



Missions for America  
*Semper vigilans!*  
*Semper volans!*

## The Coastwatcher

Publication of the Thames River Composite Squadron  
Connecticut Wing  
Civil Air Patrol

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### SCHEDULE OF COMING EVENT

04 June-Annie Fisher Magnet School Visit  
06 June-Two Rivers Magnet School Visit  
07 JUN-Bi-State SAREX (CT/RI)  
10 JUN-TRCS Meeting-Commander's Call  
17 JUN-TRCS Meeting  
24 JUN-TRCS Meeting  
28 JUN-Columbia Open House

04 JUL-GON Parade and Squadron Picnic  
07-11 JUL-ACE Academy I (GON)  
09 JUL-MIT Aero and USS Constitution-tentative  
18 JUL, 2014-CTWG Golf Tournament  
19 JUL-02 AUG-Nat'l Emergency Services Acad.

08-16 AUG-CTWG Encampment-Camp Niantic  
11-15 AUG-ACE Academy II (GON)  
23 AUG-Wing Wide SAREX-HFD

20 SEP-Cadet Ball-USCGA (tentative)  
01 OCT-CTWG Commander's Call and CAC

17-19 OCT-CTWG/NER Conference  
16-18 OCT-NER AEO Course at Conference  
18-25 OCT-NER Staff College-New Jersey

### CADET MEETING

*03 June, 2014*

*submitted by*

*C/SSgt Virginia Poe*

Cadets participated in PT tonight at Poquonnock Plains in Groton. The cadets ran the mile, did push ups and sit ups. Then cadets returned to the squadron for the sit and reach followed by a break for snacks.

Cadets played capture the flag as a team building and strategy activity.

Cadets arranged furniture for the upcoming SAREX.

### SENIOR MEETING

*03 June, 2014*

*Submitted by*

*Capt. Elliot White Springs*

LtCol John deAndrade and Maj Scott Farley led a group discussion to complete plans for TRCS participation in Saturday's CTWG-RIWG SAREX. Key personnel will meet again on Friday night to tie up loose ends.

Group Commander Litwynczk, Maj Noniewicz, and Lt Simpson prepared the squadron equipment and supply records for the upcoming audit.

A training session was held for Introductory Communications User Training.

## SQUADRON PRESENTS A TRIAD OF AEROSPACE PROGRAMS

Squadron members visited three different school events in four days last week.

On Thursday, 29 May, LtCol Rocketto headed for Fishers Island to present an all-day program for the students at the Fishers Island School. The day started badly when Rocketto discovered that the club aircraft which he had reserved for his flight was still in maintenance. The other club aircraft was reserved for the day.

But the brotherhood of aviators rescued him. A fellow member of Westerly's Snoopy's Group, Mr Charles Hutter, who had reserved the other aircraft volunteered to get him to Fishers and also offered to pick him up at 1700 on his return flight from Watertown.

### *Fisher's Island School*

Rocketto was met at the airport by the Fishers Island elementary school pupils where he conducted a short course on airports: wind sock, runway markings, numbering and lighting, and patterns.

The class then adjourned to the school where an informational session was held on the purpose, history, and missions of the Civil Air Patrol and some simple demonstrations of aerospace science principles were presented.

During a working lunch, Rocketto met with students interested in joining CAP, took names and e-mail addresses, and explained the cadet program in some detail.

*Rocketto briefs Fisher's Island upper level students on CAP's three missions.*



A second session was offered to the high school students in the afternoon and followed the pattern set in the morning but with more sophistication.

### *Annual Ledyard Aerospace Festival*

On Friday, Rocketto and SSgt Virginia Poe and Mrs. Poe set up an information booth and demonstration area at the Ledyard Aerospace Festival held at the Juliet Long School. The event is an annual program organized by Stuart Sharack, retired teacher and CAP's first Aerospace Teacher of the Year. He is assisted by another teacher, Alec Rode, a former A-7 pilot. Some of the other organizations represented were NASA, the USCG Ice Patrol, and CATO, Connecticut's amateur rocket club. A group of sailors for the US Submarine Base volunteered to assist in running some of the activities.



*C/SSgt Poe explains the CAP cadet program to a potential recruit.*

Several hundred pupils and parents passed from station to station, trying their hands at different activities and getting their "participation passports" stamped. The Thames River 'hands-on' activities were built around Newton's Laws of motion and used an air hockey puck, von Guericke's sphere, and a bicycle wheel to illustrate the principles involving force and motion.



