

*Missions for America  
Semper vigilans!  
Semper volans!*



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*The Coastwatcher* is back! In November, I was delivering fruit from our annual fundraiser when I failed to “Check Six” and a construction truck rammed me from behind. No good deed goes unpunished. I plan to publish *The Coastwatcher* intermittently rather than weekly until I become full functional.

I thank all of you for your well-wishes and your interest in *The Coastwatcher*.

## QUICK QUIZ

What Do These Five have in common?



*PA-28R*

*Fiat G.50 Freccia*



*Israel Aircraft Industries  
Hetz*

*Dornier Do 335 Pfeil*



*Avro Canada CF-105*

*(Answers at end of this edition.)*

## WHERE ARE THEY NOW

*Alexander deAndrade*



Alec has earned his private pilot rating and is now with the Georgia National Guard with thoughts about moving westward. He graduated from Auburn University with a degree in criminal justice.

*Father Mode*

After his three year tour at the USCG Academy in 2912, Father Mode was assigned as the Command Chaplain of the *USS George Washington* stationed in Yokosuka, Japan. He visited 18 different countries throughout Asia, made two at sea deployments, and traveled extensively throughout Japan. Two highlights were climbing Mount Fuji and being the PIC of a Cessna 172 over Tokyo, and around Mount Fuji.



*Father Mode conversing with Pope Francis.*

In 2014, He had a two year assignment as the Command Chaplain of Naval Station, Guantanamo Bay, Cuba caring for 6,000 military members and their families but found time to receive a certification as a scuba diver,

In 2016, Father Mode was assigned as the Director of Plans and Operations for the Navy Chaplain Corps at the Pentagon, promoted to Captain, and completed a seventh month fellowship on Capitol Hill engaging in the study of the National Security Strategy and Religious Freedom.

In 2019, he returned to Japan to serve as the Chaplain of the Seventh Fleet deploying on the Flag Ship of the Fleet, *USS Blue Ridge*, and logging a career total of seven years of sea time and 9 years assigned overseas.

In 2020, Father Mode assumed the duties as Chaplain of the Coast Guard in Washington, DC and will be heading to National Security Agency Hawaii at the end of the Summer. With all my demanding military assignments he has not been able to keep his pilot certificate current, however he does have a few friends with planes and enjoy being instructed from time to time.

Noah has finished his second semester at Embry Riddle Aeronautical University in Florida studying aeronautical science. He has completed an instrument rating and working on my commercial pilot license. Through a program with JetBlue, he received a high altitude endorsement in an A320 full motion simulator. Current plans are to stay in Florida for summer and finish my commercial license and practice for the flight team.



In April Noah attended the National Intercollegiate Flying Association's National Competition was a member of the University's Flight Team. He competed in the traditional navigation event where teams of two are given a route between a set of points using only a sectional chart for navigation. The team must plan a flight, calculating both the time to fly to each point as well as the fuel required. Along the route, teams must navigate accurately to their planned time and fuel while searching for hidden locations using a zoomed in satellite image. Noah and his team placed 6th in navigation and the team placed 4th overall.

*Erik Nelson*

Major Erik "Swift" Nelson is currently serving at the Pentagon as a strategist on a small team (3 members) who advise the Secretary of the Air Force and Chief of Staff of the Air Force on military strategy and emerging technology.

A second master's degree, in military strategy, was earned at the Air University's School of Advanced Air and Space Studies at Maxwell AFB, Alabama.



*B-52 Aircraft Commander*

Before attending the Air University, Maj Nelson was an Air Force Fellow in Washington DC serving at the State Department, Bureau of European and Eurasian Affairs, Office of European Security and Political Affairs where he led a task force for the Afghanistan Evacuation, a portfolio on Protracted Conflicts, and provided guidance from Washington to the European Ministerial Council's Organization for Security and Co-operation.

### CURRENT, MORE OR LESS, EVENTS

#### *Ingenuity Permanently Grounded*

The proof of concept Ingenuity Mars Helicopter was launched on July 30, 2020 and landed in the Jezero Crater on February 18, 2021, now christened Wright Brother Field, ICAO designator JZRO.

