

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  
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LtCol Stephen Rocketto, Editor  
srocketto@aquilasys.com

C/A1C Justin Ketcham, Reporter  
Lt David Meers & Maj Roy Bourque, Papparazis

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### SCHEDULE OF COMING EVENTS

21 SEP-CTWG pilots meeting at MMK  
21-22 SEP-CTWG Squadron Leadership Course  
24 SEP-TRCS Meeting  
28 SEP-Cadet Ball-USCG Academy  
28 SEP-Rifle Safety and Marksmanship Training

05-06 OCT-CTWG Corporate Leadership Course  
09-10 OCT-CTWG Unit Commander's Course  
12 OCT-Groton Fall Festival-Poquonnock Park  
19 OCT-CTWG Field Trip-Intrepid Museum  
26-27 OCT-TLC Course-Camp Niantic

### CADET MEETING

*17 September, 2013*  
by  
*C/Amn Virginia Poe*

A physical training session was held at  
Poquonnock Plains Park.

C/1stLt Schultz presented a lesson on leadership.

C/TSgt Johnstone briefed the squadron on cold weather safety.

Next week's lessons will be on knot tying. Cadets were instructed to bring a six foot length of suitable line.

In addition, a former TRCS cadet, USAF 2dLt Timothy Plourde will speak about the opportunities offered by a university reserve officer training program.

LtCol Rocketto told cadets that the deadline for the field trip to the Intrepid Sea, Air, and Space Museum is October 24<sup>th</sup>. The necessary paperwork was distributed and will be sent out by email.

Cadets who are interested learning rifle safety and qualifying for marksmanship medals were offered the required paperwork.

LtCol Rocketto set up a 125mm telescope and the cadets observed the moon. Prominent features which were studied were the mares, Tycho Crater and its ray pattern, and the mountains along the edge of the disc.

### SENIOR MEETING

*17 September, 2013*

Seniors worked on administrative duties and individual advancement projects.

### TRCS FLIGHTS OVER THE WEEKEND

#### *LISP*

The Squadron flew 11 hours of Long Island Sound Patrol on Saturday and Sunday. Capt Farley flew as mission pilot on two of them, LtCol Kinch took two flights in the observer position. Maj Noniewicz and LtCol Wisheart acted as mission pilots on one flight each. LtCol Rocketto and Capt

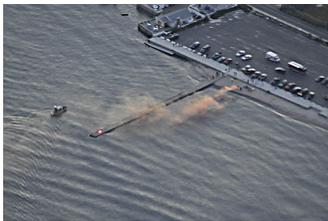
Giorgio Mungo of New Haven swapped scanner and observer seats on three missions each.

The skies were clear, the air was smooth and flight visibility was on the order of 50 miles. The marine radio was relatively quiet. Three groundings were reported but there was little in the way of emergencies. Prime fishing areas at Valiant Rock of Fisher's Island and Stamford Shoals south of Bridgeport were heavily populated with 40-50 boats at each site.



*Schooner  
inbound to New  
London Harbor*

The Saturday patrol had two highlights. They observed part of the schooner parade off New London and watched the Westbrook Fire and Rescue Squad practice using flares and smoke.



*Orange Smoke*

*Signal Flares*

Parachute flares and Roman candle-like ball flares



*(photographs by Lt  
Giorgio Mugno)*

***O Flights***

Maj Noniewicz flew three New Haven Minutemen cadets on orientation flights on Sunday. Noniewicz picked up 44L at Robertson and flew to New Haven to meet the cadets. The first two cadets were taken on a syllabus 6 ride to Groton and back over two different routes. The third cadet went on a syllabus 8 flight. The plane was then returned to Robertson.

**LONG DISTANCE FLYER SPOTTED AT  
GON**

On Sunday last, when the Long Island Sound Patrol landed, they gratefully disembarked and stretched their cramped legs after the tedious three hour, 300 nautical mile mission. We noted three other flyers on the ramp following a similar regime.

There were what appeared to be three American Golden Plovers walking around the general aviation ramp area, a male, a female, and a juvenile.



The Golden Plover is one of the fastest shore birds, attaining up to 60 mph in flight. It breeds in the Alaskan and Canadian tundra and then makes an extraordinary migratory flight. It flies south by traveling off-shore of eastern North America, crosses the Caribbean, and winters in the savannahs of South America, some ranging as far south as Patagonia.

