HORIZONS

A publication of the Massachusetts Air and Space Museum

The Massachusetts Air and Space Museum inspires new generations to explore, experience, and pursue interests and opportunities in science and technology

Vol. 11 Issue 3 September 2025

Evolution of an Airplane that Changed History

There are legendary aircraft that have evolved into folklore because of their contributions to aviation. Certainly the Wright Flyer begins the list, but the list

Boeing's original Model 299 [B-17] prototype bomber – 1935

of airships that advanced aviation technology has to be the 12,731 variations of the B-17 that were built and flew during World War iI. The military specification established by the US Army Air Corps called for a bomber that could carry a 2,000 pound bomb load 2,000 miles at 200 miles per hour. While Boeing's prototype Model 299 manage to set the non-stop speed record from Seattle, WA to Dayton, OH of 252 MPH, it crashed during a demonstration flight. Despite this misfortune, The Army was apparently impressed with the design and went ahead and awarded Boeing a development contract to produce test air-

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MASM Signs the Lease

In a very short time Beverly Airport will be the new home of the Massachusetts Air and Space Museum. MASM's leadership team negotiated a

51 LP Henderson Road, Beverly, MA
New Home of MASM Museum

great arrangement with the City of Beverly and the lease has been signed. There is renovation work that needs to be completed before the museum can move in and open the doors, and MASM is looking to both the business community and its membership for the funds needed to complete renovations and move in. More on this in the December edition of Horizons. Meanwhile, MASM asks for your generous donations now.

From the Cockpit

The lease has been signed and MASM is on the move to our new home at Beverly Airport. This promises to be a great home for the museum's collection. Beverly and the surrounding communities are most welcoming supportive of our mission.

But, like any new home, a certain amount of sprucing up is necessary, and MASM needs your financial help to accomplish this. Please consider a cash gift to MASM now so that we can hasten the date when we open the doors to a new and improved museum. We are looking forward to seeing you there!

Georgia Pappas, Board Chair

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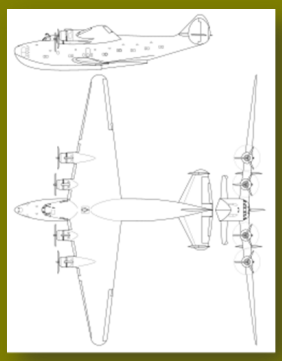
planes.

After numerous tests and reevaluations during the middle 1930s, Boeing made adjustments to the overall airframe design of their bomber resulting in a series of new improvements from the original model.

Boeing 314 Clipper

Boeing was already known as a leader in the aviation industry due to a collaboration with Juan Trippe of Pan American and the delivery of nine Boeing 314 Clippers to that company. These long haul, four engine flying boats were the biggest things in the air at that time, the epitome of flying luxury, and could traverse the world's oceans. Additionally, the wing design of the Clipper was lifted from one of Boeing's



Boeing 314 Clipper

Boeing B-17 Flying Fortress

past experimental bombers and subsequently was incorporated in the B-17. Although the 314 was a elevated wing and the B-17 was a belly wing design, the shape of the wings and

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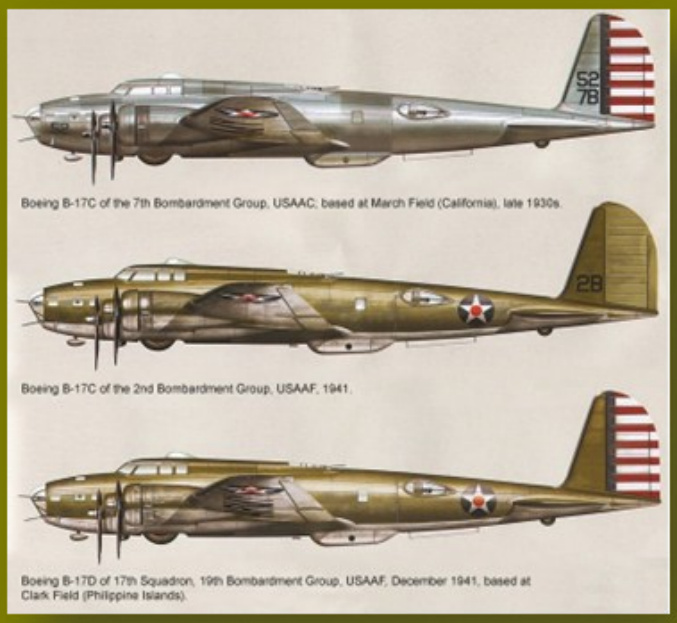
the engine placement are virtually identical.

