

# 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. 10 Issue 1

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March 2024

## Raffle Winner Collects His Prize

Yes, the Massachusetts Air and Space Museum recently received a generous donation of a [Thurston Teal](#) float plane with a heritage like



*MASM Board Chairman Kevin Currie presenting the keys for the Thurston Teal to raffle winner*

none other. This aircraft was originally consigned to the Beatles, the famous British rock and roll

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## Boeing Facing Heavy Weather with Production Issues on the 737 Max 9

Boeing Aircraft, admittedly one of the world's largest producers of commercial airplanes, has been dealing with assorted problems in the production of



*Boeing 737 Max 9*

their narrow-bodied passenger liner, the 737 Max 9, that debuted back in 2016. Five years ago two different jets crashed, resulting in a temporary international grounding of all Max 9s worldwide. The subsequent investigation into those crashes revealed that operational computers that controlled the aircraft in flight were responsible for the mishaps, and all 737 Max models remained grounded for two years.

In January a door plug on an Alaska Airlines 737 Max 9 blew out midflight depressurizing the fuselage and forcing an emergency landing. The FAA immediately grounded all domestically owned and operated

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## From the Cockpit

It seems that appeals for charitable donations confront us every day. Non-profit organizations are always in need of more funding, and MASM is no different. Unlike other tax-exempt entities, MASM doesn't do telethons or annual banquets to solicit contributions.

Instead, MASM welcomes contributions any time and is in need of financial support now. Renewing a paid membership is one way you can help. But offering an addition tax-deductible financial gift to the museum will go a long way to help us maintain our dedication to inspiring new generations to explore and experience the worlds of science and technology and possibly careers in aviation or space exploration.

*Kevin Currie, MASM Board Chairman*

**Donate Now:**



**Board Chairman Kevin Currie** [kcurrie@massairspace.org](mailto:kcurrie@massairspace.org)  
**Board Vice-chair Joe Dini** [jdini@massairspace.org](mailto:jdini@massairspace.org)  
**President Georgia Pappas** [gpappas@massairspace.org](mailto:gpappas@massairspace.org)  
**Curator Barbara Jagla** [bjagla@massairspace.org](mailto:bjagla@massairspace.org)  
**Interim Exec. Director Keith Young** [kyoung@massairspace.org](mailto:kyoung@massairspace.org)  
**Operations Manager Bryan Mckay** [bmckay@massairspace.org](mailto:bmckay@massairspace.org)

**Museum located at:**

**438 Main Street Hyannis, Massachusetts  
(508) 827-6300**

**Museum Hours:**

**Thursday, Friday & Saturday 10:00 AM to 4:00 PM**  
**Admission: Adults \$10.00 Children (ages 5-11) \$6.00**  
**Active Military with ID: Free**

**MASM Business Mailing Address:**

**200 Hanscom Drive, Bedford, Massachusetts 01730**

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**Editor-in-chief: Paul D. Bagley, esq.**

email: [paul@berkshirecottage.com](mailto:paul@berkshirecottage.com) or: [horizons@massairspace.org](mailto:horizons@massairspace.org)

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band from the sixties and seventies. When the band finally dissolved in December of 1974, the order for the airplane was cancelled.



*Thurston Teal being taxied for takeoff by the raffle winner and new proud owner of the aircraft*

The most recent owner decided to generously donate the craft to MASM for the purpose of fundraising, thereby igniting the raffle, which was held in 2022/2023. Before revealing the winner, some thank yous are in order.

The airplane itself was donated to MASM by Dr. Nathaniel "Nat" M. Sims, and for this the museum leadership extends its most profound appreciation to Dr. Sims for his gracious generosity.

Transporting the airplane from Vermont where it was residing to Mansfield Airport, where it was to be stored and serviced during the raffle period, plus covering the labor costs associated with the 2023 annual on the aircraft were donated by Michael "Mike" R.

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Dupont of [American Aero Services, Inc.](#), East Taunton, MA.

