

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. 7 Issue 1

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March 2021



Image of the MASM exhibit on display showing the model of Dr. Robert Goddard's first liquid-fueled rocket on loan to MASM by Clark University

Dr. Robert H. Goddard Exhibit Opens at Massachusetts Air and Space Museum

*Goddard Rocket Scale Model
On Loan from Clark University*

By Barbara Jagla, Museum Curator

The Massachusetts Air and Space Museum now has an exhibit on display featuring a model of Dr. Robert H. Goddard's 1926 rocket design. Dr. Robert Hutchings Goddard (1882-1945) is considered the father of modern rocket propulsion.

"Goddard" continued on Page 2

MASM Celebrates 1st Year Anniversary

By Keith Young, MASM Board Member

In February, the Museum marked its one year anniversary. In celebration, we are giving away an airplane just for the asking. Well actually, it's a Guillo's balsa wood glider and we'd appreciate it if you would buy a ticket to get in. There are some simple restrictions like one per group and so forth but just ask when you come in and we are happy to give one of Massachusetts aviation's most enduring products. Paul K. Guillo started his balsa wood airplane business in 1926 so they are celebrating 95 years!

The first day that we opened the doors we saw a rush of people coming in to check us out. Maybe that was because we had notified the newspaper that admission was free on that day but things were looking positive! There wasn't all that much to see for those first guests. The F-106 Advanced Crew Trainer, the Aeronca C-2 "Yard Taxi", the Grumman Albacross cockpit on loan from John Wood, some aircraft models from the Massachusetts Aviation Historical Society (MAHS), the equipment

"Anniversary" continued on Page 5



From the Cockpit

Over many years, we at the Massachusetts Air and Space Museum have been working diligently to bring the Bay State's aviation history to the forefront. We opened our museum doors on Cape Cod just a year ago, and the response has been nothing less than fantastic. Our humble beginnings are now blossoming thanks to our board members, staff, and volunteers, not to mention the many visitors who come to see evidence that the Commonwealth has a rich aviation and space history.

In the coming months and years, we will expand our educational outreach and add to our growing collection of artifacts. But offering a glimpse of the human effort that has made flight and space travel a reality is what really brings those objects to life, and this is where our staff and volunteer docents excel. Come and see how Massachusetts has been a vanguard of both aviation and space from the beginning.

Bob Segal, President MASM

MASSACHUSETTS
AIR AND SPACE
MUSEUM
www.massairspace.org

Chairman of the Board Joe Dini jdini@massairspace.org
President Bob Segal rsegal@massairspace.org
Curator Barbara Jagla bjagla@massairspace.org
Operations Manager Bryan McKay bmckay@massairspace.org

Museum located at:

**The Landing (formerly Capetown Mall) 790 Iyannough Road
Hyannis, MA 02601**

Museum Hours:

Thursday, Friday & Saturday 10:00 AM to 4:00 PM
Admission: Adults \$8.00 Children (ages 5-11) \$5.00
Active Military with ID: Free

MASM Mailing Address:

200 Hanscom Drive Bedford, Massachusetts 01730

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148 Union Street, Milford, NH 03055-4430
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Editor-in-chief: Paul D. Bagley, esq.

email: paul@berkshirecottage.com or: horizons@massairspace.org

Click here for your museum tickets:



"Goddard" continued from Page 1

Born in Worcester, Massachusetts, Goddard was an American engineer, professor, physicist, and inventor who is credited with creating and building the world's first liquid-fueled rocket.

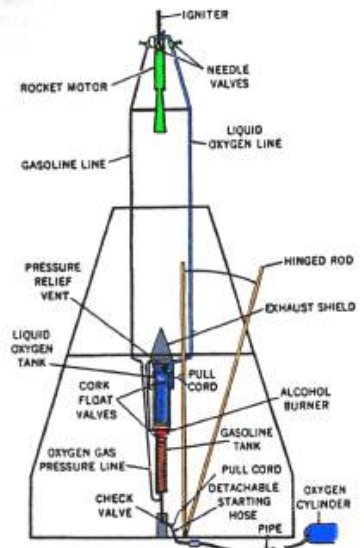
On March 16, 1926, Robert Goddard successfully launched the first liquid-fueled rocket in a field in Au-



Dr. Goddard standing beside his rocket in 1926

burn, Massachusetts. The first of-its-kind rocket reached an altitude of 41 feet, lasted 2 seconds and averaged about 60 miles per hour.