*Poe prepares a youngster for a startling demonstration of gyroscopic stability.*

*Ledyard Aerospace Adventurer's Young Eagle  
Flights*

LtCols Wisehart and Rocketto met with about 50 youngsters and parents at Columbia Aviation, Groton-New London Airport on Sunday, the first of June. The group had gathered for Experimental Aircraft Association Young Eagles Flights and consisted of children in the third through fifth grade in the Ledyard School System.

Wisehart and Rocketto spoke about opportunities in CAP for young aviation enthusiasts and for their parents. Parents were informed that one need not be pilot but that CAP had many openings for volunteers both as regular members and cadet sponsors,

**TRCS ORIENTATION FLIGHTS**

Maj Scott Farley took three cadets on their first powered orientation flights on Sunday, the 1<sup>st</sup> of June. The first departure from Groton was Raven Flight carrying the two Poes, C/Amn Ryan and Ian with Ryan in the front right seat.

Unlike Edgar Allen's "stately raven," they did not perch for long. When the aircraft returned to Groton, the Poes swiftly switched seats, Ryan moving to the rear, giving his brother, Ian the opportunity to man the observer position.

The third O Flight of the day, Sword Flight, carried Cadet Ryan Schantz, not to be confused with Lt. Col. Anton Wilhelm von Schantz, Finnish Army and holder of the Swedish Order of the Sword.

Both flights overflew the cadet neighborhoods. Cadet Schantz noted that the area resembled the overhead view of his grandfather's model train layout. If the train set is HO gauge and Cadet Schantz's estimation of size is good, a simple calculation shows that the altitude flown at the time of the observation was 2,700 ft. AGL.

Conclusion: Observations from 2,700 ft AGL are equivalent to viewing an HO model train layout from 3 ft overhead.

All of the cadets flew Syllabus #6. This is the first of the powered flight syllabi and covers ground handling, preflight inspection, checklists, take-off, the inflight relationship of controls to aircraft attitude, and identification of landmarks.

**DEANDRADE ON CLC STAFF**

LtCol John deAndrade served as a staff member for the CTWG Corporate Learning Course (CLC) which was held last weekend, 31 May-01 June.

The Corporate Learning Course (CLC) discusses the relationship the CAP squadron has with the next major echelon of command -- the wing. Specifically, CLC discusses how wing-level operations help to accomplish CAP's three missions of aerospace education, emergency services, and cadet programs. It describes the working relationships wing staff officers have with each other, and their squadron level counterparts.

CLC is a requirement for members who wish to advance to Level III in CAP's professional development program. Members who complete all the requirements receive the Grover C. Loening Award.

**AEROSPACE CURRENT EVENTS**

*Sure Sign of Rising Sea Level...NOAA's Ark  
moored in New London?*

NOAA, The National Oceanographic and Atmospheric Administration, has positioned in assets in southeastern Connecticut. The research vessel *Thomas Jefferson* has been at the USCG mooring by Fort Trumbull for about a week and 56 Romeo Foxtrot, a specially equipped DHC-6 Twin Otter has shown up at Groton-New London Airport.

Originally, the *Thomas Jefferson* was a US Navy hydrographic survey vessel which entered NOAA service in 2003. Home ported in Norfolk, Virginia, the “Jefferson” conducts hydrographic studies and charting missions from Maine to the Gulf of Mexico.



*RV Thomas Jefferson at USCG Moorings, New London*

The De Havilland Twin Otter is specially equipped with large bubble windows to allow viewing vertically as well as a belly ports for the mounting of a variety of cameras and sensing instruments.



*NOAA's Twin Otter on the LANMAR Ramp.*

For a video walk-through of the aircraft go to:

<http://oddballpilot.com/2011/01/aircraft-walkthrough-noaa-twin-otter/>

## AEROSPACE HISTORY

### NOTES ON AIRCRAFT WITH THREE ENGINES

by  
*LtCol Stephen Rocketto*

#### Part II

#### *Post World War II Designs*

After World War Two ended, many thought the utility of the trimotor had ended. Powerful piston engines and the new turbines equipped the newer two and four engine aircraft entering airline and military service. But aircraft's tend to balloon in weight far beyond the original plans of the designers and the three engine configuration is still with us.

#### *The Northrop Pioneer and Raider*

First of the blocks, in 1949, in the post-war era was Northrop's hope for a rugged bush plane and assault transport, the YC-125 Raider also known as the N-23 Pioneer. Equipped with three 1,200 horsepower Wright Cyclones and JATO, the aircraft had some chance of a future but the availability of cheap war surplus planes prevented them from acquiring a reasonable market share. Only 23 were built. The USAF acquired most of them as troop transports and arctic search and rescue aircraft but they were soon retired for more modern models.