A close look at versions A through D shows a very sleek and aerodynamic profile with the fuselage ta-



B-17-C&D

pering to a very narrow tail. Gunnery stations in these models were limited to the nose bubble, the radio room, the waist positions, and the belly gunner, whose firing position faced aft.

It wasn't until the E model B-17 was created that the prickly nature of the Forts truly came to light. The B-17-E had a much more robust tail section that carried the lines of the fuselage all the way aft to a new gunnery position. This not only allowed room for a tail gunner with twin fifty caliber machine guns, but the airframe was greatly reinforced by the rigid spine that ran forward from the rudder to roughly the middle of the fuselage. While this modification caused some additional drag, it provided for much better vertical and horizontal stabilizer control, and both elevator and rudder operations were greatly improved.

The B-17-E variant also saw the introduction of the top turret where the crew chief/gunner was stationed. This turret provided 360° coverage above the airplane with twin fifty machine guns and kept the

B-17-E

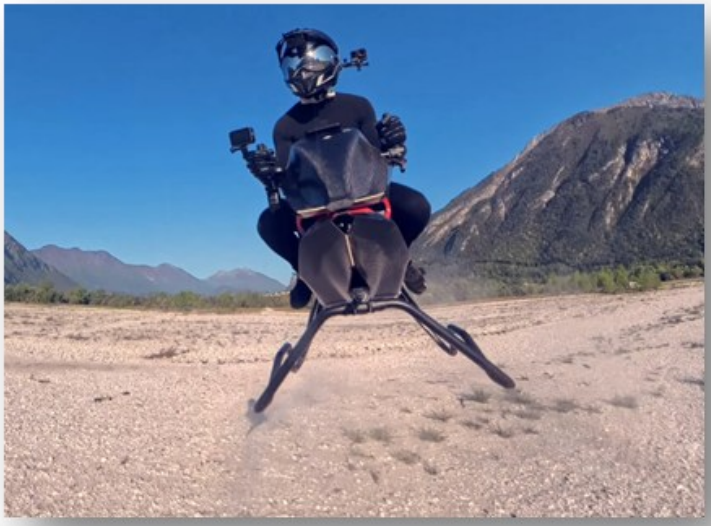
crew chief forward of the bomb bay where he could better assist with fuel transfers and attend to any mechanical problems that might arise in flight. In addition to his gunnery duties, the crew chief was also the flight mechanic and the only enlisted man positioned in officer's country forward of the bomb bay. With many crews the flight engineer was the unofficial liaison between the enlisted men and the pilot, who was also the flight commander.

But the crew chief's most pressing duty other than watching the skies overhead was to assist the copilot with controlling the flow of fuel to the engines. The B -17 had thirty-two fuel tanks, four of which were large main tanks, one for each engine. Fuel from the other 28 tanks had to be transferred into the main tanks in order to keep the props spinning. These transfers also managed to balance the aircraft in flight, especially on the bomb run where a single degree of tilt to ei-

Continued on page 5

I^3 = Internet Items of Interest

I^3s represented here are offered only as items of interest. Because they were found randomly on the internet, some accurately represent reality, while others should be considered the equivalent of idle gossip. In this latter category, if true, they are at least somewhat interesting. *Enjoy!*



Volonaut Air Bike

Xpeng X2

Airbus vs. Boeing?

V-22 Osprey on Boston Common

Paris Air Shoe 2025

Do you realize that you have a giant megaphone at your disposal? As a recipient of MASM's quarterly newsletter "Horizons" you can help grow MASM's contacts in the aviation world simple by sharing this electronic newsletter with all those in your email address book. All you have to do is click on your email addresses and attach the newsletter PDF as a document. Your family, friends, and business associates will appreciate you sharing with them. Urge them to share it with their email address book and in no time MASM will be circulated around the globe.

Use your megaphone for MASM today!