He and his team launched 34 rockets between 1926 and 1941, achieving altitudes as high as 2.6 km (1.6 mi) and speeds as fast as 885 km/h (550 mph). Goddard's work as both theorist and engineer anticipated many of the developments that were to make space-flight possible. He has been called the man who ushered in the Space Age. 🚀

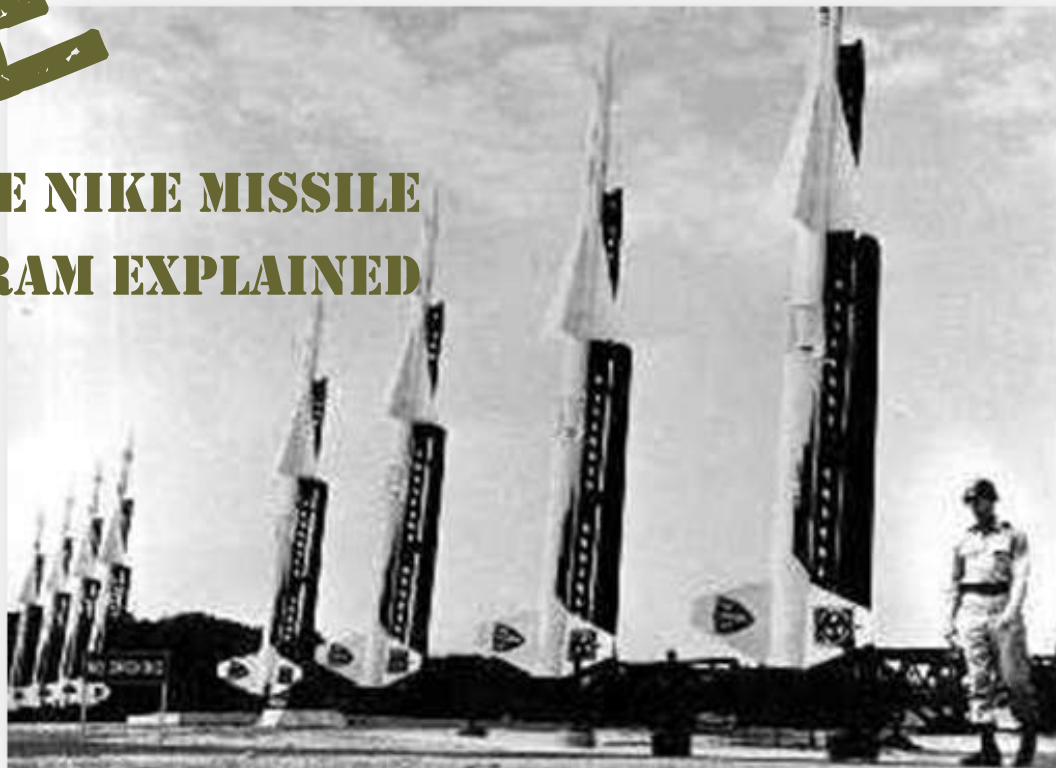


*Dr. Goddard's 1926
rocket design*

Dr. Goddard's 1926 Rocket

NIKE

THE NIKE MISSILE PROGRAM EXPLAINED



In the years immediately following World War II, the United States and both previous Soviet Russia and the subsequent Soviet Union engaged in a cold war where new push-button weaponry was the hallmark of both defensive and strategic offensive military policies. The fundamentals of modern rocketry pioneered by Dr. Robert Goddard were already being employed by militaries around the globe. Among the defensive systems implemented by the United States Army was the *Nike Missile* program.

Nike: *the Greek goddess of Victory*, was an apt name for a missile defense system employed by the United States during a substantial portion of that cold war because its very existence helped secure what many claimed was a victory when the Berlin wall came down in 1989. Such a victory was considerable when the fact that not a single Nike missile was fired at a target of the defined enemy during the entire Cold War. Nike missile batteries were scattered in a broad ring around the city of Boston, nestled in communities of all socioeconomic stripes and were positioned more or less along the new Route 128 Corridor. The multilane limited access highways insured the Army the ability to quickly deploy replacement missiles in the event any given site ran short of their

allotment of rockets.

A Nike battery consisted of multiple rockets that could be launched with very short notice at incoming hostile aerial targets. There were three variations of the Nike Missiles: the **Ajax**, the **Hercules** and the **Zeus**.

Ajax missiles were the first introduced and were relatively short-range rockets designed to intercept incoming aircraft up to twenty-five miles away. The **Hercules** missiles had enough fuel to go three times that distance, and enough explosives to take out an entire squadron of bombers instead of single aircraft. **Zeus** missiles were capable of intercepting ballistic missiles outside Earth's atmosphere. Both the **Hercules** and **Zeus** missile variations could be equipped with both conventional and tactical nuclear warheads if deemed necessary.