*A YC-125B Raider used in Alaska has been preserved at the USAF Museum.*

*This YC-125A is on display at the Pima Air Museum and bears Mexican registry numbers.*



### *Martin's Novel Attack Bomber*

In the same year, a military trijet was first flown. Martin aircraft produced the XB-51 as an attack bomber. The innovative aircraft had variable incidence wings, used spoilers instead of ailerons, took-off and landed on tandem “bicycle style” wheels, and had rotating bomb bay doors. The number two engine was buried in the fuselage numbers one and three were attached to the fuselage under the swept wings. The



*Capt Ed Miller built this model of the XB-51. Note the placement of the engines and the centerline landing gear and wing tip pogos.*

In an unusual move, the Air Force selected the English Electric Canberra as its new attack bomber and designated it as the B-57. However, Martin was awarded the contract to produce the Canberra under license and modified it with the unique rotating bomb bay.

### *Great Britain's Aero Industry Struggles to Survive*

Not much happened in the trimotor world for another decade. The development of commercial passenger aircraft by the British had been retarded by their war efforts. The need for fighters to defend their “sceptered isle” and bombers to

hammer the Germans meant that passenger and freight aircraft development were put on the back burner and the United States dominated the piston powered market with the four engine Douglas DC series and Lockheed's sleek Constellations which had been developed during the course of the war.

The Brits produced a number of passenger variations on wartime bombers: the extraordinary Avro Lancaster bomber yielded the mediocre Lancastrian and York and Handley Page's Halifax was redesigned into the Hastings but they were unpressurized tail-draggers and could not compete with the new American airliners.

Vickers did produce possible rivals to the DC-3, the Varsity and the Viking, but only about a hundred were ever produced. Parenthetically, in an experiment, a Viking's two piston engines were replaced with two Rolls-Royce Nene engines and it became the first private jet plane.

Vickers also produced the first great turbo-prop airliner, the Viscount which actually penetrated the US market when Capital Airlines acquired them and the later Vanguard. Lockheed replied with its Model 188 Electra. However, the turboprops were an hour late and a dollar short because the pure jets which the customer preferred soon dominated the airways.

A British come-back attempt was made with the early 1950s entry of the turbine powered De Havilland Comet as the first commercial jetliner introduced into service. But the Comet had several catastrophic failures due to metal fatigue and the later arriving Boeing 707 became the airliner of choice for many of the world's carriers.

Although Britain held many advantages in technology, British aviation policy was a hodgepodge of rival business interests making poor managerial and financial decisions, a government whose aviation policies were hostage to the impoverishment of the nation caused by the war, a lack of vision, an aversion to risk.

The state run airlines, British European Airways (BEA) and British Overseas Air Corporation (BOAC) were part of the problem. These airlines had special requirements. For example, BOAC served the old imperial routes and needed aircraft suitable for unsophisticated high altitude, hot airports. Demanding that British manufacturers meet the requirements for these conditions made the airplanes unappealing to the export market.

### *The Trident-First of the Trijet Airliners*

Nonetheless, Hawker-Siddeley adopted a Hunting Aircraft/De Havilland design to produce the HS 121 Trident in 1962. The British government was pushing jet development and controlled the British airlines. BEA wanted a short to mid-range aircraft for the European routes but did not desire a large jet fleet. Nonetheless, governmental economic policies prevailed and BEA was forced to order British made jets.

The Trident did have the distinction of pioneering Category 3c landings which allow landings under the absolute minimum allowed visibility and decision height requirements. This achievement was another example of the failure to capitalize on advanced British technology due to inept management and policy decisions by business and government.



*The Hawker-Siddeley Trident 2E, a long range version of the aircraft.*

However, when the passenger market weakened, BEA requested a smaller aircraft than planned with

less powerful engines. A market rebound caused BEA to request even more modifications and the changes to the aircraft made it less appealing for foreign buyers. Just over a hundred were produced in five different marks and then, a year later, the Boeing 727 trijet entered the competition and dominated the market.

### *Boeing and Its Remarkable "Three-Holer"*

Boeing's 727 incorporated fuselage features of the successful 707 and could carry more passengers over a longer range than the Trident and was competitively priced. The plane was extremely popular and 15 times as many were produced as the Trident. Designed for smaller airports, the 727 had features which made it independent of many ground support equipment.