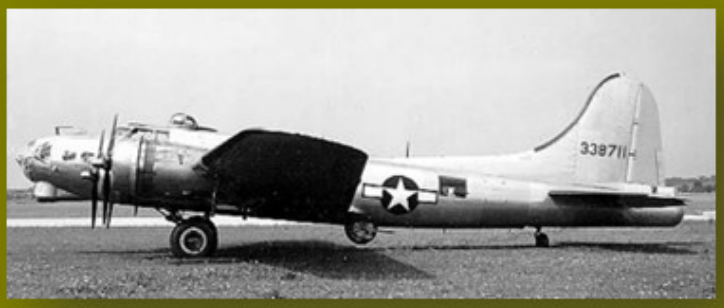
Continued from page 3

ther port or starboard could mean missing the target altogether.

B-17-F

The B-17-F model incorporated most of the structural changes. They all had top, tail, and ball turret positions, and many were fitted with the cheek mount fifty-caliber guns that were used by the bombardier or navigator.

By 1944 the Luftwaffe had altered their attack plan against the Fortresses and began strafing the cockpits in the hope of knocking off the pilot and co-pilot, thereby dooming the airplane. Boeing's answer to this was the final iteration of the Fortress: the



B-17-G

Model B-17-G.

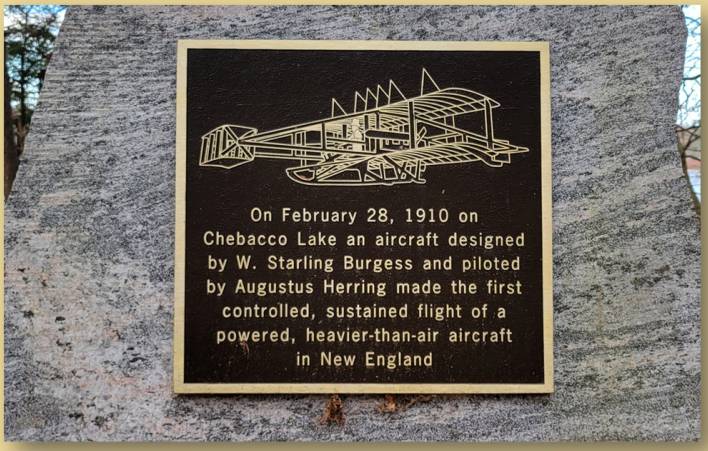
The G Models were equipped with a chin turret that was controlled by a joystick employed by the navigator. The turret had twin fifty-caliber machine guns and could take on fighters that tried to take out the flight crew. The Luftwaffe was no longer willing to go nose to nose with the Forts any longer.

12,731 B-17s flew in combat during World War II. Only a precious few still remain with us today.

From the Collection

Herring-Burgess Model A1 Flying Fish

In Marblehead, Massachusetts, Starling Burgess teamed with Augustus Herring to develop their first airplane called the Flying Fish.



Plaque Commemorating First Controlled Flight in New England

The aircraft's forward elevator was controlled by one foot pedal, the throttle with another. The rudder was controlled by thumb devices: one for left, the other for right. The airplane had a row of six triangular fins (thus the name) mounted on the upper wing for lateral stability. Fins were used instead of ailerons to avoid the Wright Brother's patent.

The aircraft's lifting surfaces and supporting structure were designed by William Starling Burgess. Augustus Herring provided the Curtis 25 hp engine, the pitch and rudder control systems and the design for the six stabilizing fins placed on the top wing surface.

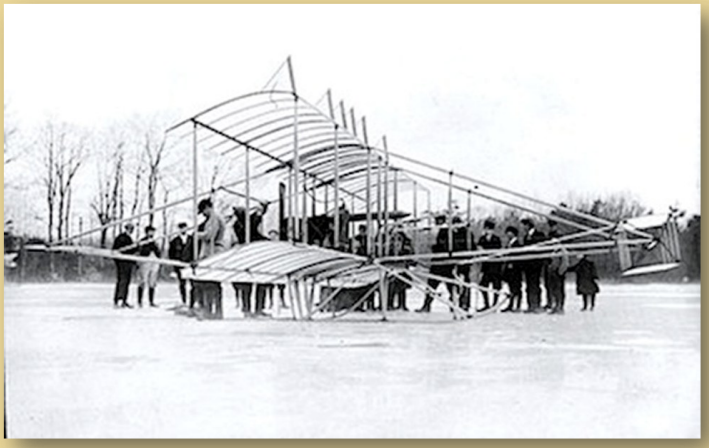
On February 28, 1910, Burgess and Herring flight tested their Model A1 Flying Fish on frozen Chebacco Lake, Hamilton, northeast of Boston, where the relatively successful flight occurred.

