

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 EVENTS

07 DEC-O Flights-Simsbury  
10 DEC-TRCS Meeting  
14 DEC-TRCS SAREX  
17 DEC-TRCS Holiday Party  
24 DEC-No Meeting  
31 DEC-No Meeting

07 JAN-TRCS Meeting  
14 JAN-TRCS Meeting-Commander's Call  
21 JAN-TRCS Meeting  
28 JAN-TRCS Meeting

22 FEB-CTWG SAREX-HFD  
26 APR-CTWG SAREX-GON  
16-21 JUN-Tri-State SAREX  
23 AUG-CTWG SAREX-HFD

### CADET MEETING

03 December, 2013

submitted by

C/TSgt Justin Ketcham

Drill practice was held on our airport parking lot drill field.

C/1st Lt. Schultz gave a quiz on the chain of command.

Captain Cox briefed the cadets on National Cadet Special Activities (NCSA). Many of the varied programs were described and cadets were encouraged to apply. Applications are now open and scholarships are available.

You have until Jan 15th to apply on line. If you have gone to encampment or will have completed encampment before the NCSA you are eligible to apply.

You are allowed to apply to more than one activity but make sure it is an activity in which you have an interest.

Review the requirements for each activity to make sure you qualify for the NCSA.

Remember the application process closes on Jan 15<sup>th</sup>. If the application has not been submitted by then you are locked out.

Certain activities like NESAs have different application schedules.

Go to the following for information:

NCSA info at: <http://www.ncsas.com/>

Scholarship Info at:

[http://capmembers.com/cadet\\_programs/library/scholarships/index.cfm](http://capmembers.com/cadet_programs/library/scholarships/index.cfm)

C/CMSgt Carter gave a lesson on how to recognize the different cadet grades in preparation for the quiz which will be issued next week.

Lt. Col. Rocketto gave a briefing on the results of

the fruit sale. Cadets Jaskiewicz, Trotochaud, and Johnstone were recognized for selling the most fruit individually. Each cadet received a monetary award and an aviation related book.

### **SENIOR MEETING**

*03 December, 2013*

Capt Farley led a discussion about the objectives and form of the 2014 training schedule for the emergency services mission. Officers are encouraged to submit ideas for consideration and will also be expected to assume the role of instructor if qualified.

Thames River has eight Skills Evaluators on its rolls and training and certification can be completed for Air Operations Branch Director, Mission Staff Assistant, Mission Safety Officer, Operations Section Chief, Planning Section Chief, Flight Line Supervisor, Flight Line Marshal, Water Safety, Mission Pilot, Mission Observer, Mission Scanner, Mission Transport Pilot, Airborne Photographer and Ground Team.

Qualified squadron members are also Certified Flight Instructors, CAP Instructor Pilot (six pack and G-1000), CAP Check Pilot (six pack and G-1000), CAP Check Pilot Examiner, Mission Check Pilot (six pack and G-1000),

### **SAILPLANE CERTIFICATE SECURED**

LtCols deAndrade and Rocketto flew to the Wurtsboro, N.Y. glider port (N82) where deAndrade successfully passed his flight examination for the commercial glider rating and Rocketto completed his last two solo flights in preparation for his flight examination.



*The SGS-33 is a long way from the "Bone" which deAndrade used to fly and the 57/67 and C182 which he flies now.*

### **AEROSPACE CURRENT EVENTS**

#### *Protoplasmic Pilot Trump Cybernetic Pilot*

A Progress M-21M supply rocket's automatic docking system failed while the capsule was within 60 meters of the International Space Station. Cosmonaut Oleg Kotov took manual control and completed the maneuver 10 minutes ahead of schedule saving 200 kg of fuel in the process.

#### *China Aims for Soft Lunar Landing*

On 02 December, mainland China launched a Long March-3 space vehicle carrying a lunar rover and will attempt to make a soft landing on the lunar surface.

The payload, Chang'e-3, consists of a lander and rover, *Yutu*, will perform geologic surveys and set up a telescope to study the plasmasphere of the earth.

The spacecraft has entered an earth-moon transfer orbit which is expected to last 112 hours during which time orbital adjustments will be made.

The vehicle is expected to reach the moon on Monday and enter a 100 km high circular orbit before deploying the lander.

The names of the payload are those from an old Chinese myth. *Chang'e* swallowed magic pills and took her pet *Yutu* (Jade Rabbit) and flew to the moon where she became a goddess.