It was carried by the Perseverance Rover which deposited it on the surface and then moved away to undertake its survey mission.



*Ingenuity photographed from Perseverance. (Credit: NASA/JPL)*

Over the next three months, Ingenuity logged 72 flights, a total flight time of two hours, eight minutes and 48 seconds.

On the last landing, it shed one rotor blade and damaged the tip of another, permanently grounding it however it will continue transmitting data on Mars weather.



*The rotor blade shed is located about 50 feet away. (Image credit: NASA/JPL-Caltech/LANL/CNES/CNRS)*

### FEATURE ARTICLE

#### *Twin Engines and Twin Tails A Lockheed Signature*

##### *Part One The Electras*

The establishment of Lockheed Aircraft as a major airframe manufacturer is intimately involved with a small group of iconic designers, the struggle to find a niche in the airline market and the pressing requirements of the United Kingdom to supplement its bomber, coastal command and training as Germany re-armed and exhibited aggressive behavior.

The Loughhead Brothers, Allan, Malcolm and Victor, were of Scottish origin and their surname was pronounced “lock-heed” but so often mispronounced that they changed its spelling to conform to the correct phonetic pronunciation. Their early efforts as aircraft builders had financial ups and downs but they dabbled in aviation, mostly sub-contracting, and had some minor successes. One of their early employees was a

young and innovative draftsman named Jack Northrop.

Post World War I, the firm focused on streamlining using an innovative manufacturing method involving a concrete mold which shaped and glued laminated plies of spruce using high pressure. However, the supply of cheap war surplus aircraft flooded the market and their innovative S-1 was a marketing failure.

Malcolm has developed and patented hydraulic four-wheel brakes so he headed east to find his fortune in the automotive industry, sold his patent rights to Bendix, made a bundle and his system was adopted as an industrial standard.

But a pair of extraordinary designers, Jack Northrop and Gerald Vultee, were working for the new post World War Lockheed and used the pre-war mold and lamination technique to produce a new aircraft, the Vega, whose performance attracted premier pilots and whose flights were a publicity bonanza for the company. It was powered by a nine-cylinder Pratt & Whitney Wasp or Wright Whirlwind engines and equipped with the low drag NACA cowling and wheel fairings. The power and streamlining yielded speeds exceeding 150 knots.

The Vega took every speed record in the 1929 National Air Races. Amelia Earhart became the first woman to solo the Atlantic flying a Vega and Wiley Post made two record setting circumnavigations of the earth in the Winnie Mae. Both Earhart's and Post's aircraft are on display in the National Air and Space Museum.



*Winnie Mae, a Lockheed 5C Vega*

But more importantly, the Vega, which was Lockheed's first production aircraft generated a succession of other aircraft, the Altair (retractable landing gear), Sirius (Lindbergh's choice for survey flights to the far east, the Arctic, Europe, Africa and South America) and the the Orion (favored by businesses and airlines). The high profile pilots and the publicity garnered made the name Lockheed familiar but none of them led to large production contracts. Except for 132 Vegas, their other efforts were produced in handful lots of one or two dozen.



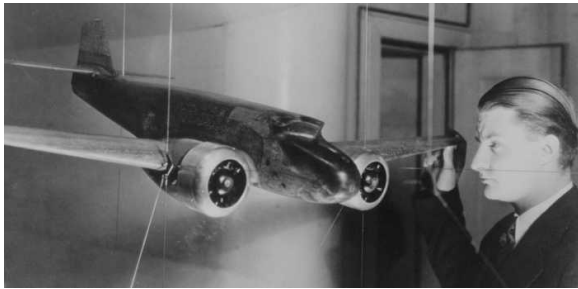
*Orion 9B operated by Swissair. Only about three dozen were produced (Credit: Walter Mittelholzer)*

In the mid 1930s as war clouds gathered over Europe, Lockheed had come under the control of a canny entrepreneur named Robert Gross and had assembled a world-class stable of designers and production experts led by Hall Hibbard. The group included Lloyd Stearman, Willis Hawkins (involved with the Electra, Constellation, C-130 and M1 Main Battle Tank) and a young kid from the University of Michigan, Clarence "Kelly" Johnson.