These three visitors may have been carried ashore

by some recent heavy weather.

During their migration, Plovers might land in relatively flat areas such as prairies, on shorelines, or at airports.

Their return journey passes through mid North America. This round trip can be as long as 25,000 miles with some 2,500 miles over water without rest!

Consider the overwater portion. A rough guide for the best range in a light aircraft might be to use half the maximum speed which is close to the best gliding speed. The Plover has high aspect ratio wings and a conservative estimate leads one to conclude that it attains this speed at around 30 mph. Assume this cruise speed. If so, the non-stop overwater portion of the flight takes about 80 hours or three and a half days! This endurance and range is assisted by the formation flying of the Plover, something forbidden by CAPR 60-1.

Moreover, at the end of the overwater voyage, the bird lands with 10% of its fuel, body fat, in reserve. This is about enough to allow it to fly for about 12 hours more. This is a 15% reserve. A CAP C182 fueled to the tabs and carrying 64 gallons, is required to land with one hour's fuel on board. This is very close to the same 15% reserve of the Plover so the bird does adhere to CAPR 60-1 2-3(j). We shall not mention duty hours.

Their navigation is also amazing. The birds fly out of sight of land, encounter variable winds, and in the case of juveniles, which leave after the adults, make the trip for the first time! The G1000 GPS pales in comparison to the avian genes which govern bird navigation.

So let us not complain about the duration of a LISP mission where all we do is flap our lips and partake of the provender and water which we choose to take aboard with us. The Plover flaps its wings at 50 beats/minute and carries his 2.5 ounces of fuel as body fat.

Incidentally, some historians believe that the American Golden Plover and Eskimo Curlew, oft

seen in company, may have been the shorebirds sighted by Columbus, two months out from Spain, on his first voyage in 1492. A review of the distance Columbus traveled, about 2,500 nmi, and the average speed of a caravel, about 4 kt, would put his ships around longitude 65 degrees west, just about on the flyway followed by the Golden Plover on its southward migration.

## AEROSPACE CURRENT EVENTS

### *Novel Dirigible in the News*

Igor Pasternak, a Ukrainian immigrant and president of Worldwide Aeros Corporation is developing a new variation on the dirigible in a former blimp hangar at the former USMC Air Station in Tustin, California.

The 245 foot long vehicle, called an aeroscraft, has an aluminum and carbon-fiber frame covered by mylar. It has three propellers. Two of which can rotate 90 degrees to provide helicopter-like performance.



*Aeroscraft at rest in Tustin Blimp Hangar*

The unique feature of Pasternak's dirigible is that he uses a buoyancy system akin to that of a submarine to change the lift. Compressed helium can be pumped from cylinders into bags in the hull where the gas expands providing lift. The helium can be re-compressed to reduce lift. Air also can be pumped in or out of the vessel to change its buoyancy and control lift.

If Pasternak can secure additional funding, he hopes to build a full scale cargo carrying version of his prototype capable of carrying 66 tons.

## *Hornet Upgrading and Its Complex Ancestral Development*

Forty years ago, the Northrop YF-17 Cobra lost a fly-off against the General Dynamics F-16 "Fighting Falcon." The internal struggles within the USAF between the supporters of the McDonnell-Douglas F-15 Eagle and the lightweight fighter adherents were byzantine to say the least but what developed only adds to a strange story.



*YF-17 at USS Alabama Museum, Mobile, Alabama*

Rejected by the USAF, the US Navy liked the twin engine design of the YF-17 and Northrop teamed with McDonnell-Douglas to produce the F/A-18 Hornet and the follow-up, the F/A-18E/F Super Hornet. The design and acquisition story behind that development involved rather clever budgetary maneuvering by the Navy to get what was essentially a new aircraft under cover of modifying an old design. The unusual designations of the Hornet and Super Hornet are a tip-off.



*Legacy Hornet*

During this period of time corporate acquisitions occurred which complicate any understanding of which company name ought be attached to the these aircraft.

When Northrop lost the lightweight fighter

contract, they formed a strategic alliance with McDonnell-Douglas (a result of a previous merger between the St. Louis firm of McDonnell and Santa Monica's Douglas Aircraft), the firm which produced the F-15, the rival of the F-16.