The Herring-Burgess Model A #1 Flying Fish was a pusher biplane with a central skin and skids under each wingtip, built in Factory #1 Marblehead. There were five built between December 1901 and May 1910. It was a single place for one person. It contained a Curtiss 25 hp 4 cyl water cooled engine with a Herring direct drive. Model A1 had a four bladed propeller, a Bosch ignition and was equipped with an El Arco radiator.

Model A1's wingspan was 26'9" with a wing area of 292 sq. ft. Its height was 9'8", length 33', chord 5'6", gap 4'4" and weight 360-400 lbs. Its surfaces were covered with Nalad silk.

The Flying Fish was displayed at the Boston Aerial Exposition February 20-26, 1910. At the Exposition, carousel and amusement park manufacturer Charles W. Parker of Abilene and Leavenworth, Kansas, agreed to pay $5,000 for the Flying Fish after its first flight. Modifications were made to the control systems after its flight experience at Chebacco Lake and the Burgess Company shipped the A1 to Kansas on March 15, 1910.

Model A#1 was the first Burgess aero plane, it made the first flight in New England and was the first commercial aero plane built and sold in New England.



Herring-Burgess Model A1 Flying Fish

For more enlightening and historical exhibits that chronicle the Bay State's space and aviation history, go to the Massachusetts Air and Space Museum web site at:

massairspace.org

and click on:

Online Exhibits

Change for Change!

Your spare change, those pesky little coins that fall into your sofa, or drop down under your car seats, or accumulate in change jars all over your house, can help MASM pay for needed changes to our new future home. Simply collect all that coinage, take it to your bank and either deposit it in your checking account and draft a check to MASM or have the bank issue you a money order made out to MASM and mail it to us. We'll turn your change into real change as we construct our new museum at Beverly airport. Like all contributions to MASM, your donation constitutes a tax-deductible offering.

So clean out those change jars, have your kids or grandkids do a scavenger hunt for any coins they can find under the car seats or in the furniture, and let them know you're sharing the treasure they find to help finance the treasured items they will discover at the new Massachusetts Air and Space Museum.

Please make checks and money orders payable to:

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Massachusetts Air and Space Museum is a 501 (C) 3 charity

C.A.V.U.

Most people familiar with aviation know that the abbreviation "CAVU" stands for *"Ceiling and visibility unrestricted."* In this recurring feature of ***Horizons***, your ability to see clearly into the history of aviation will be tested through identification of flying machines that once were. The first reader who submits the correct answer will be entitled to bragging rights and have their name and answer published in the subsequent edition of ***Horizons***. Submit your name, the name of the aircraft, the type or version (if applicable), and the country where it was manufactured to the editor-in-chief of ***Horizons*** at: **horizons@massairspace.org**

Here is your challenge for this edition:

For additional content, click on many of the photos in this edition except this one. You'll find videos and links for more information!

June 2025 Edition's Answer

HISPANO HA-200 SAETA (arrow) - Spain and Egypt
Engines: 2 1,058 lb [480 kg] thrust Turboméca Marbore VI turbojets
Speed: 429 mph [680 km/h] at 22,965 ft [7,000 m]
Ceiling: 42,650 ft [13,000 m] **Range:** 932 miles [1,500 km]
Dry weight: 4,453 lbs [2,020 kg] **Max. take-off weight:** 7,937 lbs [3,600 kg]
Dimension: span: 34 ft 1.75 in [10.41 m]; Length: 29 ft 5 inches [8.97 m]
Height 9 ft 4.25 in [2.85 m]; Wing area 187.3 sq ft [17.4 m^2]
Armament: two 0.303 in [7.7 mm] machine guns, and provision for disposable stores under the wings.
Correct Answer: Roger McDowell