Missions for America
Semper vigilans!

Semper volans!

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Maj Scott Farley, Roving Correspondent
Shawn Terry, Automated Sciences, IT Guru

29 AUG-TRCS Meeting
09 SEP-Touch-A-Truck-East Lyme
15-17 SEP-CTWG Conference
21-24 SEP-Durham Fair Parking Detail
23 SEP-Scarecrow Festival-Preston
04 NOV-Col Palmer Cadet Ball

A new weekly meeting schedule will be published in a month.

CADET MEETING
22 August, 2023

SENIOR MEETING
22 August, 2023

Maj Scott Farley discussed the threats of thunderstorms and the mitigation of the threats.

CADET WINS CASH PRIZE

Cadet Chief Master Sergeant Alexander Knets won a prize winning essay for the American Institute of Aeronautics and Astronautics 2023 Student Essay Contest and was presented with a $200 check by Lt Col Stephen Rocketto, AIAA Connecticut Section STEM/K-12 Chair.

Knets essay discussed how the James Webb Telescope will contribute to new discoveries in astronomy and astrophysics.

NATIONAL AVIATION DAY CELEBRATION

C/2dLt Buchko and Maj Bourque prepare the L-Per. (In hoc signo inveniemus.)

Thames River Composite Squadron provided a strong presence at the Groton-New London Airport Open House on Saturday, the 19th of August. In 1939, President Franklin Delano Roosevelt issued a presidential proclamation which designated the 19th, the anniversary of Orville Wright's birthday to be National Aviation Day and activities celebrating aviation are encouraged and held all over the United States.

TRCS set up a number of stations for public viewing. A CAP Cessna 182 and our radio equipped search and rescue vehicle were on display on the ramp in front of the terminal building and aircrew provided information about the equipment and its use. A ground team was attached to this group and demonstrated the use of the L-Per radio direction finder.

Two tables were set up inside the terminal. A flight simulator was running and the public was encouraged to try their handing at a straight in approach to Groton's runway 23.

Young children and a few sweet-toothed adults tried their hand at operating our robotic arm to seize pieces of candy from a dish. Various other CAP related displays were manned by senior members and provided information to the public about CAP's mission and history.

Chapter 334 of the Experimental Aircraft Association had a number of their aircraft on display and must be thanked for the generous sharing of the doughnuts and pizza with the CAP contingent.

The 1109th Theater Aviation Support Maintenance Group's UH-60 Blackhawk helicopter was a steady draw and National Guard members stood ready to answer the many questions posed about the aircraft and the Guard mission.

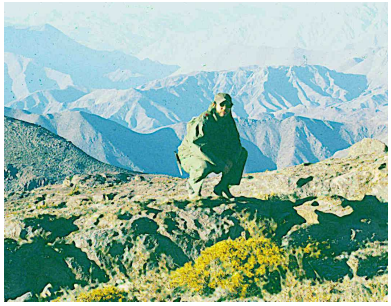
Mr. Stuart Sharack, a retired teacher and Aerospace Education Member affiliated with TRCS set up a table highlighting the activities of the FAA Aviation Career Education Academy which he has organized and run for the last 10 summers at Groton. Sharack is the first teacher to win the CAP National Aerospace Teacher of the Year Award which was presented to him in 2008 at the CAP National Conference in San Antonio.

Squadron members participating were Maj David Pineau, Maj. Roy Bourque, The Buchkos, SM Stephen, C/2dLt Stephen, C/CMSgt Nicholas Buchko, Capt Stephen Deignan-Schmidt, LtCol Richard Doucette, Maj Scott Farley, SM Theresa Esenberg, C/Capt Aneleise Mazzulli, Maj Keith Neilson, Maj John Peski, 2dLt Joanne Richards, Lt Col Stephen Rocketto, Capt Adam Sprecace and Capt Jennifer Thornell

WHERE WERE THEY THEN?

Capt Ed Miller, St. Francis Prep Flying Club, Staten Island Airport, 1957.