*Many 727s such as this -227 version have found useful employment as freighters.*

The 727 design incorporated has its own auxiliary power supply to operate to operate the electrical system, start-up, and air conditioning when the main engines were shut down. The air stair, a passenger ramp, could be lowered for the tail at airports that did not have ramp stairs or air bridges.

Originally, the air stair could be lowered in flight. In 1971, a man known only as D.B. Cooper claimed he had a bomb and hijacked a Northwest Orient Airlines 727 over the Pacific northwest, demanding a ransom of \$200,000 dollars and some parachutes. These were supplied when the aircraft landed. Cooper then released the passengers but forced the flight crew to take-off.

Somewhere over Washington, Cooper opened the air stair, bailed out, and was never heard from again.

About ten years later, 290 twenty dollar bills, identified as part of the loot, was discovered but forensics yielded little information about how it got to the place where it was discovered.



*A 727-200 at El Alto, La Paz, Bolivia, 13,325 ft MSL. Note the air stair*

Most planes with air stairs are now equipped with the “Cooper Vane” which prevents the door from being opened in flight.

Just under 200 of the original 1800 727s remain in service, mostly as freighters. After the 737, it is the most widely produced airliner in history. Once over two dozen US Part 121 operators flew the plane. Now, the only major airline to employ the 727 in regular service flies the “unfriendly skies” for Iran Air.

#### *The “Tin Lizzie” is Rejuvenated*

The penultimate piston trimotor emerged in 1964. William Stout, whose design work led to the Ford trimotor, purchased the manufacturing rights from Ford. Improvement were made in the design which included internal control wires and engine instruments, and a larger tail. The original Pratt and Whitney Wasps were retained at a slightly higher power rating. Plans were made to produce the aircraft in quantity but only two were built under the name Bushmaster 2000.



*The sole surviving Bushmaster, of two built, flies from Greg Herrick's Golden Wings Museum in Minnesota.*

#### *A Triad of Trimotors in One Year*

1970 was a banner year for trimotor first flights. Lockheed and Douglas fought it out with the L-1011 TriStar and DC-10 and the little company of Britten-Norman located on the Isle of Man produced its BN-2A Mark III Trislander, a long name for a small airplane.

#### *The Entry from the Isle of Wight*

The BN-2 Islander, a familiar local site flown by Bill Bendokas's Block Island Airlines, was modified to carry a bigger load. The company took a prototype Islander, added a third engine high up on the tail, lengthened and strengthened the fuselage and landing gear and ended up with a tough little STOL aircraft which could operate from rough strips and make a few dollars for its operators who might be found in New Guinea or Africa or some of the Caribbean islands.



*A Trislander at Spaatz Field, Reading, Pennsylvania*

*Lockheed and McDonnell-Douglas Fight It Out  
DC-10 vs. 1011*

The Douglas DC-10/Lockheed L-1011 battle of the titans ended with Lockheed withdrawing from the commercial aircraft market and Douglas ending up as the junior partner in McDonnell-Douglas. The TriStar was more technologically advanced, looked better, flew faster but had a sorry experience when Lockheed chose the highly advanced Rolls-Royce RB211 engine as a sole source engine.

Alas, the development costs of the engine drove Rolls into bankruptcy and was nationalized by the British government. Lockheed considered switching engines but discovered insurmountable production problems if it did so. The delays meant that the L-1011 would be introduced after the rival DC-10, not a good portent for future sales.



*An Eastern Airlines L-1011 departs.*

The Brits promised to subsidize Rolls to get the RB211s produced by only if the US government guaranteed the loans which Lockheed needed to produce the TriStar. At about the same time, Lockheed got caught bribing Japanese officials in order to get 1011 sales from All Nippon Airlines.



*Lockheed TriStar side view clearly shows the s-ducted number two engine.*

Eventually, the TriStar reached the market. Delta Airlines was the largest customer and the Royal Air Force adopted it as a tanker and freighter/passenger plane. Lockheed ended up sending 250 of them out the doors of its factory, about half or what they needed to sell to break even on the development costs.

An interesting 1011 flies today. Orbital Sciences Corporation uses a TriStar, named *Stargazer*, to launch its Pegasus rocket which can achieve orbit carrying various scientific payloads. This is a cost-effective launching method which has a lot of versatility not found in ground launches.

The DC-10 design work started before the Douglas-McDonnell merger. The idea was to fill the niche between the larger 747 aircraft and the smaller 707s, capable of relatively large passenger payloads over relatively long routes but operating off smaller airports.