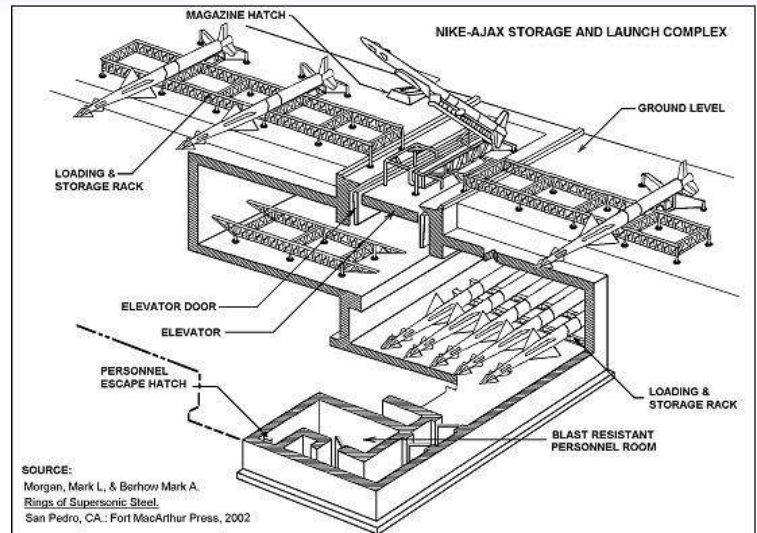
While the **Ajax** system was fueled with liquid propellant, the **Hercules** and **Zeus** missiles employed sol-

"Nike" continued on Page 4

id rocket propellants which assured almost instant deployment of the weapon on a moment's notice. Even though the **Ajax** was liquid fueled, the response time for firing a rocket could still achieve target intercept within its effective range based upon the Nike radar identification and verification.

Integral to the missile system was the dedicated radar system that accompanied every Nike installation. There were actually two primary radar systems employed at each facility: one to identify and plot incoming aerial targets, the other used as a missile guidance radar to insure proper intercept of those targets. These radar systems were augmented by auxiliary sites set up well outside the site on nearby hills, giving the radar operators a better picture of the skies around them. Unlike many surface defense systems that relied upon the accuracy of a gun crew to knock out hostile targets, Nike missiles were controlled to a great degree by a computer that assessed incoming data on the location of the target and the trajectory of the missile in flight. The computer would direct the missile to a given altitude, compute the arc needed for an intercept, then detonate the missile in relatively close proximity to the target, thus providing the ability to knock out multiple enemy aircraft with a single missile.

During the twenty-plus years that the Nike program existed, twenty-three such installations spread from Danvers in the north to Cohasset in the south; Nahant toward the east and Sudbury/Lincoln to the west stood watch over Boston. While a communication network capability was maintained allowing for a unified command structure, each facility was thoroughly capable of functioning independently as was the standard for virtually all United States military operations during



the Cold War. Following strict protocols for deployment of weapon systems, and a thorough understanding of the established rules of engagement for armed forces, individual commanders at each Nike facility held an awesome power in their hands.

Unlike many post-World War II military programs, the Nike Missile facilities welcomed visitors from the neighboring communities to tour the facilities and meet and get to know the soldiers operating the bases. This public information effort likely helped the Nike program in deterring Soviet aggression with airborne strikes due to the likelihood of being shot down on approach to the continental United States. Nike sites covered the prominent coastlines, both east and west, and provided a significant defense should an attack come from over the North Pole and threaten the U.S. through Canadian air space.

Nike survived well into the 1970s, providing a safety net defense from both aircraft and missile attack. It provided air cover without being airborne, and proved to be a formidable deterrent to nuclear proliferation during the Cold War.



Credit US Army, Image Courtesy of Golden Gate NRA, Park Archives, PAM Photo Collection, GOGA-036

that flew on the Space Shuttle and the interactive hands-on exhibits in the back. There were some used books to purchase, also from the MAHS, but the place looked shiny and new under all the track lights and newly painted walls. People commented on how pleased they were to have a new place to visit on Cape Cod, welcomed us to the community and wished us the best of luck!

After being open only 4 weekends, however, we were required to shutter the doors due to the COVID-19 pandemic. The past year can only be described as tumultuous. Anxiety rose as the virus spread, businesses, even non-profit ones, tried to find a way to survive. Like the Little Engine that Could, the museum continued to move forward despite being closed. Museum Curator Barbara Jagla continued to add to the offerings within the small footprint of the museum walls. Into the museum went the panels on loan from the Marconi Museum on the Women Airforce Service Pilots (WASP). Also the 1910 Boston Harvard Aeromeet information was put on display. The Massachusetts Air National Guard Exhibit was expanded. Bob Segal arranged for several display cases to be delivered in June. Finally, in the second week of July, the museum was able to reopen under the rules of Phase III, Step 1 mandate issued by the state. Keith Young worked in the museum, many times alone, for the first month to assure that the facility was available to the public. As the time passed, volunteers started to trickle back, but some chose to stay away concerned for their health in an uncertain environment. By August the museum was getting back into its groove.