General Dynamics, the developer of the F-16 sold its aviation interests to Lockheed which then merged with Martin-Marietta to form Lockheed-Martin.

Northrop then purchased Grumman to create the Northrop-Grumman Corporation.

Boeing acquires McDonnell-Douglas, the company which cooperated with Northrop to produce the F/A-18. Now Boeing owns the rights to a successful descendent of Northrop's YF-17 which once lost a competition to the F-16, now a Lockheed-Martin product.

But recall that McDonnell-Douglas, now a part of Boeing, was instrumental in turning the YF-17 into the F/A-18. And of course, Northrop-Grumman is a major player is producing components for the "Boeing" F/A-18 series.

Now, the high cost of new aircraft and the necessity of keeping heritage aircraft flying and up-to-date leads to a proposal by Boeing to upgrade the F/A-18 series. The most obvious upgrade is the addition of conformal fuel tanks and a belly mounted weapons pod, digital displays with touch screen pads, and new engines. The blended fuel tanks and weapons pod reduces the radar signature of the aircraft and extend its range.



*The up-graded F/A-18E/F as proposed by Boeing.*

*(Photo by Boeing)*

As to cost, a new upgraded F/A-18 is estimated to cost one-quarter the price of the 200 million dollar

Lockheed-Martin F-35C Joint Strike Fighter (JSF) which the Navy intends to purchase for its carriers. Boeing claims that for 1/10 the price of the F-35, it can upgrade the current Super Hornets. Given the troubled history of the F-35 program, Boeing claims it is offering an interim alternate. But the F/A-18E/F was originally supposed to be a short term replacement for the Grumman F-14 and A-6. Its versatility and the redesign of the original F/A-18 created a whole new beast which may be around for a long, long time.

For Boeing, this could be pay-back. The F-35C, by Lockheed-Martin, won the JSF competition by eliminating Boeing's X-32B.



*Boeing X-32B at Patuxent Naval Air Station*



*The Lockheed-Martin X-35C Lightning II won a fly-off against the Boeing X-32 and went on to be developed as the F-35C.*

The ghost of the Northrop YF-17 haunts Lockheed-Martin and its threatened F-35C program, a program which claims ownership of the successful F-16, which once “put paid” to the future of the YF-17.

## **AEROSPACE HISTORY**

### **Three Easy Pieces A Rough History of Unmanned Aerial Vehicles Part 2**

*The last edition of The Coastwatcher carried Piece One, The Sperrys, Pere et Fils, and Kettering worked with early “aerial torpedoes,” and Piece Two, Denny and Richter and the Radioplane Corporation.*

*Piece Three  
A California War Orphan and Three Israelis Buddies Have an Idea*

The 1973 Arab-Israeli war, 6-25 October, is known in Arab lands as the Ramadan War and to the Israelis as the Yom Kippur War. It commenced when the forces of Egypt and Syria attacked Israel on Yom Kippur, the holiest day in the Jewish religion, a day which by a quirk of the lunar calendar occurred during Ramadan, the holy month of the Muslims.

As the Duke of Wellington put it, like Waterloo, it was a near run thing for the over-confident Israelis. The Israeli Defense Force, its command structure near collapse, stumbled to victory thanks to tactical mistakes by their opponents, the tenacious improvised defense and focused counter-attacks by their ground and air forces, and a massive airlift of supplies by the United States.

For the Israelis, one of the most shocking aspects of the war was the horrendous losses which their vaunted air force took when they encountered the Russian supplied missile belt which covered the Egyptian attack. When the war broke out, Israel counted some 400 combat aircraft in their order of battle. When the war ended, they had lost 25% of their strength, almost all of it to the surface-to-air missiles.

After the war, the Israeli Air Force searched for a solution to the problem of how to crack an integrated surface-to-air missile defense system. It took a decade to solve the problem and the UAV played an important role.

The key player in the story of the Israeli development of drones was an American born engineer, Alvin Ellis, an orphan from Los Angeles. Ellis was a US World War II army veteran who fought on Okinawa where he was wounded. After

the war, he joined *Machal*, the foreign volunteers who participated in the 1947 Israeli War of Independence. Ellis smuggled refugees and arms and later served in their navy as a frogman.