*An American Airlines DC-10 displays the high mounted number two engine.*

The most noticeable difference between the DC-10 and the TriStar is the mounting of the #2 engine. The TriStar mounts its engine in the fuselage and feeds air to it via an s-shaped duct. Douglas placed the DC-10 engine at the base of the vertical stabilizer which simplified feeding air into the engine. Both Pratt and Whitney JT9D and General Electric CF-6 power plants can be found on various marks of the -10. Engine options add to the sales appeal of an airliner but add to its design costs.

The DC-10 was produced for the USAF as the KC-10 Extender. The Extender is a versatile aircraft and finds its primary use as a refueling aircraft but can carry passengers and freight. The passenger-freight option is useful when deploying units overseas since the aircraft must be refueled in flight but upon landing need personnel and logistical support. Some of the supplies and support troops can deploy onboard the tanking aircraft. Two commercial contractors fly KC-10 which are leased by various air forces.



*USAF KC-10 Extenders at the ARINC facility, Will Rogers Airport, Oklahoma City, Oklahoma.*

*A Good Aircraft Can Be Improved*

McDonnell-Douglas produced a successor in 1990, the MD-11. The MD-11 has a more sophisticated airfoil, incorporating winglets, a stretched fuselage, and more efficient engines. When Boeing took McDonnell-Douglas over, they modified some DC-10s as MD-10s, eliminating the flight engineer position and making the flight deck common with the MD-11 which allows both aircraft to be flown with the same type rating.



*The MD-11 above and the DC-10s are gainfully employed as cargo haulers.*

Freight carriers such as FedEx still fly the DC-10/MD-11 series and Orbis, a non-profit which is dedicated to treating eye disease operates one of these aircraft as a medical clinic. The aircraft is flown to sites which lack proper medical facilities and the on-board teaching medical staff teaches the latest techniques in ophthalmology while treating the local patients.

*Further Proof that Good Aircraft Can Always be Improved-the Growth of the CH-53*

Connecticut's own Sikorsky Aircraft produced a three engine helicopter, the CH-53E, in 1974. Sikorsky's internal identification number is the S-80 but the series is better known as the Super Sea Stallions. The USMC used them as heavy-lift helicopters and the USAF adopted variations as the Super Jolly Green Giant combat search and rescue aircraft.



*A USMC Super Stallion departs Groton.*

The original design was a twin engine machine but the military services required helicopters with heavier lifting capacities. Sikorsky approached the USMC with its S-80 concept. Adding an extra engine to a proven design, the S-65 series, had merit. A lot of development money would be saved and it would be quicker to enter production.

The new aircraft would have a larger fuselage, a stronger transmission, seven rotor blades, and a new tail. (A TRCS officer, Ed Miller, was intimately involved in the tail modifications and his recall of the work follows this article.) The three General Electric turbines supply about 13,000 shaft horsepower to the rotor system.

The Navy uses the plane for resupplying ships and have the Sea Dragon version for anti-mine warfare. The Marines can move their artillery and light armored vehicles in the Super Stallion. Hundred have been built and a few have also found a place with the Japanese Maritime Self Defense Force.

Sikorsky is now working on the CH-53K King Stallion. Ground testing has begun with the helicopter attached to massive steel pillars to hold the 22,500 SHP vehicle down.

The French firm Dassault has three trijet business planes in the air, the Falcon 50, the 7X, and the 900 series, all with #2 engines fed through s-ducts.

The Falcon 50 was derived from the twin jet Falcon 2 but included the aerodynamic refinement of an area ruled fuselage.



*Falcon 50*

Another trijet helicopter is the Augusta-Westland AW101. The aircraft has been incorporated into a number of air forces which find its medium lift capacity sufficient for their missions.

At one point the AW101, designated VH-71 Kestrel, was selected to become Marine One, the US presidential helicopter but it faced very strong congressional opposition because of its foreign origins and cost over-runs.



*The EH-101 Heliliner at the RAF Museum, Hendon*

The third pre-production aircraft was tested for commercial use as the Heliliner but no civilian models were ever produced.

Perhaps one of the most unusual trijets in the line-up is Boeing's X-48 which is an unmanned aerial vehicle (UAV) using a blended wing body. The Boeing Phantom Works design was built in England.

*Falcon 900EX, the long range version of the aircraft.*



The Falcon 7X is the first business jet with a fly-by-wire control system and was designed on Dassault's proprietary CATIA, a three dimensional computer assisted drafting system now used by Boeing and Also by Groton's Electric Boat which used it to design the Virginia class submarines.