In 1934, the government enacted new safety regulations that banned airlines from using single engine aircraft for passenger service at night. The original project conceived by the the new company directors was an all-metal single engine 10 seat transport plane along the lines of the successful Orion or Vega but the new regulations and rival Boeing's projected twin engine Model 247 led to the conclusion that the future lay in twin engine transports.

Wind tunnel models of a tentative design were constructed and tested at the University of

Michigan. Kelly Johnson, an undergraduate student noted instability problems in the design and notified Lockheed but was ignored at first. He was rejected for employment and told to return to Michigan, complete his master's degree and come back in a year. He did so and was hired as a tool designer. Not being shy, he finally convinced Hibbard that the new design suffered from directional instability problems and provided a fix including the addition of the classic twin tail and fairing and fillet modifications to improve the aerodynamics.



*Kelly Johnson studying the original Electra design at the University of Michigan.*

The development and production of what was now the Model 10 was a near run thing as the company was in a continuous struggle to stay financially solvent. Investors were found, shares were swapped, loans were brokered and the Model 10 received its airworthiness certificate on the 11<sup>th</sup> of August, 1934.

The Vega and Orion line were closed out and airline and government orders for the Model 10, christened Electra, began to flow into the sales office and in 1935, a profit was entered into the company books. The aircraft filled a narrow niche in the commercial aircraft market, smaller than the Boeing 247 and Douglas DC-2 but with equivalent performance and cheaper to purchase and operate.

A number of Electras are noteworthy. A Model 10E was flown by Amelia Earhart when she and her navigator, Fred Noonan, disappeared over the Pacific on their attempt to fly around the world. Another 10E, designated XC-35 by the Army Air Corps was modified with a strengthened circular fuselage, equipped with a pair of P&W550 hp turbo-supercharged engines and used to test cabin

pressurization.



*XC-35-Note the small windows.*

A third Model 10E named *Daily Express* and under the command of Capt. Dick Merrill won the Harmon Trophy for a round-trip Atlantic crossing, New York-London-New York carrying newsreels of the Hindenburg crash east and photographs of the coronation of King George VI westward. A total of 149 were produced and served in the U.S. military as the C-36/37, dozens of domestic and foreign airlines and European and South American military organizations.

The Lockheed Model 11 was a still-born twin engine fighter which was never built but the Model 12 was an unusual decision to produce a smaller version of the Electra. Ordinarily, successful airliners end up being stretched. The DC-2 was designed for 14 passengers but the DC-3 carried 21. The original Boeing 737-100 was outfitted for 85 passengers but the 737-900 will take 189 in a one-class high density configuration. What all entrepreneurs know is that a product must be marketable and that means fulfilling customer demands, finding a product which can fill a need at a reasonable price and returns a reasonable profit.

In 1935, the Bureau of Air Commerce invited proposals for a twin-engine aircraft that could function as a feeder airliner for the mainline carriers such as Northwest, Delta and PanAm to name just three. Carl Squier, Lockheed's head of sales saw an opportunity and Hibbard, Johnson and the design team set to work to beat the Bureau's deadline, the end of fiscal year 1936. The decided to scale down the Electra and made the first flight three days before the Bureau of Air

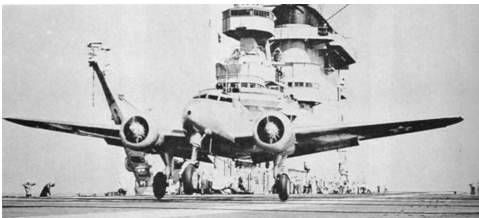
Commerce deadline.

The aircraft, named Electra Junior used the same 450 hp P&W Wasps as the Model 10 Electra and was lighter so it was faster. As it turns out, it did not appeal to any of the feeders except some South American airlines but it could be fitted with a luxurious interior so it appealed to business interests and its performance led to its adoption by the Army Air Force and foreign militaries and 130 were produced.