Airport that made the raffle so much more profitable.

Winner of the grand prize of the Thurston Teal airplane was Gregory "Greg" Carl Roby of Owensboro, Kentucky. Keys and title to the airplane were handed to Greg on June 6, 2023 by Kevin Currie, MASM's Chairman of the Board.

Greg Roby is a long-time pilot and comes from a family of pilots, including his father and his two sons. He is a certified commercial pilot with both land and seaplane ratings and is employed by [Mid America Jet](#).

Along with the airplane itself, Greg Roby was presented with \$3,000 as part of his prize in order to upgrade and update his numerous certifications.

Second and third place prizes of a Bose aviation headset and an iPad Mini and Foreflight subscription were also offered in the raffle.

Donations, such as those from Dr. Sims and the others mentioned above, are a fantastic way of generating much needed income by MASM for operating the aviation museum. With rising costs for virtually everything, MASM needs much more than just the income generated by attendance and sales. It needs dedicated sponsors and contributors who are willing to help share in the funding of the museum's primary mission: to ***"inspire new generations to explore, experience, and pursue interests and opportunities in science and technology."***

Benevolent gestures of this magnitude carry with them substantial tax benefits for the donor from both the Internal Revenue Service and most state tax agencies. MASM is a 501 (c) 3 organization, a registered tax-deductible charity recognized by both state and federal authorities.

So, if you are in possession of a serviceable aircraft that you no longer need or use, and you discover it is a bear market for selling anything other than factory fresh airplanes, maybe donating that aircraft to MASM could be your answer. Not only do you rid yourself of the burdensome costs associated with the storage, maintenance, and annual fees for the craft, you will be rewarded with a substantial tax savings and the knowledge that you have aided a worthy cause and promoted the field of aviation to generations that will follow! ✈️



**AOPA article from April 2022 verifying the ownership of this particular Thurston Teal being owned by the Beatles**

Finally, a special thanks from MASM belongs to Brian Jones, [Rivermoor Engineering of Scituate, MA](#) for furnishing a subsidized hanger rental at Mansfield



**Thurston Teal once owned by the Beatles**

# Maintenance and Repair of Aircraft ... Fundamental to Safety

A floating iceberg shows only ten percent of itself above the water and, just like an iceberg, the aviation industry has many facets that remain out of sight de-



*Maintenance technician readying an aircraft for flight*

spite being crucial to the safe and efficient operation of aircraft and airports. Among these behind-the-scenes workers are the men and women who provide service and repair across a broad spectrum of aircraft types from general aviation to commercial passenger carriers, from freight haulers to supersonic fighter jets employed by the military. All aircraft require mainte-



nance and often repairs, and this requires skilled and certified technicians to accomplish such maintenance and repairs.

Like many aspects of modern society, there is a three-letter moniker that is the generic identifier used in aviation known as MRO [Maintenance, Repair, Overhaul]. These maintenance, repair, and overhaul organizations are independent companies that air carriers use to help handle the upkeep of their fleets of aircraft. There are some 4,000 MROs in the United States providing all kinds of highly technical work performed by skilled FAA-certified technicians.

There are MROs that deal exclusively with the power plants on aircraft, namely the engines. While routine maintenance with engines is normally han-



*Avionics repair and maintenance*

dled inhouse by commercial airlines, MRO facilities provide heavy overhaul work that involves rebuilding vital components. Other MROs deal only with avionics, electronics, or computer software. Some handle only hydraulics, landing gear assemblies and associated systems. There are radar specialists who fine-tune onboard equipment so that the return signals received by flight crews are accurate and precise. Some of these companies are mom-and-pop operations while other employ hundreds.

MROs are an integral component of the aviation industry and save independent air carriers the exorbitant costs they would incur by employing just one of each specially trained technician to handle the

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# From the Collection

By Barbara Jagla, Curator

## Helen Messinger Murdoch (1862-1956)

We hold an 11' x 14' photograph in our collection of two women standing in front of a biplane aircraft at East Boston Airport with the terminal building in the background.