The Falcon 900 is the largest ship in the series. The long range version can fly 5000 miles at Mach .85. The presidential aircraft of Bolivia is a 900.



*The XB-48B in flight*  
(Photo Credit: Dryden?NASA)

Three very small turbojets, each developing 52 pounds of thrust drive the UAV at around 135 mph. The aircraft has been used to study the

performance of blended bodies at low speed. The program has modified the vehicle several times as new test goals are developed. In 2012, after six years in which the goals were met, the program was terminated.

A number of trijets have been produced in the former Soviet Union both by Tupolev and Yak. Almost all of them have been medium or regional airliners.

The French SNCASO SO.9000 Trident was a supersonic point defense interceptor using two turbo jets and one rocket. Only twelve were produced before project cancellation.

Robert Bass, scion of a wealthy family and a successful investor has spent \$100 dollars over the past decade attempting to develop a supersonic business jet. The latest iteration, the AS2, is planned to use three 15,000 lb thrust engines which theoretically will propel it to Mach 1.6. Aerion's aerodynamics are based on an unswept wing which is designed to produce supersonic laminar flow. Bass hopes to have the airplane flying in 2021. Time will tell.



Artist's Conception of the ASR

(credit: Aerion)

This brief review of trimotors has touched upon aircraft design problems, economics, governmental policy, business management, and airline history and military history.

As mentioned earlier, one, two and four engines are regarded as standard by three engines have

seen their day and many other combinations have existed. That topic must wait for another day.

## HOW THE CH-53E SUPER STALLION GOT ITS NEW TAIL

*(with apologies to Rudyard Kipling)*

by

*Capt Edward Miller, TRCS*

When I went to work at Sikorsky Aircraft in October of 1972 I was assigned to work on the YCH-53E which was the CH-53E prototype, two of which were built. The YCH-53E had left and right horizontal stabilizers mounted on the tail cone. During flight testing, this location was found to have an adverse effect when the helicopter flared for landing. The problem was that the rotor down wash impinged on the low set stabilizers causing an extreme nose up attitude which made landing very difficult.



*YCH-53E with its original tail configuration.*

*(Photo Credit: US Navy)*

In early 1975 it was realized, as design of two pre production aircraft was to begin, that relocation of the stabilizer to a point high on the vertical stabilizer was necessary. I became involved in design of a modified stabilizer which was to be flight tested on one of the YCH aircraft. Because of the high mounting position, all of the stabilizer area had to be located on the right hand side since the tail rotor was located on the left hand side. One of the low stabilizers was increased in area and the necessary mounting structure incorporated. Flight testing proved the concept and we proceeded with the CH-53E design work. Since the tail pylon on the 53E folds for storage on an aircraft carrier, the new stabilizer was designed with a kink which has remained a characteristic of the 53E to this day.



*The CH-53Es at the Connecticut National Guard Base, Groton clearly shows the high mounted and kinked right stabilizer developed to eliminate the downwash problem which was discovered when flying the prototypes.*

Because the redesign for the two pre production aircraft would require a significant increase in engineering manpower to meet the first flight date, it was decided to locate the engineering work off site. Additional engineers were loaned to Sikorsky by Republic Aviation and office space in the Trumbull Shopping Center was chosen as the off site location. We got the design done in time and the first flight date was met .

Years later the Trumbull Shopping Center was redesigned and the area, previously occupied by our engineering office, became the food court. One day in 1990 I was in shopping center food court with my wife and my son, and as we waited on line for some great cinnamon rolls, I pointed out where , among the sea of tables, my desk had been when the CH-53E got its new tail.

### TRIMOTOR ODDS AND ENDS

Here are a few more trimotor aircraft which were not part of *The Coastwatcher* files. Each one represents the efforts of engineers from five different countries to meet the design criteria which have been specified by either a potential customer or a perceived need.



*The Airspeed AS.4 Ferry was partially designed by Neville Shute, later an acclaimed author. Note the cranked lower wing and the high mounted #2 engine. (PD)*



*DeHavilland of Australia produced the DHA-3 Drover to meet special conditions of the Australian outback. (Bill Dannecker Collection)*



*The French built Loire 70 flying boat combines tractor and pusher propellers, high mounted to keep them out of the spray. Only eight were built and they were used as maritime reconnaissance aircraft (PD)*



*Jack Conroy put three P&W PT-6 turboprops on the immortal DC-3. The aircraft had an interesting career in the high latitudes. (Naples News)*