Missions for America
Semper vigilans!
Semper volans!

The Coastwatcher

Publication of the Thames River Composite Squadron
Connecticut Wing
Civil Air Patrol
300 Tower Rd., Groton, CT
http://ct075.org.

LtCol Stephen Rocketto, Editor
srocketto@aquilasys.com
Lt Col deAndrade, Publisher
Lt David Meers & Maj Roy Bourque, Papparazis
Hap Rocketto, 2nd Lt, AUS, (ret'd.) Feature Writer

Issue 11.01 03 January 2017

Our 11th Year and 426th Edition

CADET MEETING

03 January, 2017
submitted by
Lt Steven R. Deignan-Schmidt
Deputy Commander for Cadets

The first meeting of the year commenced with the usual opening ceremonies. Lt Schmidt addressed the Cadets outlining goals and objectives for the new year. Building rockets to qualify for the Rocketry Badge and to fly in the Wing Commander's Cup competition was the hands-on activity for the evening.

Special activities for the immediate future were announced.

O-Flights – Times to be scheduled
1/28/17 - UDF Training (lesson and field activity # 1) - 4 hrs
1/31/17 - Astronomy/Meteorology Night-set up weather station and use optical devices to observed the moon, visible planets, important constellations, and asterisms. An alternate astronomy activity has been prepared in case of cloudy weather.
2/25/17 - UDF Training (lesson and field activity # 2) - 4 hrs

SENIOR MEETING

03 January, 2017

Maj Paul Noniewicz briefed the officers on aircraft operations on icy runways, taxiways, and ramps.

Squadron Commander Maj J. Scott Farley outlined the Squadron goals for 2017.

Lt Col Lawrence Kinch handed out Personnel Authorization 17-01 listing Squadron duties and committee memberships for the year.

Maj Farley and Lt Col Kinch explained the new uniform regulations regarding display of the reverse United States flag on BDUs and the wearing of black t-shirts.

The requirement for external outreach was discussed. Members are requested to submit the names of organizations or activities which might be contacted.

A discussion of the distribution of the Squadron calendar distribution ensued. The calendar will be posted on the TRCS website, CT075.org.

Maj Farley read the CAP “non-Discrimination” policy to the membership.

ACHIEVEMENTS AND ADVANCEMENTS

Two New Scanners

Lt Col Larry Bright and SM Adam Sprecace are newly minted scanners.

Lt Col Bright is a 30 year submarine veteran who retired as a Commander. He holds an MBA in Management and was employed as a welding engineer and specialist in non-destructive testing. A private pilot, he is now retired.

SM Adam Sprecace is an engineering supervisor at Electric Boat and has been with the company of 22 years. He holds Bachelor and Master degrees in Mechanical Engineering from Rensselaer Polytechnic Institute. A private pilot, he is a former New London City Councilor and will continue his public service with the Civil Air Patrol.

Orientation Flights

Cadet Alexandr Petrillo, who has been a member of less than 90 days, completed his first orientation flight with Maj Scott Farley. She completed Syllabus One, Ground Handling, Preflight Inspection, and Use of the Controls. While in flight she handled the controls, learned about aircraft attitude, and identified her own house.

C/Capt Hollingsworth Earns Award at RCLS

The Regional Cadet Leadership School was held during the holiday break at Fort Devens, Massachusetts. C/Capt Daniel Hollingsworth attended and earned the Distinguished Honor Graduate of his seminar group.

The school explored leadership as it relates to the skills of Cadet Officers. Before attending RCLS, cadets were required to prepare by reading four publications in advance.

During the week, cadets attended classes and wrote an essay. The week ended with the presentation by each seminar group of a plan for a National Cadet Summer Activity.

CURRENT EVENTS

The TX Competition

The U.S. Air Force is looking for a new advanced training aircraft to replace the venerable Northrop T-38 Talon. The basic requirements are that the new plane meet specific performance and equipment requirements which allow it to meet the standards required to train pilots in the high performance and technologically advanced demands for future generations of pilots. The winning contract will lead to the production of 350 aircraft, their associated training systems, and the downstream supply of replacement parts. The estimated cost is around 15 billion dollars for a 40 year life cycle.