Al Ellis is right front with three navy comrades.  
(Aliyah Bet & Machal Virtual Museum)

He returned to the United States, earned a degree in electrical engineering from UCLA and was employed by Ryan Aircraft where he worked on the Firebee drone control system. In 1967, he returned to Israel and joined Israel Aircraft Industries (IAI) and participated in the development of the Kfir fighter.

Ellis, like Denny, was a radio controlled model builder. He started a small company with three friends, Ezra Dotan, an Israeli Air force ace, Yehuda Manor, a fellow IAI engineer, and Dr Shlomo Barak, an air force pilot and physicist. They designed an RC model for the sale in the US but market forces caused them to abandon the project. However, in the aftermath of the Yom Kippur War, Ellis envisioned an RC aircraft which could carry a video camera and provide troops with real time intelligence data. In 1974, with the assistance of Nick Zirol, an air frame builder from Smithtown, Long Island and Herbert Adise, an aerodynamicist from Hempstead, Long Island, the partners struggled to produce a viable product. When their employer, IAI showed no interest, they offered the prototype to Tadiran, an Israeli electronics firm, which hired Ellis as a consultant and in 1974, started to produce the Mastiff I at which point Ellis returned to the United States.

In Israel, the Israeli military, which had been impressed by the potential of a cheap source of real time intelligence imagery which put no soldier or airmen at risk started incorporating the UAVs into their battle doctrine. IAI finally saw the opportunities available and produced the Scout.

The utility of UAVs expanded as more sophisticated electronics were developed and were integrated into the Israeli order of battle.



*A Collection of UAVs at Hatzerim*

Front (L-R) Mastiff III (827), Searcher (234),  
Middle (L-R): Scout, Oriole (123)  
Rear: (L-R): Firebees in the BQM-34 series  
027 carries nine mission marks.

Col Aviem Sella, another ace pilot, realized that the battle to destroy an enemy air defense system required a wide range of resources: good intelligence about the disposition and technical details of the system and the critical evaluation of that information, the ability to jam and spoof the air defense radars, a central command capable of assessing the myriad details of a four dimensional battle in real time, and the ordnance suitable to destroy the missile and gun batteries. The acronym for neutering the anti-aircraft defenses is SEAD, Suppression of Enemy Air Defenses.

Under Sella's guidance, resources were marshaled, techniques were developed, and men were trained. A decade after the Yom Kippur War, an opportunity arose to put Sella's creation into operation. Israeli military operations in Lebanon were threatened by a vast array of Soviet supplied Syrian surface-to-air (SAM) batteries which had been deployed in the Bekaa Valley. Therefore, the Israelis commenced gathering information about this threat.

Radar signals emitted by the SAM tracking units had been carefully monitored and analyzed to determine frequencies, pulse repetition rates, beam

widths, sweep rates, and energy outputs. UAVs overflew the valley, low value targets which put no aircrew at risk, and imaged the positions of the missile batteries or caused the missile men to turn on their radars. Ferret aircraft, stationed out of harm's way, recorded the signals. The data was loaded into computers specially programmed to provide information, upon demand, to the battle commanders.



*The TALD in the foreground is a glider. The I-TALD in the rear is powered.*

On the evening of June 8<sup>th</sup>, Syrian ground forces engaged the Israelis and Sella launched Operation Mole Cricket 19, the Bekaa Valley Campaign, June 9-11, 1982. The events are somewhat cloudy since the security conscious Israelis have been reticent about the tactics used and events which occurred but this is a reasonable reconstruction.

As the missile batteries were being taken out, the Syrians launched around 100 MiG -21, MiG-23, and Su-20 fighters in an attempt to disrupt the attack. UAVs circling over Syrian airfield spotted the Syrian aircraft taking off and relayed that information to the Hawkeyes.

Mastiff UAVs overflew the valley causing the Syrians to light up their radars. These signals were relayed to Scout UAVs which in turn sent them to Grumman E-2C Hawkeyes and Boeing 707 Airborne Warning and Control (AWAC) aircraft stationed outside of the battle area.