Hand written in pencil on the reverse: "H.M. Murdoch F.R.P.S. Garrison Hall Boston Mass USA." Research led me to Helen Messinger Murdoch of Boston, a fellow of the Royal Photographic Society of Great Britain and an early aviatrix.

Helen Messinger Murdoch was an American photographer who pioneered the use of Autochromes in travel photography. Murdoch turned to photography in the 1890s after first training as an artist at Cowles School of Art in Boston. She initially took monochrome portraits but in 1907 she discovered the Autochrome colour process developed by the Lumière brothers.

A frequent visitor to London, Murdoch exhibited at the Wigmore Street Gallery, the Halcyon Women's Club and the Society of Colour Photographers. In 1911, she joined the Royal Photographic Society.

In 1913, at 51, Murdoch became the first woman photographer to travel around the world, taking both Autochrome plates and black-and-white negatives. Her journey took her to Egypt, Palestine, India, Bura, Hong Kong, China, Japan, the Philippines, and Hawaii. She returned to Boston via the west coast in 1915.

The *1919 Official Register of Women's Clubs* includes her sketch portrait accompanying an advertisement for her Autochrome photography at 282 Boylston Street, Boston.

Unable to continue her travels during the First World War, Murdoch turned to aviation, took flying lessons, and joined the National Aeronautic Associa-



*Possibly a photo of Helen Murdoch and an unknown woman posing in front of a biplane at East Boston Airport*

tion. She photographed the Lindberghs, Richard E. Byrd, and Amelia Earhart. In 1928, she took the first Autochrome view of Boston from the air.

Murdoch spent the years from 1929 to 1933 in London, compiling travel albums of her black-and-white photographs. She was also made an Honorary Fellow of the Royal Photographic Society in 1934, relieving her of further fees. The Royal Photographic Society holds about 600 Autochromes and lantern

**Helen Messinger Murdoch, F. R. P. S.**  
A TALK ON THE PLEASURES OF AUTOCHROME  
MAKING AROUND THE WORLD  
Illustrated with color-slides taken by her on a two years' journey from Boston,  
including England, France, Egypt, Jerusalem, India, Burmah, Ceylon, China, Manila,  
Japan, Hawaii and California.  
**Natural Color Photographs**  
PORTRAITS, CHILDREN, HORSES, DOGS, CATS, BIRDS AND GARDENS  
ENGAGEMENTS FOR LECTURES AND APPOINTMENTS FOR SITTINGS MAY BE  
MADE BY ADDRESSING  
**Miss H. M. Murdoch, at her studio**  
**282 Boylston Street, Boston, Massachusetts, U. S. A.**  
Telephone Back Bay 6074  
EXHIBITION OF AUTOCHROMES (Color-Photographs)  
OPEN FROM 10 A.M. TO 6 P.M.

*Advertisement of Helen Murdoch's lectures regarding her photography from her around the world journey*

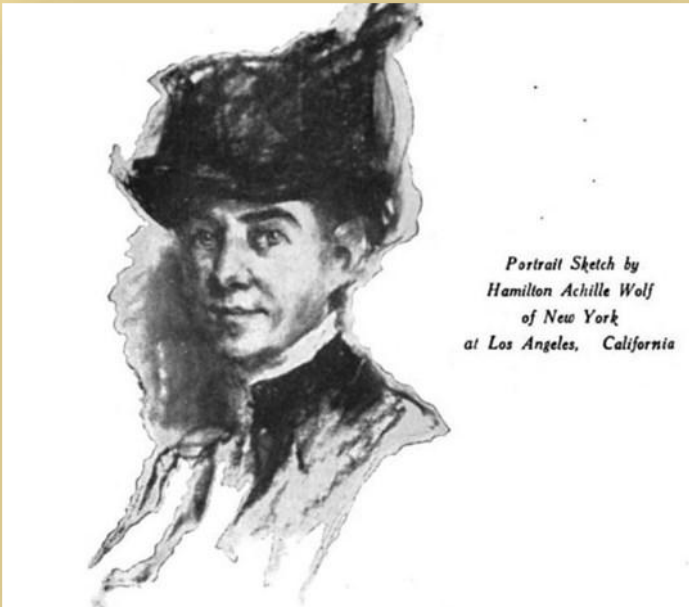
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slides taken by Murdoch, mostly of her round the world trip.