The T-38-On Its Way Out

The Air Force "request for proposals (RFP)" stipulate that the aircraft/simulator system will not only fulfill basic flying skills but also train pilots in the use of the newest electronic devices such as data-link and synthetic sensors. The aircraft must be capable of 6.5 g maneuvering but the Air Force will reward a bonus for performance up to 7.5 g. The bonus will be awarded in a fly-off so the cheaper aircraft might not win the contract. Four and possibly five aerospace companies will vie for the prize.

Lockheed-Martin is cooperating with Korean Aerospace Industries (KAI) and will offer a variant of the KAI T-50A already in use by at least three air forces. The single engine T-50A is already flying and would be built in Greenville, N.C. It already meets many of the contract requirements. On the other hand, the T-50A may have less flexibility for future growth since the

basic airframe is already in production. South Korea, Thailand, the Philippines, and Iraq currently use the T-50A.

T-50A (credit: Lockheed Martin

Raytheon, Honeywell, and Leonardo pin their hopes on their T-100, the Alenia-Aermacchi M-356 Master already in service with Italy, Singapore, and Israel. Raytheon, the prime contractor, promises that the aircraft will be build in the United States. The T-100 has the unique "live, virtual, and constructive" (LVC) training capability which allows airborne crews to train simultaneously with crews in simulators. LVC is already employed by the Italian and Israeli air forces. However, its flight performance is marginal when compared with Air Force requirements.

TX-100 (credit Raytheon)

Boeing-SAAB has a clean-sheet design code named "Black Diamond." The aircraft has a single engine and two are in the air. Boeing touts that their design is more flexible and less expensive than its competitors but that remains to be proven.

Boeing-SAAB Black Diamond (credit: Lara Seligman AW&ST

Northrop, BAE Systems, and L-3 are offering a twin engine design already under tests in Mojave. The aircraft's performance exceeds RFP requirements. As with Boeing, the "clean sheet" design has its advantages but is offset by the fact that the Lockheed-Martin and Raytheon entries have proven abilities based upon their services with six different air forces.

The Northrop T-X (credit AW&ST)

A fifth proposal has been floated by Textron, the Airland Scorpion. The company is waiting for the details of the RFP so judge whether or not their design can meet the stringent performance requirements.

The Scorpion (credit Textron)

Finally, the Sierra Nevada Corporation and Turkish Aerospace Systems are deciding whether or not to enter the ring with their all-composite Freedom Trainer.

Freedom Trainer

The competition is expected to start this year. A final decision may take five years as the prototypes are constructed and tested. The factors used to decide the winner will be performance and cost but other factors such as the location of the manufacturing facility, engine choice, and the

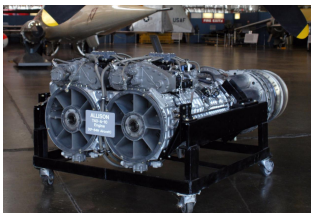
need to distribute military procurement over a range of companies will not be ignored.

AEROSPACE HISTORY

The Allison T40 Engine

Some engine airframe combinations were superb matches, the Rolls-Royce Merlin and the North American P-51 to name just one example. Some engines are so well-designed that they are adopted to many airframes. The Pratt & Whitney R-2800 Double Wasp that it was adopted for use in over 40 different aircraft. Some engines are so mismatched to an airframe that they become operational failures such as the Avro Manchester and the woefully inadequate Rolls-Royce Vulture. And then there are good engines on dangerous airframes. A local product, the Granville Brothers R-1, built in Springfield, Massachusetts was powered by Hartford's P&W R-1340 Wasp. Over 50 very successful types used the Wasp including the DHC-3 Otter, North American's T-6, and the Sikorsky S-38. The R-1 was purposely built for racing and only six were built. All six were destroyed in crashes, killing four pilots and injuring two others.

But one engine, the Allison T40 turbine, was teamed with six different airframes, all of which were failures. The T40 consisted of two Allison T38 power sections mounted side by side. They the drove two contra-rotating propeller via a common gear box. There were two salient weaknesses in the final product, the gear box and the propeller controls. Aircraft gear boxes are a traditional source of unreliability from the Allison to the helicopters and lately, the Airbus A400M. Put a lot of finely machined rotating objects in a box and subject them to the loads imposed by high torque engines and you can well expect problems.



The side-by-side mounting of the two T-38s is evident.

The second major source of problems involved the propeller control system. The electronics consisted of 25 vacuum tubes. Vacuum tubes consist of glass envelopes enclosing thin metallic filaments. In operation, they produce a lot of heat and if they operate in the hostile environment of an aircraft's propulsive system, the frequent failures are expected. Semi-conductor devices have almost eliminated the fragile and bulky vacuum tubes but they came into use a decade after the T40.

