



Renaissance in Maryland's Aerospace Industry

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Images left to right: A-10 Warthog in the 175th Wing of the Maryland Air National Guard, NASA Parker Solar Probe, NASA Webb Space Telescope, Atmospheric Modeling at the NASA Goddard Space Flight Center, the NASA Gemini spacewalk being practiced in the McDonogh School pool, and Textron Systems Aerosonde UAV.

Flight has fundamentally changed transportation and how we look at the world. Flight and air superiority brought an end to World War II and has become a cornerstone of our national defense. The space part of aerospace has allowed us to observe and explore our world from above. The extent of Maryland's historical and current contribution to aerospace is remarkable. And, rather than receding, the state's role in the industry is actually expanding.

Historical Perspective The Value of Intelligence

During the Civil War, Union soldiers sought to understand the strength of the Confederate force. A barge on the Potomac was converted to a balloon carrier to observe troop strengths from the air at different vantage points.

First Powered Flights

In 1909, Wilbur Wright, along with his brother Orville, flew demonstration flights in College Park, Maryland, and the first aircraft built in Maryland flew in Owings Mills, Maryland. In 1911, realizing the importance of powered flight, the Army Signal Corps Aviation School was founded at the College Park Airport, which became the first U.S. military airbase. In August 1918, the first U.S. postal airmail flight left the College Park Airport.

In addition to being the location of these early flights, Maryland was deeply involved in the technology development and manufacturing of aircraft. The American Propeller and Manufacturing Company in Baltimore produced three-quarters of the propellers used by U.S. forces during World War I. From 1927 to 1933, the first radio navigation aids were developed at College Park Airport to help pilots land aircraft in low visibility.

The Lindbergh Lift

Charles Lindbergh's historic nonstop flight across the Atlantic on May 21, 1927, sparked enormous growth and development in aircraft manufacturing. In 1928, Baltimore alone attracted four aircraft manufacturing plants and advertised itself as the "New Capital of Aviation." While the stock market crash of 1929 forced many of Maryland's aircraft companies to merge or go out of business, Glenn L. Martin Company became a leading aircraft producer in Middle River, Maryland.

In 1935, Pan American Airways took delivery of its first of three Glenn L. Martin "boat planes" for transpacific flights. Paying homage to the clipper sailing ships of the 1800s, the aircraft were named China Clipper, Philippine

Clipper, and Hawaii Clipper. The boat planes provided transpacific flights for 43 passengers and seven crew members. The Glenn L. Martin Company Clippers developed radio navigation and seaplane bases that opened up the Pacific to air traffic.

World War II

In 1938, Fairchild Aircraft, located in Hagerstown, Maryland, won an Army Air Corps order to train pilots for the PT-19, which became the primary Allied training aircraft during World War II. A short takeoff and landing plane, the Fairchild 24, was also produced to support the U.S. Army Air Corps and the Royal Air Force. During World War II, the General Motors plant in Baltimore made the tail section of the Grumman F4F Wildcat, a carrier-based aircraft, and the Avenger Torpedo Bomber, which first saw action in the Battle of Midway in 1942.

Before World War II, the Glenn L. Martin Company built a number of bombers and naval patrol boats for the Allies. In 1943, Glenn L. Martin Company was Baltimore's largest employer, with over 52,000 employees supporting aircraft production in Middle River. One of the company's most successful aircraft was the B-26 Marauder, which helped the Allies end Hitler's invasion of Europe.

In 1942, the father of American spaceflight, Robert Goddard, moved to the Naval Engineering Experiment Station in Annapolis, Maryland. His team developed rockets for jet-assisted takeoffs and variable-thrust rocket motors that were later used on the Bell X-2 rocket plane.

The Plane Anyone Could Fly

A few miles from the College Park Airport, the single-engine Ercoupe aircraft was built by Engineering Research Co. (ERCO) in the 1940s and 1950s. These airplanes were designed to be "the plane anyone could fly." The twin tail and lack of rudder pedals helped stabilize the aircraft and prevent stalled spins. Amazingly, 359 of the well-designed Ercoupe aircraft still fly today.