*Lockheed 12A Electra Junior*

Some of the Model 12s have interesting stories. The Maharajahs of Jodhpur, Jaipur and Kashmir each owned one. The National Advisory Committee on Aeronautics, NASA's predecessor, used one for wing de-icing experiments using exhaust heat. The U.S. Navy used their XJO-3 equipped with tricycle landing gear for tests aboard the *USS Lexington*.



*XJO-3 on board the U.S.S. Lexington (Credit: US Navy)*

The Netherlands East Indies government ended up with 35 Model 12s and outfitted them with defensive armament and bomb racks but most were lost when operating against the Japanese although a few escaped to Ceylon and Australia. But the most interesting were three of them operated by Sidney Cotton for the French *Deuxième Bureau* and British MI6

The interwar years found a free-wheeling, innovative, Australian veteran of the Royal Naval Air Service (RNAS) veteran named Sidney Cotton moving from continent to continent trying to make an honest shilling. Cotton had already achieved a modicum of fame for his invention of the Sidcot flying suit, a multilayered, windproof and insulated coverall which became a standard for open cockpit aviators. He spent three years in Newfoundland where he participated in a number of aviation enterprises, flying some search and rescue missions, air mail, and an attempt to establish a seal-spotting business.

On return to England, Cotton became an agent for Dufaycolour film and flew around the continent marketing the product and promoting several other business schemes. Frederick Winterbotham, a member of the Air Section of the British Secret Intelligence Service (MI6) realized that Cotton had a ready made cover for aerial espionage and recruited Cotton. Cotton's new company, Aeronautical Research and Sales, acquired with the assistance of His Majesty's Government, several Lockheed Model 12A Electra, Jr. aircraft. The new "company" planes were equipped with vertical and oblique viewing cameras hidden under cunningly designed sliding panels and operated by an unobtrusive switch in easy reach of the pilot. The paint scheme was a duck-egg green specially ordered by Cotton which blended nicely with the sky background. One of the aircraft were fitted with long range tanks and a "bubble" window, invented by Cotton, to allow the pilot a view directly below the aircraft.



*Cotton in the cockpit of his modified Electra, Junior*

*photo credit: J. Fenevrol*

The aircraft made a number of flights over continental Europe and the Mediterranean basin. Two months before the German invasion of Poland, Cotton made several excursions into Germany, ostensibly to market film. The Germans

were impressed by the aircraft and requested flights. Cotton obliged and used the opportunities to take even more photographs while German military officers were aboard!

When the war started, Cotton received a special appointment as an RAF officer and established the Photographic Development Unit (PDU) which was to become the Photo Reconnaissance Unit (PRU). He argued that the best aircraft for photo reconnaissance were small, fast, and high flying. After much resistance from higher authorities, he obtained several of the precious Spitfires which he stripped of armament and armor, painted duck-green blue, and polished the wings and fuselages. The lightened and camouflaged aircraft could outrace and out climb the German interceptors, performance features which are the *sine qua non* of PR aircraft to this day.

Cotton's departure from the RAF mirrored his departure under similar circumstances from the RNAS two decades earlier. His Aussie brashness and aggressiveness in obtaining the resources needed for his projects irritated the aristocratic hierarchy which commanded and which, no doubt, questioned his qualifications as a "gentleman." Once the PDU was running smoothly, Cotton was replaced by a regular RAF officer and the PRU entered the RAF's order of battle.

Model 13 was never assigned by Lockheed but the Model 14, Super Electra, first flown in 1937, was developed as a scaled-up version of the Model 12, a solid entry to compete with the DC-2 and Boeing 247 but the magnificent DC-3 has been introduced 18 months earlier. The '3 carried 50% more passengers and was arguably superior to the Super Electra except for speed. The Super Electra could be supplied with a variety of engines from Pratt or Wright and the 900 hp Wrights gave it a 35 knot cruise advantage. The wings were shorter and the highly loaded wing meant higher take-off and landing speeds which were off-set by the newly developed fowler flaps. Around 350 were manufactured and they did have some popularity with foreign commercial operators.