Historically, the T40 was installed in six different airframes and save one, none of them became operational. The only one which ever entered service was the Convair R3Y/R5Y Tradewind. Two test vehicles and 11 operational aircraft were built.

During the early 1950s, the Navy faced a crisis. The war planners settled on a strategy which planned for nuclear war with the Soviet Union. However, the carriage and delivery of nuclear weapons was beyond the capabilities of aircraft carriers and carrier aircraft. This led to the dominance of the USAF Strategic Air Command and its enormous slice of the defense budget pie. The Navy needed a mission.

During World War II, seaplanes had proved useful in the Pacific campaign, especially for patrol and reconnaissance duties. So the Navy came up with a plan for a Seaplane Striking Force. The force would consist of jet bombers and fighters and a turbo-prop transport capable of landing troops and vehicles on a beach. This triad of aircraft would consist of three aircraft: the Convair Sea Dart, the Martin Seamaster, and the Convair Tradewind.

The first two were jet-powered. The Seadart was a waterborne fighter which used hydroskis to take-off and land. The Seamaster was a handsome four engine flying boat scheduled for bombing, mining, and reconnaissance duties. The Tradewind was equipped with turbo-props and would be used as a transport, beach assault aircraft, and bomber. The first two were jet aircraft. The Tradewind was equipped with the

Allison T40 Turboprop.

Only thirteen Tradewinds were built. The two protoypes were designated XP5Y-1, a patrol bomber but the Navy decided that another patrol bomber was excess to their needs. The next five were designated as the R3Y-1 and were outfitted for troop transport and aerial refueling duties. Utilizing the "probe and drogue" method, the aircraft was capable of refueling four aircraft at a time!

XP5Y-1 (credit: Convair)

The final six, the R3Y-2, were equipped with a nose door which lifted vertically, much like the C-5, and allowed the loading and unloading of heavy equipment such as trucks, artillery pieces, and armored vehicles. The plan was to use these aircraft for beach assaults, landed them offshore and then driving them up to the beach where their troops and vehicles could disembark swiftly through the open nose. In practice, this did not work because of the difficulty in maintaining a steady position during the unloading. Consequently, they were all converted to serve as aerial refuelers.

Tradewind Docking (credit: U.S. Navy)

One Tradewind set a transcontinental record for seaplanes but, alas, technical problems ended the program. The Allison engines were a unreliable to say the least, contributing to four crashes. A change is Navy doctrine concerning the operation of sea planes changed and the remaining aircraft were scrapped.

Another naval problem was supplying fighter support to merchant ships. During World War II, escort carriers had been built and some were used to protect convoys from submarines and sometimes, air attack. The British outfitted some merchant ships with catapults mounting a Hurricane fighter. Their primary use was to either destroy or chase away German reconnaissance aircraft which were shadowing a convoy and radioing its position to submarines. But the aircraft could not return and land so the pilot was forced to bail out or ditch. Even under the best of circumstances, the Navy could not supply enough aircraft carriers to defend the sea lanes so an alternate solution was proposed.

The concept of vertical take-off and landing (VTOL) was under development and the Navy contracted with Convair and Lockheed to build an aircraft which could be based on a small flight deck, a merchantman or destroyer, take-off vertically, act as a fighter, and land vertically.

The products were two tail-sitters, the Convair XFY-1 Pogo and the Lockheed XFV-1. For both aircraft, lift and flight power was produced by two contra-rotating propellors driven by an Allison T40. But a number of problems arose. First, landing vertically would require highly skilled and trained pilots so the number of aircraft which could be deployed was limited. Next, the Convair aircraft, the only one of the two to execute VTOL encountered severe control problems when descending through its own prop wash.

L-R: Convair and Lockheed VTOL Aircraft

US Navy photo of Lockheed XFV-1 on the ungainly landing gear needed for flight testing.

XFY-1 in Storage at Suitland

The Lockheed article never operated in the VTOL regime. It did make some horizontal flights utilizing an ungainly landing gear but it would have encountered the same problems as the Convair design.

Finally, both of them used the ill-starred T40 turbo-prop power plant with all of its faults and the Navy saw its future aviation needs in pure jet aircraft.

The two aircraft have been consigned to museums. The Lockheed is on display in Lakeland, Florida. Convair's Pogo rests in the storage facilities of the National Air and Space Museum.