Lt Col Steve Rocketto, Somewhere in the Altiplano, 1967.



AEROSPACE CHRONOLOGY

August 23, 1941-Capt. Homer Boushey makes the first rocket powered flight of a US aircraft when he took-off in an Erco Ercoupe using solid fuel rocket motors mounted under the wings. The motors were designed and fabricated by a group of researchers at the Guggenheim Aeronautical Laboratory, California Institute of Technology (GALCIT). Each of the solid propellant rockets produced produced 28 pounds of thrust for about 12 seconds.

The original grant of $1,000 was controlled by Prof. Theodore von Kármán, arguably the greatest theoretical aerodynamicist of the 20th century who led the "suicide squad" of experimenters, Dr. Frank Malina, the notorious Jack Parsons (Check this dude out!) and Dr. Hsue-shen Tsien, father of the Peoples Republic of China rocketry program.

Their rocket tests on campus on campus were finally considered so dangerous that they were exiled to the remote Aroyo Seco where the Jet Propulsion Laboratory was eventually established. The group also formed the Aerojet Corporation which after a number of business sales became Pratt and Whitney Rocketdyne. Along the way, they were prime contractors for the U.S ballistic missile program and NASA's manned space program.

An ERCO Model 415 was flown by Boushey for the testing at March Field in California. Three JATO units were attached under each wing and the take-off distance was halved. Boushey was an engineering graduate of Stanford University and assigned to research and development programs.

He commanded the 412th Fighter Group, the first USAAF jet organization at Muroc Army Air Field (now Edwards AFB) and commanded the USAF Arnold Engineering Development Center, at Tullahoma, Tennessee and retired as a brigadier general.

August 24, 2001 – A new record, the longest powerless glide by a commercial jet airliner. Air Transit Flight 236, Montreal to Lisbon.

An undetected fuel leak, a gallon/second in the right tank was due to a maintenance issue. When the imbalance was noted, the pilot transferred fuel from the left tank to the right tank, the one which was leaking. Capt Robert Piché declared a fuel emergence and made the decision to divert to Lajes Air Base in the Azores.

At 150 miles out at 39,000 feet engine number two (right side) flamed out and Piché initiated a descent to 33,000 feet, the correct altitude for single engine operations at the current weight of the aircraft. Thirteen minutes later, 75 miles out engine number one shut down. The electrical power was lost but swiftly regained when the ram air turbine deployed.and supplied enough energy to run critical systems, especially the hydraulic systems needed to control the aircraft.

Radar provided guidance to the airport and the aircraft was high enough that Piché had to execute a 360° turn and the s-turn to lose enough altitude. A hard touchdown at 200 knots was made 1,000 feet past the runway threshold and hard braking brought the aircraft to a stop with several thousand feet to spare. However, all eight main wheels had locked up and were destroyed.

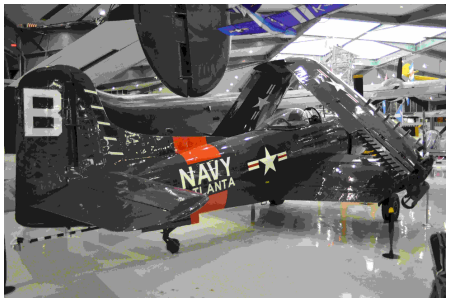
The 75 mile glide set a new record originally set by the 1983 “Gimli Glider” flight.

The only serious injuries were suffered by two passengers during the evacuation (*AP Photo/Humberta Augusto)*

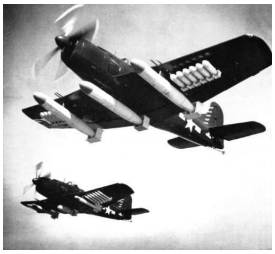
August 25, 1947 – Maj Marion Carl, USMC sets a new world speed record over a 3 km straight course, 650.797 mph at Muroc Army Air Field, California. Carl was flying the No. 1 Douglas D-558-1Skystreak

The record setting Skystreak on display at the Naval Aviation Museum, Pensacola, circa 1968.