This is the first Chinese attempt to make a soft landing on an extra terrestrial body.

#### *US Commercial Firm Launches Telecommunications Satellite from Cape Canaveral Air Force Station.*

A Space-X (Space Explorations Technology Corp.) Falcon 9 launch vehicle lofted an Orbital Sciences SES-8 telecommunications Satellite into a transfer

orbit on 03 December. The satellite is not positioned for insertion into a geosynchronous orbit over 95° East longitude.

The SES payload is one of a fleet of telecom satellites owned by a Luxembourg company. The end use will be to broadcast television programming to India and Southeast Asia.

Space-X is now poised to offer serious competition to France's Arianespace. Arianespace uses an equatorial launch site in French Guiana and serves Ariane-5, Soyuz, and Vega missions.

### *F-35 Bases Selected*

The USAF has announced that Hill AFB in Utah and Burlington International Airport will house the first operational F-35A units.

Hill was selected because of its proximity to training ranges and the F-35 depot. The active-duty 388th Fighter Wing and the reserve 419th Fighter Wing at Hill will fly 72 Lightnings expected to arrive in 2015.

Eighteen of the F-35s are scheduled to start operations at the Burlington Air Guard Station in 2020. Burlington offers low cost, infrastructure, and suitable airspace and ranges for economic and realistic operations.

Both the Utah wings and the Green Mountain Boys now fly variants of the F-16.

## **AEROSPACE HISTORY**

### ***THE WRIGHT BROTHERS***

*by*

***Stephen M. Rocketto***

*December 17<sup>th</sup> will be the 110th anniversary of First Flight at Kitty Hawk. (2<sup>nd</sup> Revision for CAP)*

Some dozen years ago, I got involved in a project tentatively titled "From Kites to the Wrights," a proposed interdisciplinary curriculum package for celebrating the centennial of flight in 2003. My involvement in this effort started in typical fashion. Gordon Schimmel, the Superintendent of

Schools in Mansfield, CT called Ralph Yulo, Professor Emeritus of Education at Eastern Connecticut State University. He asked Ralph if he might recommend anyone and Ralph mentioned me.

I have always liked projects like this one. Even if they do not fulfill their expectations, enough good material can be developed to make it all worthwhile. Besides, the collegiality and fellowship of the other participants buoys my spirit and brightens my dour disposition. But this project was a real bonus. My earliest memories are entwined with things aeronautical. Flying, model building, and studying the history of aviation has diverted me from the mundane, emptied my pockets, and enriched my soul. So I eagerly seized the opportunity to minimize my sleep and complicate my life. Some people just cannot say "NO!"

One meeting led to another and the project has focused on developing a set of interdisciplinary modules centered on some sort of laboratory exercise or construction activity which is directly related to the experiences which Wilbur and Orville Wright underwent between 1895, when they first heard about the gliding experiments of Otto Lileanthal and 1905, when they produced the improved model of their 1903 Flyer.



*In 1895, the Lilienthal glider was the first successful aircraft to receive a U.S. patent. This replica is on display at Long Island's Cradle of Aviation Museum.*

Emulating the Wright Brothers, I entered into a bibliographical search of the literature which might assist me in producing one or two useful segments for the project. I was especially interested in the convergence of talents, social

conditions, and technology which contributed to the Wright's success in controlled, powered, manned, heavier than air flight; a goal which was eluding many notable scientists and experimenters. Four books proved especially helpful. The first was Tom Crouch's biography of the brothers, *The Bishop's Boy's* (A Life of Wilbur and Orville Wright). The second and third were Octave Chanute's *Progress in Flying Machines* and Orville Wright's *How We Invented the Airplane* (An Illustrated History). Both of these volumes were readily available in Dover Publications editions. As an aside, Dover should be commended for their consistent policy of producing inexpensive reprints of seminal writings in science, mathematics, and technology. The last book which I considered was Peter L. Jakab's *Visions of a Flying Machine* (The Wright Brother and the Process of Invention). This is another of the fine Smithsonian History of Aviation Series. The two historical reprints would serve as a "reality check" as I considered the theses offered by Crouch and Jakab.

The best recent biography of the brothers is Crouch's, *The Bishop's Boy's*. Crouch develops a detailed and coherent narrative of the unusually close relationships among the Wrights; the father Milton, the sister Katharine, and especially, the youngest brothers, Wilbur and Orville. One of their favorite toys was a Penaud helicopter, a variation of the familiar rotor on a stick, which soars aloft when twirled by a sidewise motion of the hands or by the stored energy of a twisted rubber band. The 11 year old Wilbur tried, with little success to scale up this clever mechanism and exhibited a lifetime interest in building variations of this classic child's toy.

