation and space exploration.

To learn more about the National Air and Space Museum's Steven F. Udvar-Hazy Center, take a virtual tour of the museum, see more photos of the museum's artifact collection, or plan a visit to the museum, please visit ***https://airandspace.si.edu/visit/udvar-hazy-center****.*

Aichi M6A1 Seiran (Clear Sky Storm)

The National Air and Space Museum Steven F. Udvar-Hazy Center's Aichi M6A1 Seiran is the world's only remaining example of this innovative floatplane designed to operate as a strike aircraft from large aircraft carrier submarines. During World War II, the Imperial Japanese Navy planned to use these aircraft to launch a surprise strike against the Gatun Locks of the Panama Canal.

The Aichi M6A1 Seiran was designed to fulfill a requirement for a bomber that could operate exclusively from a submarine. During World War II, the Imperial Japanese Navy developed a fleet of aircraft carrier submarines to bring aircraft within striking distance of the mainland United States and other strategic targets that were thousands of miles from Japan. No Seiran saw combat during World War II, but the aircraft represents an innovative blend of combining submarine and aircraft technology into a weapons system.

Japan had experimented with and successfully operated small reconnaissance aircraft from submarines before the United States entered World War II. In April 1942, the Japanese Navy issued a requirement to build a new series of submarine aircraft carriers designated the I-400 class. Japanese Navy planners envisioned a large fleet of these submarines but the war turning against the Japanese and a shortage of strategic materials meant only three of these submarines were completed, the *I-400* through *I-402*. These submarines were the largest built during World War II. The *I-400* class displaced 6,560 tons submerged and cruised at 18.7 knots when surfaced. The ships could carry three aircraft in a special waterproof hangar and had a range of over 43,000 miles.

After commencing the *I-400* program, the Japanese Navy contracted with Aichi to develop a specialized aircraft that the submarines would carry as a strike force. Designated the Special Attack Aircraft Prototype M6A1. Aichi's chief engineer, Toshio Ozaki, faced a daunting challenge when designing the aircraft. The Navy requirements specified that the aircraft had to be able to carry a bomb or torpedo load of 1,200 lb. The M6A1 had to have a top speed of 294 mph with floats or 347 mph without them. The Navy also stipulated that if the M6A1 needed to be assembled prior to launch from the submarine, the assembly and launching of three of the aircraft had to be completed in 30 minutes. The aircraft and its components would also have to fit inside a specially designed, watertight, cylinder-shaped hangar on the submarine's main deck. This hangar's diameter only measured 11 ft 6 in.

To confront the space challenges on the submarine, Ozaki designed the main wing spar of the M6A1 to rotate 90° once the deck crew removed the floats. After rotating the wings, the crew then folded them back to lie flat against the fuselage. About ⅔ of each side of the horizontal stabilizer and the tip of the vertical stabilizer also folded down so the aircraft could fit in the submarine's hangar. The floats and pylons were removable and stored in compartments on the submarine's deck. If necessary, the M6A1 Seiran could be launched from the submarine without the floats installed, or the pilot could jettison the floats in flight. The first prototype was completed in October 1943, and flight tests began in November. In February 1944, a second prototype joined the flight test program. In addition to the prototypes, two land-based M6A1-K Nanzan training aircraft were built for pilots to familiarize themselves with the type.

Unfortunately for the Japanese Navy, the war situation deteriorated rapidly in late 1944. Progress was stopped on the development of the M6A1 Seiran after an earthquake damaged Aichi's production line in December 1944. Boeing B-29 bombing raids further damaged Aichi's production facilities. In March 1945, further military setbacks caused the Navy to curtail the submarine program, and work on the last two *I-400* class submarines was stopped. The *I-402* was turned into a submarine fuel tanker, so only the *I-400* and *I-401* were completed as intended. Using parts on hand, Aichi eventually built 28 Seirans, the production total included the eight prototypes and two trainers used in flight testing.

Japanese Navy leaders organized the Seirans and their crews into the 631st Air Corps. The *I-400* and *I-401* and two AM class submarines, the *I-13* and *I-14*, were organized into the 1st Submarine Flotilla. The whole force was placed under the command of Captain Tatsunosuke Ariizumi. During sea trials, the units focused on reducing the time it took to assemble and launch the Seirans. Eventually, the crews could launch three Seirans without floats in less than 15 minutes. The major drawback was that the Seiran could not land safely on the water without floats, so the pilot would have to ditch following the mission, and the aircraft would be lost.