The command and control system of the Syrian Air Force was based upon the Soviet model in which ground control interception intercept (GCI) officers directed the intercepting aircraft. The Israelis, knowing this, used ECM signals to jam the GCI transmissions, cutting off the Syrians from their commanders and Israeli AWAC aircraft positioned the Vipers and Eagles into optimum attack positions. Once the Syrian aircraft passed outside of the protective curtain of Syrian based SAMs, the Israeli Air Force used radar guided Sparrows, heat seeking Sidewinders, and cannon against the oncoming enemy. What may have been the largest all-jet air battle in history erupted.

At that point, McDonnell-Douglas F-4 Phantoms, protected by F-16 Viper and F-15 Eagle top cover, attacked the sites with Shrike and Standard anti-radiation missiles. Anti-radiation missiles lock onto the active radars and home in on them. The attacking aircraft were also equipped with electronic counter-measure pods which transmitted signals which blinded or distorted the anti-aircraft radars which in turn rendered the missiles harmless.

Two days later, when the smoke had cleared and a truce declared, Syria's Lebanon based ground forces, deprived of air support, had ceased to exist. Twenty-eight or more missile batteries had been destroyed and around 80 Syrian fighter planes had been shot down with no Israeli losses! To a great extent, this remarkable victory may be attributed to the information gathered by the unglamorous, slow, cheap, propeller driven drones fathered by Al Ellis and his colleagues. For his efforts, Ellis was awarded the Israel Defense Prize for "significant contributions to the defense of the State of Israel."

The F-4s also launched Sampsons. Sampson is a glider developed by Brunswick Corporation for the USAF and known as the ADM-144 Tactical Air Launched Decoy Missile (TALD). It was license built in Israel. Sampson imitates the flight profile of a manned aircraft and serves as a missile decoy.

But Ellis did not abandon the world of drones. Upon his return to the United States in the mid-

A specialized ground based anti-SAM missile, the Chachalit was also used. Chachalit is a booster equipped Shirke fired from a modified M4 Sherman tank.

70s, he continued to build model aircraft and develop new drones. He worked on drone autopilot systems and was involved with Maryland's AAI Corporation, originally Aircraft Armaments Incorporated, in the development of the RQ-2 Pioneer. Pioneer was a spinoff of the Mastiff and IAI teamed with AAI in order to produce it for the USN and USMC. He also was involved with the Defense Advanced Research Projects Agency (DARPA) and the Sea Ferret. Sub launched drone.



*USMC RQ-2B Pioneer at the Flying Leatherneck Museum*

The development of these relatively small drones, have found a wide range of uses by the military other than air forces.. The provide instant information to the ground soldier about what lies “on the other side of that hill.” Naval forces find that their handy size makes them suitable for launching and recovery aboard ships and their ability to get to altitude expands the ship's useful horizon making them useful for reconnaissance and shell spotting.

The first naval use occurred during Operation Desert Storm's Battle of Khafji. The battleship USS Missouri used Pioneers to spot the fall if its 16 inch gunfire.

In Israel, IAI and Tadiran consolidated their UAV divisions and formed a new corporate entity, Mazlat, which had produced a line of successful successors to original designs. Over the last eight years, their airframes, electronics, and operating systems have brought in 4.6 billion dollars in revenue.

The utility and relatively low cost of the drones have made them extremely popular to cash strapped military. About 50% of the Israeli exports go to European nations, 35% to the Asian-Pacific market, and 10% to South American. The United States buys about 4%. Part of the Israeli success is due to their ability to optimize their products to satisfy the needs of the customer base.

### *L'Envoi*

This essay barely touches upon the rich history of the UAV. The high altitude, long endurance (HALE) and specialized supersonic reconnaissance aircraft such as Northrop-Grumman's Global Hawk and Lockheed's Mach 3 D-21 have not even been mentioned. The article concentrated on the light, propeller driven adjuncts to the battlefield which are the nearest relatives to the model planes of the hobbyist.

However, the story does attempt to show how a few clever and dedicated individuals can be instrumental in introducing a technology which, when the time is ripe, provides novel and remarkable changes in the conduct of not only the military but also scientific researchers, emergency services providers and law enforcement agencies. Many may argue that some of these of these applications are neither moral nor justifiable but none can argue that the world is a different place with the arrival of the UAV.



*The Spirit of Butts Farm(TAM 5)  
First Model Aircraft to Fly the Atlantic  
Amateur Built UAV  
On Display at New England Air Museum*