In 1944, Murdoch moved to Santa Monica, California where she died in March 1956.

Please contact me if you have any information on the identities of the two women in the photograph or the ownership of the aircraft: [bjagla@massairspace.org](mailto:bjagla@massairspace.org).



*Portrait Sketch by  
Hamilton Achille Wolf  
of New York  
at Los Angeles, California*

*Sketch portrait of Helen Murdoch by Hamilton Achille Wolf  
of New York at Los Angeles, California*

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<https://books.google.com/books?id=pX0fAQAAIAAJ&dq=San%20Diego%20Women&pg=PR26#v=onepage&q=xxvi&f=true>

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Max 9s for the purpose of undergoing inspections to insure the door plugs were properly installed. While this grounding lasted only a few days, quality control



*Alaska Airlines Flight 1282 losing a door plug midflight*

issues at Boeing have fallen under tighter scrutiny.

The Federal Aviation Administration issued a preliminary report on the Alaska Airlines flight 1282 incident identifying the absence of four critical bolts in the door plug that failed. While both Boeing and Spirit Aerosystems, the supplier of the door plug assemblies, have accepted responsibility for the oversight, and have apologized for it, the question of quality control within both companies leaps to the forefront. Additionally, there has been a renewal of the questions surrounding government oversight at Boeing being less than it should be. Apparently the FAA has allowed the giant airplane manufacturer to self-inspect much of their work because it is more cost-effective to do it in house.

The latest woe involving the Max 9 aircraft again comes from the subcontractor Spirit Aerosystems. A factory employee at Spirit reported to management that holes had been improperly drilled that did not meet the specifications set by Boeing. In checking this report, Boeing discovered that the holes were located around the window openings, but posed no

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problem to continued operations of existing airplanes. But Boeing is currently sitting on fifty undelivered airplanes that will require some form of mitigation before they pass an air-worthiness examination. Boeing has already received cancellation orders, which are starting to accumulate. The question now shifts from the immediate problems that are the result of poor or no quality control within the manufacturers to whether Boeing and its



*FAA Director Michael Whitaker*

subcontractors will develop a more comprehensive path toward providing zero-defects production. This will require a complete cultural metamorphosis within Boeing coupled with a more robust effort on the part of governmental bodies like the FAA to administer both fair and thorough inspections of all new airplanes that include all the subsystems that might become a risk to safe operation of the aircraft.

Boeing is fighting a tough battle with a global market involving global competitors. The FAA is fighting a tough battle trying to establish reauthorization of funding by two battling branches of Congress: the House and the Senate. The House has passed a sweeping reauthorization bill that was passed along to the Senate with overwhelming bipartisan support, 351 to 69 votes. Michael Whitaker, the newly installed FAA director, has inherited a beehive of issues that all need immediate attention and all require more funding. Until the transportation reauthorization bill passes the Senate and is signed into law, virtually all proposed infrastructure improvement initiatives are on hold, and US aviation remains in a holding pattern relative to the Boeing 737 Max 9. ✈

## **FAA Press Release:**

**Wednesday, January 17, 2024**

***This information is preliminary and subject to change.***

After taking decisive action to ground 171 Boeing 737-9 MAX airplanes, the FAA is now investigating Boeing's manufacturing practices and production lines, including those involving subcontractor Spirit AeroSystems, bolstering its oversight of Boeing, and examining potential system change.