Howard Hughes modified one of the Super

Electras and set a new record for a round-the-world flight. He and his crew departed Floyd Bennet Field in Brooklyn and after six intermediate stops over four days, returned after flying 14,761 miles in 71hr 11min 10 sec.



*Hughes's Model 14 mobbed by the crowd after landing at Floyd Bennett Field.*

Another Super Electra flight gained historical notoriety. It returned British Prime Minister Neville Chamberlain to England after his Munich meeting with Adolph Hitler at which the western allies sold out Czechoslovakia for a piece of paper with a promise by *der Führer* which Chamberlain said guaranteed "peace in our times...and...peace with honour."



*Chamberlain displays the Fuhrer's written promise. (Credit: UK Ministry of Information)*

However, the lessons learned in producing the Electra series would soon provide the basis of designing skill and manufacturing prowess which would lead to the largest contract ever awarded to a U.S. airframe manufacturer and the birth of Lockheed as a corporate giant.

Part Two will appear in a subsequent issue and will discuss the follow-up versions which achieved success as bombers, patrol aircraft and transports,

## AEROSPACE CHRONOLOGY

02 June, 1941 – The United States Navy commissions USS Long Island (AVG-1), its first escort aircraft carrier. The Long Island was a proof of concept experiment to test air operations from converted merchant ships. Later re-designated CVE-1, she was the first in a long line of 122 baby flat-tops.

The CVE's were not meant to directly engage enemy war ships. Generally built on a merchant ship hull, their light construction made them vulnerable to shellfire and bombs. Of the 122 US Navy CVE's, six were sunk, three by kamikazes, two by submarines and one by shellfire. Sailors sometimes said that CVE stood for "combustible, vulnerable and expendable." So CVE's did not sail with the main battle force.



*Acting as an aircraft ferry, Long Island is carrying 21 Hellcats, 20 Dauntless dive bombers and two Ducks.*

The escort carriers were useful in three roles. As an anti-submarine weapon, they escorted convoys and later formed hunter-killer teams with detachments of destroyers and destroyer escorts. Their aircraft provided close air support to invasion forces. The "jeep carriers" as they were called also ferried aircraft into the combat zones and provided replacements for combat losses suffered by the fleet carriers

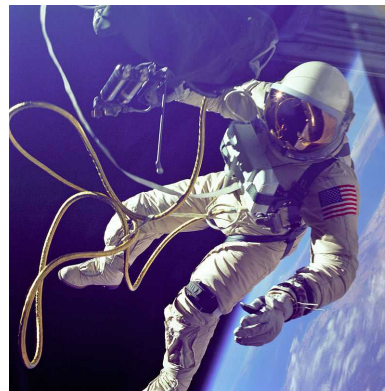
The Royal Navy called them "Woolworth Carriers." Like the U.S. ships they were cheap to build but slow and carried a limited number of aircraft. But they filled an important role in

combating the U-boat menace.

The British invented the concept and operated 45 ships. But 39 were built by the United States and transferred as land-lease. Two of them were sunk by U-boats and one by an internal explosion.

When the war ended, many of them were converted into cargo ships and were able to give 20 more years of service before relegated to the ship-breakers. Not one ship of this type survives today.

3 June, 1965 – Gemini 4 launched. This was the 2nd US 2-man flight and carried James McDivitt & White aboard. White became the first American to "walk" in space, during this flight.



*Ed White, First US Spacewalker*

4 June, 1932 – William G. Swan, at Bader Field, Atlantic City, New Jersey, makes the first rocket-powered glider flight.



(Long photo)  
William G. Swan and the rocket glider he successfully flew recently at Atlantic City, N. J.



The glider carried 10 solid fuel rockets producing 50 pounds of thrust each. On the first flight, he

ignited one rocket and flew 1,000 feet at an altitude of 100 feet.