August 26, 1944– First flight of the Martin AM Mauler. The Mauler was a large attack bomber capable of carrying 6,000 pounds more than its contemporary Douglas AD Skyraider.



The Mauler in the Museum of Naval Aviation at Pensacola bears the markings of the Atlanta, Georgia reserve squadron.



However, it was less capable of carrier operations than the Skyraider and was plagued by maintenance difficulties. Only about 150 were built compared to the Skyraiders production run of over 3,000.

The aircraft was notable for its load carrying abilities. Arguably, it lifted the largest payload ever carried aloft by a single engine piton powered aircraft. On March 30th, 1949, a Mauler toted three 2,200 pound torpedoes, 12 250 pound bombs and full magazines of 20 mm cannon ammunition, 10, 648 pounds!

August 27, 1941- The German submarine U-570 surrenders to a RAF Coastal Command Lockheed Hudson.

Lockheed Hudson

The ship is taken in tow by the Royal Navy, refurbished, and enters service as *HMS Graph*.

U-570 taken in tow by a Royal Navy Trawler (*Photo Credits: Imperial War Museum)*

Aug. 28, 1957 – An English Electric B.2 Canberra bomber using supplemental power supplied by a Napier Double Scorpion rocket motor set a new altitude record flying to 70,308 feet.

In the picture on the left, the exhaust for the rocket engines are visible mid-fuselage. *Credit: Institution of Mechanical Engineers)*

The motor, using kerosene as a fuel and a hydrogen peroxide oxidizer was being tested to determine its capabilities of improving the performance of cold war interceptors.

Aug 29, 1944 – Goodwood IV, a Royal Navy airstrike against the battleship *Tirpitz* fails due to an effective German smoke screen and fog which shields the ship from the attacking bombers.

The Royal Navy employed 34 bombers and 25 fighter escorts launched from *HMS Formidable* and *HMS Indefatigable.* The aircraft were a mixed bag consisting of Grumman Hellcats, Vought Corsairs, Supermarine Seafires and Fairey Barracudas and Fireflys.

Readying aircraft on the deck of the Formidable. *(Credit: Davies, F A (Lt), Royal Navy)*

The *Tirpitz* was the second Bismarck-class battleship and the largest capital ship in European waters. She served as a force in being, threatening the Russia-bound convoys and forcing the Royal Navy to station a sizable force of warships in case she sortied.

Between 1940 and 1944, the British made around 25 attempts to sink the Tirpitz, mostly air raids but two attacks using midget submarines and manned torpedoes. The final attack, November 12, 1944, was carried out by the Royal Air Force dropping the 12,000 pound Tallboy. Two direct hits and a near miss causing the ship to capsize in the shallow waters of Tromsø Fjord, Norway.

Lancaster releasing a Tallboy from its modified bomb bay. *(Credit: Imperial War Museum.)*

Tirpitz turned turtle and being salvaged after the war.

FEATURE ARTICLE

Twin Engines and Twin Tails
A Lockheed Hallmark

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 crucial requirement of the United Kingdom to supplement its bomber, coastal command and training.

The Loughead 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 joint enterprises 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 glued laminated plies of spruce, and subject to high pressure. However, the supply of cheap war surplus aircraft flooded the marked 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 the system was adopted as an industrial standard.

But a pair of extraordinary designers, Northrop and Gerard Vultee, were working for the new post-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 women 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.

Earhart's Vega 5B in which she made he first non-top flights across the United States and the Atlantic by a woman. *(Credit:NASM)*

The Winnie Mae, Post's Vega 5C in which he was first to solo the world and explored the jet stream.

But more importantly, the Vega, 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 these aircraft to large production contracts. Except for the 132 Vegas, the others were produced in handful lots of one or two dozen.

In the mid 1930s as war clouds gathered over Europe, Lockheed hd come under the control of a canny entrepreneur named Robert Gross and had assembled a 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 Boeing's projected twin engine Model 247 led to Gross's 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.