Table 1: Aircraft Built in Maryland

Maryland's Largest Aircraft Manufacturers	Notable Aircraft	Number Built*
Glenn L. Martin	B-26, Flying Clippers, B-57	8,698
Fairchild - Republic	Fairchild PT-19, Flying Boxcar and A-10	8,068
Engineering and Manufacturing Co. (ERCO)	Ercoup single engine stall resistant aircraft	5,050
Other aircraft manufacturers		348
Total		22,164

* Aircraft built totals adjusted for aircraft not built in Maryland.

Modern-Day Developments in Maryland

Rockets, Missiles, and Crewed Space Flight

In 1955, Glenn L. Martin Company's Titan rocket won the Air Force's intercontinental ballistic missile program contract. All Gemini space flights in the 1960s were on Titan rockets that were integrated and tested in Middle River before being sent to Cape Canaveral. The first Gemini spacewalk was practiced in the pool of the McDonogh School in Owings Mills. The headquarters for the successor company Lockheed Martin is based in Bethesda, Maryland.

In 1979, the Maryland National Guard started receiving A-10 aircraft, affectionately known as Warthogs, straight from the Fairchild Republic Hagerstown, Maryland, aircraft factory. The twin-tail A-10 aircraft were designed around a 30 mm Gatling-style cannon for close air support of ground troops. However, aircraft production ended in Hagerstown in 1984.

The Goddard Space Flight Center in Greenbelt, Maryland, supports NASA's earth and planetary science missions and designs and supports satellites for the National Oceanic and Atmospheric Administration and the National Weather Service. Our understanding of the universe has been furthered by the Hubble, Webb, and soon Roman Space Telescopes. Goddard's planetary missions include lunar and asteroid missions, the Parker Sun Probe, and the upcoming DaVinci mission to Venus. The space science missions are supported by the Johns Hopkins Applied Physics Lab in Laurel, Maryland, and the Space Telescope Science Institute in Baltimore.

Maryland's Naval Air Station Patuxent River is home to the Naval Air Systems Command and the Naval Test Pilot School and serves as the operating base for naval fixed-wing and rotary-wing test aircraft. Recent test aircraft have included P-8 Poseidon maritime patrol aircraft, the extended-range version of Reaper drones, and the Marine One replacement rotary craft. Naval Air Station Patuxent River is home to program offices for each naval aircraft, rotary craft, and weapons system.

Joint Base Andrews in Camp Springs, Maryland, is home to Air Force One, two 747-200 aircraft, the U.S. vice president's aircraft, and aircraft that support congressional and Department of Defense leadership missions through the U.S. Air Force 89th Airlift Wing and the 316th Helicopter Squadron. In all, 14,000 service members support Joint Base Andrews operations.

The Aberdeen Proving Ground in Aberdeen, Maryland, is home to Chinook and Black Hawk rotary craft associated with the 126th and 224th Aviation Regiment of the Maryland Army National Guard. It is also home to rotary craft engine research performed by the U.S. Army Research Lab.

Table 2: Top Maryland Aerospace Employers

Maryland Based Research Centers 2024	Employees
Applied Physics Lab	8,700
Goddard Space Flight Center	10,000
Naval Air Station Patuxent River	20,000
Space Telescope Science Institute	500

Sensors and Navigation

Northrop Grumman's Mission Systems division is based in Linthicum, Maryland, which is heavily involved in producing sensors and radars. Radar sensors are cryogenically frozen to almost 460 degrees below zero to improve sensitivity. In the last two years, Northrop Grumman opened a second space integration facility and a hypersonic research and production center in Elkton, Maryland. Collins Aerospace in Annapolis supports aircraft navigation and awareness systems.

Crewless Aircraft Production and Development

Textron Systems in Hunt Valley, Maryland, makes uncrewed aerial vehicles (UAV) that support the U.S. Army. Its new vertical takeoff and horizontal Aerosonde UAV recently finished collaborative tests with Andruil Industries. The Textron Shadow has over 1.2 million flight hours. SURVICE Engineering in Belcamp, Maryland, is partnering with Malloy Aeronautics to manufacture lift UAVs for the U.S. military that can carry 250 pounds of cargo. Platform Aerospace in Hollywood, Maryland, is producing the Vanilla UAV that recently set an eight-day world record for continuous operations.