The next day, Swan ignited all 12 rockets. At 35 mph he lifted off and got to 200 feet and stayed aloft for eight minutes.

5 June, 1969 – The Tupolev Tu-144 supersonic airliner becomes the first aircraft of its class to fly through the sound barrier when it exceeds Mach 1 at an altitude of 36,000 ft.



Fifteen years ago, NASA and major U.S. aerospace firms teamed with Russia's Tupolev Design Bureau and studied the technology which might be needed to develop a second generation of supersonic transports. The aerial workhorse was a modified Tu-144D. The last production Tu-144 was given more powerful engines, digital electronics and a wide range of data recording equipment and sensors and renamed the Tu-144LL.



Between 1996 and 1999, about two dozen flight and extensive ground testing studied thermodynamic characteristics of the airframe and engines, shock wave development, acoustics and handling in various flight profiles. Data gathered could then be used for comparison with other aircraft and to validate computer modeling.

6 June, 1942– Adeline Gray, an employee of the Pioneer Parachute Co. of Manchester made the first jump using a nylon parachute.



*Gray at work at Pioneer Parachute Co.*

Gray, a licensed parachute packer and rigger was 24 years old and made her first jump at the age of 19. She was the only licensed parachute jumper in Connecticut. This was her 32 jump.

7 June, 1938 – First flight of the Douglas DC-4E. The single DC-4E, not to be confused with the later DC-4/C-54 was paid for by a consortium of United, Eastern, American Airlines, Pan American Airways and Transcontinental and Western Airlines as a DC-3 replacement.



*The triple tail allowed it to fit inside hangars then in use and provided more yaw control in an engine-out situation.*

The aircraft was complex and expensive and PanAm and T&WA dropped out and adopted the Boeing 307. The work done on the DC-4E led to the development of the highly successful C-54/DC-4.



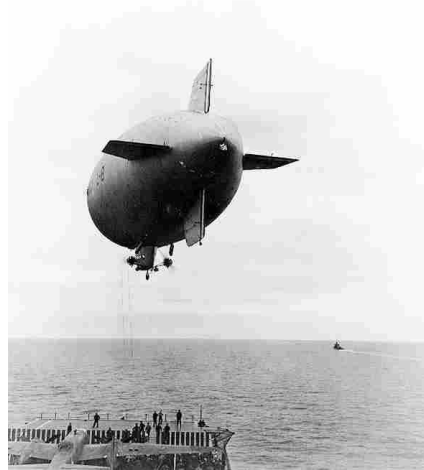
*Berlin Airlift Commemorative C-54*

Imperial Japanese Airways brought the aircraft and had it shipped to Japan. There, Nakajima Aircraft studied its features and used them to produce its unsuccessful G5N bomber.

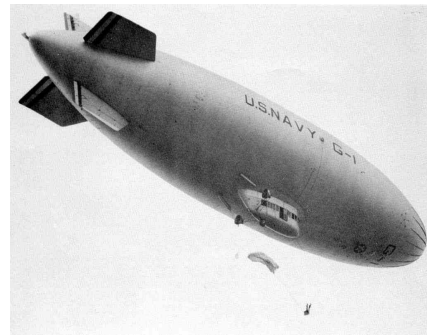


*Japanese JN5 Liz*

08 June, 1942 – Two Navy blimps collided and crashed off the New Jersey coast. They were conducting night visual and photographic tests. One was the prototype G-1. The other was the L-2. Of the 12 aboard, only one survived.

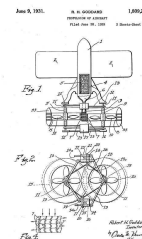


*A Class L-8 blimp delivering special equipment to the USS Hornet for the Doolittle Raiders*



*The ill-fated G-1, formerly the Goodyear Flagship Defender working as a jump platform at the parachute school at Lakehurst.*

9 June, 1931– Robert Goddard patented the first rocket powered aircraft design.



## QUIZ ANSWER

They are all named “Arrow” in English, German, Italian and Hebrew. Don't you wish you studied languages instead of Gender Studies with a minor in Grievance Studies.