In what would have been one of the most daring raids on a strategic target during World War II, Japanese Navy planners intended to use the 1st Submarine Flotilla in a strike against the Panama Canal. Ten Seirans would strike the Gatun Locks with six torpedoes and four bombs. To plan the attack, pilots studied a large-scale model of the lock system and memorized important features of the canal. The planning for the attack was very similar to how the Japanese Navy planned for the strike against Pearl Harbor in 1941.

During these preparations, the Japanese Navy decided to strike first at Ulithi Atoll in an attack called Operation Hikari. The plan would require the use of six Seirans and four Nakajima C6N1 Saiun reconnaissance aircraft. The smaller *I-13* and *I-14* submarines would carry two C6N1s each and offload them at Truk Island. The C6N1 pilots would then take off from Truk and scout the American ships at Ulithi Atoll, relaying target information to the Seiran crews. The Seirans would then attack the most important American ships located there, the aircraft and troop transports being primary targets.

Unfortunately, the mission was a failure. The *I-13* was spotted by American aircraft and damaged and later sunk by a U.S. destroyer. The *I-400* missed a critical radio message and proceeded to the wrong rendezvous point. On August 16, 1945, the 1st Submarine Flotilla received a radio transmission the war was over and to return to Japan. The crews of both the *I-400* and *I-401* scuttled the Seiran aircraft before returning home, punching holes in their floats and then catapulting or pushing them into the ocean so they would sink.

The National Air and Space Museum's M6A1 Seiran is the world's only remaining example of the type. This Seiran was the last example built by Aichi. Imperial Japanese Navy pilot Lt. Kazuo Akatsuka flew this Seiran from Fukuyama to Yokosuka, where he surrendered it to American forces. After examination by American forces, this aircraft, along with other captured Japanese aircraft, was shipped to the United States. It was periodically displayed at the Naval Air Station in Alameda, California until it was donated to the Smithsonian Institution for the National Air and Space Museum.

The National Air and Space Museum took possession of the Seiran in 1962 but had no space to display or store the rare aircraft. Sadly, the Seiran remained in outdoor storage for nearly 12 years at the museum's Paul E. Garber Restoration and Storage Facility in Silver Hill, Maryland, until space became available to move it indoors.

In June 1989, curators began restoration work on the M6A1 Seiran. Restoring the Seiran proved to be one of the most challenging restorations ever completed by the National Air and Space Museum curators. No production drawings of the Seiran survived, and the restoration team had to conduct exhaustive research into how the various aircraft systems operated as no manuals were available. In addition, many original components of the aircraft were missing and had to be fabricated to complete the restoration. The restoration team included museum curators, volunteers, and Japanese nationals working in both Japan and the United States.

During the restoration process, the team discovered engineering and design features on the Seiran that were both innovative and absurd. The Seiran also displayed signs of the difficulties faced by the Japanese aviation industry at the end of World War II. The fit and alignment of parts in many places on the aircraft was poor, the interior of the fuel tanks were contaminated with paper, and a metal flap had been hastily patched and covered with fabric. Contrary to Aichi's claims, museum curators could find no evidence the pilot could jettison the floats in flight. It is unknown if this feature was deleted during the production run or never installed.

After over ten years of work, the National Air and Space Museum restoration team completed work on the Seiran in 2000. After the restoration work was finished, the Seiran was kept in storage at the Paul E. Garber Restoration Facility and could only be viewed during special tours of the facility. In 2003, with the opening of the museum's Steven F. Udvar-Hazy Center in Chantilly, Virginia, the Seiran was finally put on public display. Today, the Seiran is on display in the World War II Aviation gallery of the museum, along with other rare examples of World War II aircraft from Japan, Germany, Great Britain, and the United States.

Sikorsky JRS-1 (1937)

The Sikorsky JRS-1 was a military variant of the twin-engine S-43 amphibious flying boat monoplane produced by Sikorsky Aircraft for the U.S. Navy and Marine Corps. Nicknamed the "Baby Clipper", the S-43 entered service in 1935 and accommodated between 15 and 20 passengers. Inter-Island Airways of Hawaii was the launch customer for the aircraft. Pan American Airways also operated several S-43s on flights from Florida to Cuba. In 1937, Sikorsky sold five S-43 aircraft to the U.S. Army Air Corps under the designation OA-8 for use as transports. The U.S. Navy purchased 17 S-43s, designated the JRS-1 in U.S. Navy service, for use as utility aircraft between 1937 and 1939. This JRS-1 is the only surviving example of the type and the only aircraft in the Smithsonian collection that was at Pearl Harbor on December 7, 1941.