Exhibits continued to expand. The exhibit depicting Anne Baddour's amazing accomplishments were enhanced by featuring a portion of Anne's certificates on speed records, her many noted aviation achievements, and models of all the aircraft she flew. Her portrait was hung in the gallery and her trophy for aviation excellence was made a prominent feature across from the painting. As curator, Barbara continued to smooth the edges of some of the exhibits such as the Women

in Aerospace while adding material donated from the daughter of a NASA career engineer. She also arranged with Micheal and Karen Goulian to feature his flight suit from when he won the 2009 Red Bull International Air Races.

It was clear that hiring someone to work at the museum was becoming necessary as it was becoming increasingly cost prohibitive for Keith to continue the 2 hour one way trip from the north shore down to the Hyannis every week. It was decided that the museum ought to hire its first real employee as an operations manager for the museum. After two months of an exhaustive search of candidates, Bryan McKay was selected. Bryan has insured that the museum would be open to public regularly, that actual tours would be available to patrons, and he would oversee the daily functions of the museum. Board Member Keith Young would still work to advance the overall operations of the museum, but would no longer need to be on-site for the museum to be open.

Bryan brought with him experience as a space enthusiast and arranged for the donation of several items from astronauts who are Massachusetts natives. Barbara put these into one of the new display cases that arrived in June.


Other additions in the fall included a painting by Ray Crane of the Vought OU-4 that the Museum had used in their brochures. Ray is a museum Pathfinder and has been a longtime supporter of the museum's mission. Barbara also worked with the New England Air Museum in Windsor Locks, CT to arrange for a donation of Plexiglass panels and a mobile base. This allowed Larry and Patti McGlynn to offer their reproduction Apollo 17 space suit for display in the museum. The Extravehicular Mobility Unit (EMU) now greets museum visitors as they enter through the front doors.

Barbara Jagla also worked with Bud Brealt, one of the museum's Board Members, to arrange for an exhibit featuring the Flying Santa program. The Friends of the Flying Santa is headed by its president, Brian

Tague, who met with Barbara, Keith and Bud at the museum in November to discuss what they had to offer. In less than three weeks, Barbara had the exhibit installed and available to the public while the Christmas season was just getting underway.

Barbara also worked with Clark University in Worcester, thanks to introductions made by Board Member Tom Hinneker, to install an exhibit on Robert Goddard, the father of modern rocketry. The presentation features Goddard standing beside his experiment in a field in Auburn MA in 1926. The photo, taken by his wife, shows him with quiet confidence that the liquid field rocket would work as expected. Two days later he proved his theories and changed how the world would forever create propulsion. To the left side is the scale model rocket on loan from Clark University that depicts how the early device actually appeared. Included in the exhibit is a list of Dr. Goddard's amazing achievements.

As we move into our second year of existence, the museum is on solid footing to continue to grow. The number of visitors continues to increase every weekend. We now have docent volunteers who assist Bryan with tours of the exhibits and who assist with the hand-on interactive exhibits. We continue to reach out to the community to build awareness of our boutique museum in Hyannis with more than 120 years of aviation and space history packed into a shopping plaza store front.

It is the museum's hope that you will put on your schedule a visit to the museum this year. There's always something going on and when you come in, don't forget to ask for your very own piece of Massachusetts aviation history in the form of a balsa wood glider. 


Museum Tickets

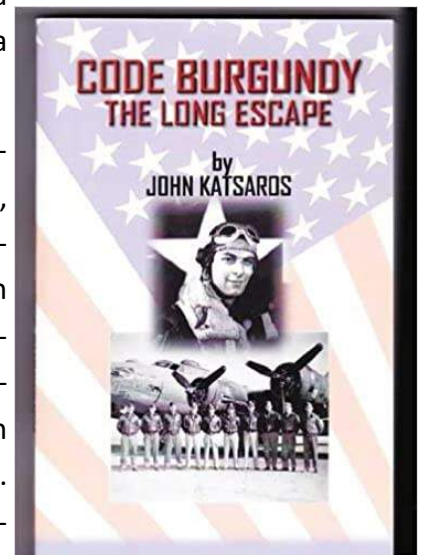
Baystate Airman Survives Air Crash and Escapes Nazi Capture

Among the many heroic stories that emerged from World War II was the tale of a young Haverhill man who became a member of an aircrew who flew in the celebrated B-17F "Man of War;" the late John S. Katsaros. Like many young men of the era, John signed up to fight the German war machine from the air, assigned as both a wing gunner and a photographer.