Rocket Building Returns to Middle River

Rocket Lab is returning Middle River to its rocket-building roots. It has started to build carbon fiber segments of its new medium-lift Neutron rocket, which is designed to be reusable and compete with Space X's Falcon 9 rocket. There is significant demand for low-earth-orbit lift capability. The 140-foot by 21-foot rocket is so big that larger sections will have to be transported by barge to its Wallops Island, Virginia, launch facility.

General Aviation

The Aircraft Owners and Pilots Association (AOPA) is based in Frederick, Maryland. AOPA and its 200 employees work to ensure the logistics and infrastructure are in place to continue the growth of general aviation and pilot training. Also based in Frederick is Avemco Insurance, a leading aviation insurance underwriter. Commercial pilot school activity is expanding as airlines provide more financial incentives for student pilots to become commercial pilots.

Commercial aviation is an important part of the Maryland economy, with Baltimore/Washington International (BWI) Airport ranked number 23 in the nation in 2023, handling 12.8 million passenger boardings. The Maryland Aviation Administration has \$1.2 billion of improvements planned between 2023 and 2028. BWI will get the lion's share of the improvements, but some of the most noticeable improvements are to regional airports. Martin State's runway is being lengthened to 8,100 feet so it can support fighter jets and more commercial operations. The regional airports in Easton, Hagerstown, and St. Mary's, Maryland, are receiving significant airport upgrades as well.

Maryland's aerospace history is celebrated at the College Park Aviation Museum, Glenn L. Martin Aviation Museum, Hagerstown Aviation Museum, Massey Air Museum, Patuxent River Naval Air Museum, and the NASA Goddard Space Flight Center.

175th Wing of the Maryland Air National Guard

Martin State Airport is receiving comprehensive improvements, so it can continue to support the 175th Wing of the Maryland Air National Guard. After training missions, A-10 flyovers during Orioles and Raven games inspire Maryland's next generation of aviators. From a deterrence perspective, the 175th Wing of Maryland's Air National Guard supports Estonia during NATO forward deployment missions. The State of Maryland is appealing the U.S. Air Force's decision to retire the 175th Wing of 21



Neutron Rocket half fairing photo courtesy of Rocket Lab USA, Inc.

Table 3: Publicly Traded Maryland Aerospace Employers

Fiscal Year 2023	Lockheed Martin	Northrop Grumman	RTX	Rocket Lab	Textron
Stock ticker	LMT	NOC	RTX	RKLB	TXT
Revenue	\$67,571	\$39,290	\$68,920	\$225	\$13,683
% change	2.4%	7.3%	2.8%	6.4%	6.8%
Gross profit	\$8,479	\$2,537	\$8,888	\$51	\$1,053
% change	2.3%	-29.5%	18.3%	170.5%	19.3%
Net income	\$6,920	\$2,056	\$3,195	(\$181)	\$921
% change	20.7%	-58.0%	-38.5%	34%	7.0%
Cash Flow from Operations	\$7,920	\$3,875	\$7,883	(\$99)	\$1,266
% change	1.5%	33.6%	10.0%	-7.0%	-14.9%
Backlog	\$160,567	\$84,230	\$196,000	\$1,046	\$13,899
% change	7.0%	7.9%	12.0%	107.7%	4.8%
Maryland employees	2,600	13,000	N.A.	65	1,000

\$ in millions

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A-10s at Martin State Airport, which affects 1,500 support personnel. If the A-10 Warthogs are retired, Maryland would be the only state in the country without an Air National Guard flying mission. Having training paths for aircraft mechanics and pilots is critical to retaining the knowledge base.

Conclusion: Maryland's Aerospace Industry is Growing

As can be seen in Table 3, all the large publicly traded aerospace employers in Maryland are experiencing revenue and backlog growth. Rocket Lab more than doubled its order backlog in 2023. The opportunities to support Maryland's defense companies, research centers, military branches, and commercial aerospace activities are growing, bolstering Maryland's leading role in the aerospace industry. 

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