On Friday, the FAA announced requirements for a rigorous inspection and maintenance process as a new and necessary step before the FAA contemplates any further steps in the process to return Boeing 737-9 MAXs to service. The first 40 inspections that are part of that process are now complete, and the FAA will thoroughly review the data from them. All 737-9 MAX aircraft with door plugs will remain grounded pending the FAA's review and final approval of an inspection and maintenance process that satisfies all FAA safety requirements. Once the FAA approves an inspection and maintenance process, it will be required on every grounded 737-9 MAX prior to future operation. The safety of the flying public, not speed, will determine the timeline for returning these aircraft to service.

The FAA is supporting the National Transportation Safety Board's investigation into Alaska Airlines Flight 1282. The NTSB is in charge of the investigation and will provide any updates.





maintenance, repair, and overhaul of every component of every airplane in their fleet.

A typical MRO usually focuses on a single aspect of the work needed to maintain an air fleet. By offering a scope of work that is specialized and confined to certain technologies or systems, their technicians are trained to handle the specific equipment requiring expert attention. These smaller companies make money while simultaneously saving the air carriers considerable costs were they to take on that work themselves.

This symbiotic relationship between air fleet owners and MRO companies is what helps keep the aviation industry profitable while simultaneously keeping



*Skilled mechanical technician services a highly sophisticated rotary-wing aircraft*

it safer than ever before. The cost alone of the many and diverse types of test equipment used by the many and diverse specialists performing analysis, repairs, overhauls, testing, certification, and recertification of all the components on a single aircraft would be overwhelming.

As each MRO narrowly focuses its efforts within a small niche area of the overall aircraft maintenance industry, technicians must similarly focus their sights



*Just a few of the test bench testing systems used by MROs and required to test and certify aircraft components*



*Student preparing for a technical career*

on specific areas to hone their personal expertise. There are many routes that will lead to acquiring the skillset required to handle the demands of working for an MRO, but they all begin with a basic education in the science, technology, and engineering fields of endeavor. MASM exists to help direct new generations toward such careers. ✂



# Lockheed Martin X-59 Soon to Test Viability of Transcontinental Supersonic Flight

Lockheed Martin, in concert with NASA, has built and is testing a proof-of-concept aircraft designed to be the forerunner of transcontinental supersonic



***X-59 Supersonic Test Aircraft***

commercial aircraft. Not since the Concorde was phased out of service have commercial passengers been able to experience speeds above Mach 1. Even when Concorde was flying, moving over many inhabited regions of the world above Mac 1, especially the continental United States, was prohibited due to the disrupting and disturbing noise from sonic bombs below. But new design innovations combined with new technologies and twenty-first century materials have greatly reduced and dispersed the shock waves that accompany the fracture of the sound barrier to levels where the FAA could eventually permit supersonic passenger jets to cross the continental United States at hypersonic speeds.

Testing is in progress now and results thus far have been good. The initial test flight had been slated for December of 2023, but was postponed until early 2024 and is anticipated any time now. Delays in production schedules were attributable to the delays

that occurred with the delivery of key components. Many of these delays could reasonably be blamed on the Covid-19 epidemic and the related supply chain disruptions with raw materials and manufactured goods worldwide.

While the X-59 will be traveling considerably slower than the former supersonic Concorde, its primary purpose being to gather data on the sound levels it generates, it is programmed to achieve Mach 1.4 [925 MPH] at 55,000 feet. The Concorde flew measurably faster [1,350 MPH] and at higher altitudes [60,000 feet], while simultaneously transporting up to 100 passengers.

The challenge was to build a craft that would produce a sonic boom which would not exceed 75 PLdB. Acoustic engineers have developed a system for measuring sonic booms, called *perceived levels of decibels*, or PLdB. A decibel (dB) is a measurement of pressure; PLdB is what people actually hear. A sonic boom at or below this 75 PLdB figure is the equiva-



***Lockheed-Martin X-59 dimensions***

lent sound intensity of an average home appliance such as a dishwasher.