On his tenth mission on March 20, 1944, he left Deenethorpe Air Station in the midlands of England, bound for an engineering target in Frankfurt, Germany. While hitting their target, the aircraft lost

two engines and began limping its way home. The plane didn't make it. John was wounded, managed to bail out, and was captured by the Gestapo. He managed to escape twice and joined the French Underground movement and was given the name "Code Burgundy." His long escape from occupied France was held in close secret until very recently because of the secret intelligence information that he brought back to England with him. That intelligence greatly helped win the second World War for the allies.

John Katsaros passed away in late January, but his legacy of training airmen in the art of escape and evasion lives on. His autobiography is well worth reading. It illustrates true patriotism in wartime when true patriots are needed the most. 



LiveATC at HYA

By Keith Young, MASM Board Member

Nestled in the storage area of the Massachusetts Air and Space museum sits a small black container with a hinged lid. Inside this unremarkable box sit two aviation radios. Each of these are scanning different frequencies listening for local aviation traffic. The antenna jacks are connected to weather grade cables that run to a pair of antennae mounted on the rear of the museum's exterior wall, rising a few feet above the roof line. Connected to the radio output headphone jacks are a smaller set of cables that run to a Raspberry Pi mini-computer. The computer connects to the Internet. These handheld units are on 24 hours a day - 7 days a week. Nobody touches them, most people who enter the museum have no idea that they exist, yet if anyone in the world wishes to hear the air traffic around the Cape Cod Gateway Airport (HYA), all they need do is connect their computer or smartphone to LiveATC and tune in the proper frequency.

Dave Pascoe, the founder of LiveATC, has been an on-going supporter of MASM for several years. When he began to work towards his instrument rating he discovered that the ability to hear real radio terminology and conversations was virtually non-existent. Having to bring a hand-held radio to an airfield just to get familiar with the conversations between pilots and Air Traffic Control was impractical. As a radio technician and user of the Internet, he figured that there must be a better way to hear the


conversations from home using his personal computer. Thus the groundwork for what would grow into the LiveATC network was germinated. Squared within the Boston airspace, Dave set up a simple aviation radio that he could access through the internet for listening only. Soon other pilots were asking if they too might be able to have access to hear the radio communications. From that simple need to hear what was going on grew an international network of communications that has allowed aviation novices and enthusiasts to expand their experiences with the art of aviation communication and allowed seasoned veterans to keep abreast of what is happening at an airport from many miles away. The site is now used by FBO operators, airline operators, student air traffic controllers, aviation enthusiasts, flight simmers, student pilots and aviation museums to hear what is

happening at their local airport or even the big hubs.

LiveATC.Net was the first site to provide both live and recorded Air Traffic Control audio with instant retrieval. If you have ever heard a recorded conversation between a pilot and the air traffic control system, there's a reasonably good chance that audio was recorded on the servers maintained by LiveATC. This service is not just available to the

media, however. If you've ever

wanted to know how you sound on the radio, the recordings are made available to the general public simply by connecting to the website and selecting ATC Audio Archives. All of this free, although donations are appreciated, except for a minimal cost should you choose to purchase an app for use on your smartphone.

As part of the museum's mission to educate, encourage, and foster the interest in aviation and space exploration, the partnership of MASM with LiveATC allows us to deliver both current and recorded communication between aircraft and the tower, ground and airspace of the airports and area surrounding greater Hyannis. 



Dave Pascoe, Founder of LiveATC

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:



December 2020 Edition's Answer:

Hawker “Hunter” - Great Britain

Single-seat ground-attack fighter—**Max. speed:** 702 MPH (1,130 km/h)

Ceiling: 52,500 ft (15,850 m) **Radius:** 443 miles (713 km)

Dry weight: 14,400 lb (6,532 kg) **Max. take-off weight:** 24,600 lb (11,158 kg)

Dimension: Wing span: 33 ft 8 in (10.25 m); length 45 ft 10.5 in (13.93 m); height 13 ft 2 in (4.02 m); wing area 349.0 sq ft (32.42 m)

Powered: one 10,150 lb (4,604 kg) thrust Rolls-Royce Avon MK 207 turbojet

Armament: four 30-mm cannon and up to 6,000 lb (2,722 kg) disposable stores

Correct Answer: John T. Griffin, Jr., who also noted the Swiss livery.