Johnson, testing the original single tail Electra in the University of Michigan wind tunnel.

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

Earhart and Noonan in Calcutta, June 17, 1935, two weeks before their disappearance.

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.

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 the 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.

An Electra 10A built for the Secretary of the Navy and designated XR2O-1

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.

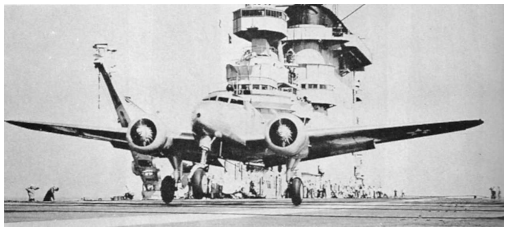
For example, the original Boeing 737-100 was outfitted for 85 passengers but the 737-900 will take 189 in a one-class high density configuration.

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, Jr used the same 450 hp P&W Wasps as the Model 10 Electra but 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 acceptable to business interests and its performance led to its adoption by the Army Air Force and foreign militaries and 130 were produced.

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. In 1939, the Navy used their XJO-3 equipped with tricycle landing gear and tail hook aboard the *USS Lexington* to study a twin engine nose gear configuration suitability for carrier operations.



It is commonly accepted that Winkle Brown was to first to make tri-gear and multi-engine landings on aircraft carriers but these experiments preceded Winkle Brown's landings by around five years.

In 1941, the aircraft was used by the MIT Radiation Lab to test a microwave radar unit equipped with a plan position indicator to locate ships.

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 the 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 (MI-6) 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.

One of Cotton's spy planes is still registered and flying.

The new “company” planes were equipped with vertical and oblique viewing cameras hidden under cunningly designed sliding panels and an unobtrusive switch in easy view 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. Feneyrol

The aircraft made a number of flights over 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 PR 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.

A reverse lend lease Mark XI Spitfire assigned to the USAAF's 14th Photographic Squadron.

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 no irritated the aristocratic hierarchy who commanded and who, 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, a head start. She 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 higher cruise. The wings were shorter and the highly loaded wing meant high 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.

The protrusions behind the wing's training edge house the mechanisms for deploying the Fowler flaps which track out and down, adding lift by modifying the camber of the wing and adding to its surface area.

Howard Hughes modified one of the Super Electras, designated Model 14-N2, and set a new record for a round-the-world flight. Extra fuel tanks had been installed and the aircraft was fitted with 1,100 hp engines and special navigation gear.

He and his crew departed Floyd Bennet Field in Brooklyn and after six intermediate stops and four days, returned after flying 14,761 miles in 71hr 11min 10 sec.

The press mobbing Hughes after landing at Floyd Bennet Field.

Another Super Electra was notorious, It returned British Prime Minister Neville Chamberlain to England after his Munich meeting with Adolph Hitler which sold out Czechoslovakia for a promise by *der Führer* which he said guaranteed "peace in our times...and...peace with honour."

Chamberlain, waving the document with Hitler's signature guaranteeing peace in our times." (Credit: IWM)

The Peace was a piece of Czechoslovakia, a piece of Poland, a piece of France.....

However, the lessons learned in producing the Electra series would soon provide the basics 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 II discussing the Hudson, Lodestar, Ventura and Harpoon will appear in a future issue.

INTERNATIONAL MOONING

Both Russia and India completed moonshots this month but with distinctly levels of success.

From Le Voyage dans la Lune (A Trip to the Moon), the first science fiction film, released in France on September 1, 1902.

On August 19, Russia's Lunar 25 failed to enter a planned orbit for its final descent to the lunar surface. Apparently, an engine burned for 127 seconds rather than the planned 84 seconds and led to an uncontrolled descent and crash.

On August 23, India's Chandrayaan 3 made a successful landing near the moon's south pole which was also the planned destination for the Russian craft. The south pole is of special interest since it contains deep craters with permanently shadowed regions which may be a source of water.