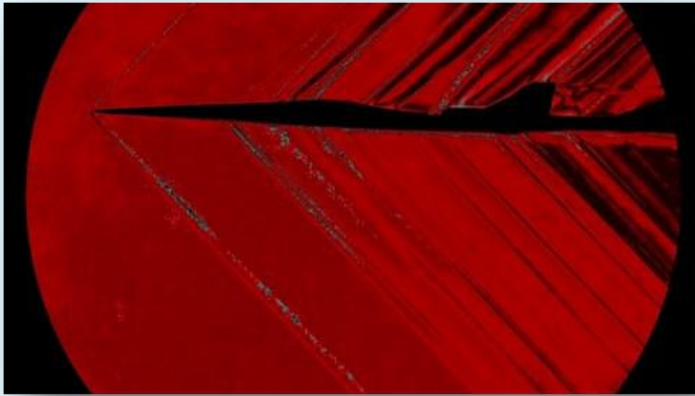
Design of the X-59 makes it look more like a dart or an arrow as opposed to a conventional airplane. Its dramatically long nose, the canard, short wings and stabilizers, and relatively short T-tail all exist to move air out of its path as it passes through it. By redistributing where and how the air moves with the

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aircraft shape itself, the impact of the sonic boom below is reduced.

Part of the testing will include Schlieren photog-



*X-59 Schlieren Photography showing wave patterns of air disruption during test flights*

raphy where the airflow around the airplane can be seen in wave patterns. Test flights will be conducted over uninhabited regions where NASA has wired the desert floor with microphones that will collect sound data to determine the impact at ground level. Analysis and assurance that this specific data illustrates a noise ratio at 75 PLdB or below will likely be the key to the alteration of regulations that have prohibited supersonic transcontinental travel over the past half century.

When the actual flight testing begins it will include not only the X-59, but also an F-15 fighter jet acting as a chase plane to record the impact of shock waves produced during flight. Data thus obtained up close to the test aircraft will be crucial in determining the actual flight characteristics. Such data will not only be helpful in adjustments that might be needed with the X-59 itself but also helpful in determining design elements that will be needed with future designs intended to carry passengers across country.

The X-59 has no forward-facing window or windscreen for the pilot. Instead it is equipped with cameras that capture and produce images on a flat screen in front of the operator. In addition to the images the

pilot sees outside the aircraft, the screen acts as a heads-up display, showing critical data such as speed, altitude, rate of climb, heading, and so on. Instead of



*X-59 Cockpit view forward with heads-up display*

having to deflect attention from the horizon in order to read instruments that are customarily situated below a cockpit windscreen, the pilot has both the horizon and important data in one place, directly in front



*X-59 at Lockheed in embryonic stage of construction*

of him or her.

It is hoped that the X-59 will undergo its initial hypersonic testing shortly, and hopefully approval lifting the ban on supersonic transcontinental commercial flight by the FAA will be forthcoming in the next few years.





# CAVU.

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](mailto: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!

## December 2023 Edition's Answer

**deHavilland Canada DHC-6 TWINOTTER 300 STOL utility transport**  
**Engines:** two 652 ehp (486 kW) Pratt & Whitney Canada PT6A-27 turboprops  
**Max. speed:** 210 MPH (338 km/h)  
**Ceiling:** 26,700 ft (8,140 m) **Range:** 115 mi. (185 km)  
**Dry weight:** 7,415 (3,363 kg) **Max. take-off weight:** 12,500 lb (5,670 kg)  
**Dimension:** Wing span: 65 ft (19.81 m); Length: 51 ft 9 in (15.77 m) Height 19 ft 6 in (5.94 m); Wing area 420 sq ft (39.02 m<sup>2</sup>)  
**Payload:** 20 passengers or 4,280 lb (1,941 kg) of freight  
**Correct Answer:** Roger McDowell was first to submit a correct answer.