Sikorsky JRS-1

Crew: 3 (Pilot, Co-pilot, Radio Operator/Navigator)

Passenger Capacity: 15

Length: 51 ft 11 in

Height: 17 ft 7 in

Wingspan: 86 ft

Wing Area: 780.6 sq ft

Powerplant: Pratt & Whitney R-1690-52 Hornet air-cooled, nine-cylinder radial piston engine (x2)

Range: 673 nmi

Cruise Speed: 166 mph

Maximum Speed: 190 mph

Empty/Maximum Takeoff Weights: 13,749 lb/19,500 lb

Service Ceiling: 20,700 ft

Pearl Harbor Survivor

Pearl Harbor

During the Pearl Harbor attack, the ten JRS-1s of VJ-1 stationed at Ford Island were not damaged, and the aircraft were immediately pressed into service to search for the Japanese fleet. As the JRS -1s had no defensive armament, it was hoped that if any of these aircraft found the Japanese fleet, they could radio the fleet's position back to Pearl Harbor before being shot down by Japanese fighters. After searching for five hours, all the JRS-1s returned safely to Pearl Harbor, with none of the aircraft making any contact with the Japanese fleet. In the days after the Pearl Harbor attack, the JRS-1s were armed with depth charges and defensive armament and flew patrol missions from Ford Island searching for Japanese submarines.

Engines

The JRS-1 was powered by a pair of Pratt & Whitney R-1690-52 Hornet radial engines. These nine-cylinder engines generated 750 horsepower each. These air-cooled, radial engines were reliable, simple to maintain, and could operate well in a variety of climates. The twin-engine design of the JRS-1 was also an added safety measure when flying over water, as the aircraft could be fly safely even if one engine failed. The engines were mounted high on the airframe to help avoid damage due to debris and sea spray.

Utility Role

The JRS-1 was used by the U.S. Navy as a utility aircraft. In this role, the JRS-1s and their crews performed many flights that helped keep the U.S. Navy functioning. The JRS-1s carried mail, personnel, spare parts, and cargo to the various installations throughout the Hawaiian Islands. Other roles performed by the JRS-1s included towing targets for gunnery practice and taking aerial photos. Many aerial photographs of the damage in the aftermath of the Pearl Harbor attack were taken by the JRS-1s of VJ-1.

Crew & Passengers

The JRS-1 had provisions for a crew of three consisting of a pilot, co-pilot, and radio operator/navigator. Extra crewmembers were sometimes carried on special missions. Just behind the cockpit was a position used by the aircraft's radio operator, who also functioned as a navigator. The fuselage of the JRS-1 had seating accommodations for 15 passengers. These seat were removable so the JRS-1 could carry cargo as well.

Landing Gear

The JRS-1 was one of many successful amphibian aircraft built by Sikorsky Aircraft and was capable of operating off of both land and water surfaces. The boat hull-style fuselage and outrigger floats provided excellent stability when landing and taking off from water surfaces. The JRS-1 also had conventional landing gear so it could operate from regular runways. The main landing gear and tailwheel extended and retracted from the hull of the JRS-1. This versatility was useful to the U.S. Navy, especially in a location like the Hawaiian Islands.

Markings

On the day of the Pearl Harbor attack, the JRS-1 in the Smithsonian collection wore these colorful markings as part of Utility Squadron One (VJ -1) stationed on Ford Island. The green tail identified the JRS-1 as one of VJ-1's aircraft, and the red ring around the fuselage identified it as the squadron commander's aircraft. After the attack, VJ-1 personnel quickly painted the aircraft blue with white undersurfaces to give it a measure of camouflage in wartime. The aircraft's current appearance is due to many years of the paint being exposed to the elements. The blue paint has weathered, and the aircraft's original paint scheme is showing through.

A Rare SB-17G Model

The Franklin Mint manufactured a line of 1/48 scale die-cast model aircraft called The Armour Collection during the early and mid-2000s. This die-cast model of a Boeing SB-17G Flying Fortress is one of the rarer models produced by the company. The SB-17G was a modified search and rescue variant of the B-17 Flying Fortress used by the U.S. Army Air Corps, and later the U.S. Air Force, from 1944 to the mid-1950s. Some SB-17Gs were also operated by the U.S. Navy and U.S. Coast Guard.