Another experimental T40 powered aircraft was the Douglas A2D Skyshark, a planned replacement for the AD Skyraider. Like the VTOL aircraft, the enormous power generated by the T40 demanded the use of contra-rotating propellors.

The Navy hoped to use the Skyshark from escort aircraft carriers and their short flight decks which could not handle the new jets which the Navy was acquiring.

A2D Skyshark (credit: Museum of Naval Aviation)

But true to its history, the T40 became a major cause of the failure of the Skyshark. Its was late in development and once flying, two engine failures. By the time some of the teething problems had been solved, larger carriers and better jets were coming into the fleet and the turbo-prop Skyshark became, as the British day, redundant.

The same reasons spelled the end of the North American XA2J-1 Super Savage. The Super Savage was designed to replace the piton powered A2J Savage. The Savage had composite power, two Pratt and Whitney R-2800 radial engines and an Allison J33 turbojet. She was the Navy's “great white hope” to secure funding for delivering nuclear weapons from carriers. The Savage could operate from some of the larger aircraft carriers and carry one of the large nuclear weapon then in use.

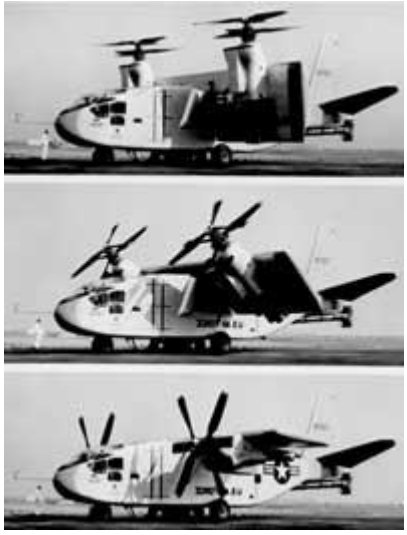
The Super Savage (credit: Museum of US Naval Aviation)

The Super Savage would replace the Pratt pistons with two Allison T40 turboprops and eliminate the J33. As with the tail-sitters and Skyshark, contra-rotating props and the necessary gear box was an “Achilles heel.”

The reliability of the gear box and the engine itself led to an extended development period. During this time, Douglas produced the jet powered A3D Skywarrior, and far superior aircraft and the sole Super Savage which flew was scrapped.

The lamentable history of Navy attempts to use the T40 is not the end of the story. The USAF struggled with two airframe utilizing the Allison engine.

The investigation of the VTOL concept led to a contract with Hiller Aircraft Corporation to build the X-18 Propelloplane. To save money, the XFV-1 and XFY-1 contributed their engines which were they connected to the now traditional contra-rotating propellors. The engine-prop combination were then mounted on short wide wings which rotated and changed the orientation of the engines from the horizontal to the vertical much as used in the familiar Osprey today. A small tailed mounted jet engine was mounted vertically in the tail to allow for pitch control.



The X-18 Demonstrates the "Tilt Wing"

The engine-propeller combination, like that of the Tradewind, had developmental and reliability problems. The gear box problem raised its ugly head slow thrust control led to control problems. Additionally, the wing acted like a sail when vertical adding to the control issues.

After 20 test flights, the X-18 was mounted in a test stand and which allowed the performance of safer and more controlled experiments than that of free flight. The need to cross-shaft the engines so that failure of one of them would not be catastrophic was one lesson learned before the X-18 was sent to the scrap pile.

A modified Republic F-84F was was modified by installing a T40 in the center of the aircraft and using a long drive shaft to turn a 12 foot three bladed prop. And herein lay the problem. The propellor tips moved faster than the speed of sound creating an unbearable level of noise and giving the aircraft the name "Thunderscreech." The resultant shock waves damaged property and combined with the roar of the turbines, induced nausea and headaches in anyone unfortunate to be nearby. As might be expected, the gear box and propellor pitch gearing contributed to its woes.

The "Thunderscreech" (credit Ray Wagner-SDA&SM)

The "Thunderscreech" was one of the fastest propellor planes ever built but the T40 mechanical weaknesses, its instability in certain flight regimes, and its appalling noise footprint led to the cancellation of the program.

One of the two built was stripped and its T40 engine sent to support the ill-starred Skyshark program. The other is now on display in the Museum of the USAF.

Arguably, the T40 bears the "honor" of installation in more airframes with less success than any other engine.