The Franklin Mint was a well-known company that mass-marketed collectibles such as dolls, plates, knives, record sets, die-cast vehicles, and privately-minted coins and medallions. In the early 2000s, the Franklin Mint bought CDC Armour, an Italian company that made die-cast model aircraft in 1/48 scale. When the Franklin Mint took over ownership of the company, they added several new models to the product lineup. These models had a huge following with aviation enthusiasts worldwide and were revolutionary in the industry with the size and detail they offered. After several changes in the parent ownership of the Franklin Mint and a decline in the market for collectibles in the mid-2000s, the company decided to wind down its operations and sell off its assets. The last 1/48 die-cast aircraft models produced by the Franklin Mint were manufactured in 2009.

One of the most sought-after die-cast model aircraft offered by the Franklin Mint was their incredible 1/48-scale Boeing B-17 Flying Fortress. This heavy and large die-cast model of the famous World War II heavy bomber featured movable gun turrets, rotating propellers, and rolling wheels. The B-17 was produced in several different paint schemes by the Franklin Mint, but this one, depicting an SB-17G, is one of the rarest.

The SB-17G was a modified version of the B-17G Flying Fortress designed for search and rescue missions. The U.S. Army Air Corps (later U.S. Air Force) modified over 130 B-17Gs for this mission. To carry out the search and rescue missions, these aircraft had their guns removed and were equipped with search radar and a Higgins A-1 lifeboat mounted on the underside of the airplane. The lifeboat could be dropped to survivors of a sinking ship or an airplane forced down at sea. The lifeboat had a motor and sail and was stocked with enough food and water to supply 12 people for about 20 days. The lifeboat also had a survival radio and antenna aboard. Because of their role as search and rescue aircraft, the SB-17s were affectionately known as “Dumbos” in service by their crews. Introduced into service late in 1944, the SB-17Gs were used in their search and rescue role until the mid-1950s.

The Franklin Mint SB-17G model is not a perfect replica of the type but captures the overall appearance of the actual aircraft well. The Franklin Mint correctly removed the gun turrets, added the search radar under the nose and the Higgins A-1 lifeboat under the fuselage, and replicated the SB-17G’s high-visibility paint scheme. The model is a great conversation piece in a collection as it replicates the B-17 in one of its lesser-known roles.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Distelfink Airlines

Est. 2013

ABOUT DISTELFINK AIRLINES

My late grandfather, John Brey, and I at the 2007 Geneseo Airshow. This was one of the few times that we had our photo taken together at an airshow.

The story of "Distelfink Airlines" begins in the early 1990s when my late grandfather, John Brey, began building and flying remote control model aircraft in his retirement. He enjoyed the hobby and quickly amassed a large fleet of model airplanes, which filled his garage and woodworking shop. He gave a name to his fleet of aircraft, "Distelfink Airlines". For the symbol of his fleet, he chose the Pennsylvania Dutch/German hex sign featuring the "Distelfink", a colorful bird that is a symbol of good luck and happiness. This hex sign and symbol is very common on Pennsylvania Dutch/German barns in Eastern Pennsylvania and is an important part of our local culture. He had custom "Distelfink" decals made for all his airplanes and had T-shirts made with "Distelfink Airlines" printed on them. It wasn't long before curious people began asking about "Distelfink Airlines" and what it was. My grandfather told anyone who asked that "Distelfink Airlines" was a new startup airline that was going to be offering service between the Lehigh Valley International Airport and Philadelphia International Airport with more routes to come soon.

In addition to flying his model airplanes, my grandfather enjoyed attending airshows and we traveled to airshows together for almost 20 years. He also enjoyed local aviation history and was particularly fascinated by the history of the Consolidated TBY Sea Wolf, a torpedo bomber that was built locally in Allentown, Pennsylvania during World War II. He also remembered when famous aviator Amelia Earhart visited the Lehigh Valley in the early 1930s to raise funds for her failed attempt to become the first woman to fly around the world.

Established in 2013 in memory of my grandfather, "Distelfink Airlines" is an online aviation newsletter that carries on a tradition of sharing a love for aviation that my grandfather shared with me. This newsletter features photographs and writings on a variety of aviation topics. The logo that was chosen for "Distelfink Airlines" is the hex sign that my grandfather chose for his fleet of remote control model aircraft many years ago. This proud symbol of local Pennsylvania Dutch/German culture is joined by a pair of Consolidated TBY Sea Wolf torpedo bombers, the aircraft that was built locally in Allentown during World War II and is such an important part of our local aviation history. Thank you for reading "Distelfink Airlines" and sharing in the passion for aviation that my grandfather shared with me.