The earliest business ventures of the brothers involved the construction and utilization of a series of printing presses and for a number of years, they were involved in the dual business of publishing and press manufacture. But in 1892, the bicycle craze swept into Dayton and they swiftly transitioned from riders to sellers, repairers, designers, and manufacturers of the safety bicycle. They outfitted a machine shop, designed their own gas operated power plant, and engaged in the

production of high quality machines.



*One of the Wright Cycle Shops at 22 South Williams St., Dayton. Their printing business was on the second floor. The Wrights invented the self lubricating hub and were also the first to machine left hand threads on the pedal crank arm to keep the arm from unscrewing.*

As the last five years of the century played out, Wilbur started to exhibit an interest in heavier-than-air flying machines, initiated by reading about the experiments in gliding which Otto Lilienthal had been carrying out in Germany. Wilbur read Marey's *Animal Mechanisms* and started to consider the problems inherent in building a flying machine. Both brothers were keen observers of animal flight and Orville stated that "If the bird's wing can sustain it in the air without the use of any muscular effort, we did not see why man could not be sustained by the same means." The use of the verb "sustain" indicates thinking beyond short glides, such as practiced by Lilienthal, to flights in which altitude is not constantly lost. They observed the wide variety of flying creatures and could not see any reason why, in principle, why many could not accomplish the same feat.

In 1899, the physicist Samuel Pierpont Langley was the leading experimenter in aerial enterprises in the United States. Langley, Secretary of the Smithsonian Institution and a scientist noted for his work in stellar astronomy, had in 1896, first flown a steam powered model and two years later, received a \$50,000 grant from the U.S. Army for the development of a man-carrying version of his Aerodrome. Wilbur wrote a letter to Richard Rathbun, Langley's assistant, requesting information on the current status of aeronautical science. Rathbun sent Wilbur a collection of pamphlets and a suggested reading list which included Octave Chanute's *Progress in Flying Machines*.

Chanute was a remarkable man with a national

reputation as a surveyor of railroad lines, bridge builder and inventor. In 1888, Chanute retired and concentrated all of his attentions on a 30 year advocacy, aeronautics. He compiled all of the experimental reports which he had collected during that time and published a series of articles which became the book *Progress in Flying Machines*. A perusal of this text reveals that the book is a comprehensive study of the research from Chinese kites and Leonardo da Vinci's ornithopter in 1500 to the 1890's trials of Hiram Maxim, Lawrence Hargrave, and Lilienthal. But Chanute was not merely a researcher and archivist. He and his assistant, Augustus Herring, conducted over 2000 gliding experiments on the shores of Lake Michigan. Research and experiment led Chanute to the conclusion that the development of a method for aircraft control was the key to practical flight. The Wright Brothers concurred.



*A Chanute Glider at the Museum of the USAF*

However, the eminent Langley and the inventive Maxim were convinced that the evolution of a suitable power plant was the major problem to be solved. Furthermore, since most of the practitioners were doing their research with models, stability was a highly prized characteristic of any design. The Wrights, taking their cue from Chanute and Lilienthal, eschewed stability in favor of controllability.

This difference in design philosophy foreshadowed the arguments in the manned space flight program over automatic systems or pilot controlled vehicles. The U.S. astronaut corps forced the engineers away from the "SPAM in a can" model favored by our designers and adopted by the Soviet program. The Wrights opened up a

correspondence and a friendship with Chanute which was to continue until his death in 1910. Chanute personally visited their camp at Kill Devil Hill in 1901, 1902, and 1903 and served as their unofficial spokesman. Within several years, with Chanute's encouragement and assistance, the Wrights surpassed their mentor's achievements and Chanute saw the dream of practical flight achieved.

Orville's text, *How We Invented the Airplane*, is a succinct and profusely illustrated account of their adventure in invention. As might be expected, they were amateur photographers and carefully documented each step in the process of invention. The stark landscape of Kitty Hawk forms a dramatic backdrop. The poised figures at launch and the clean images of flight are a delight to the eye. Commentary is supplied by a Wright biographer, Fred C. Kelly. Their first personal account to the public, a 1908 article from *Century Magazine* is included as an appendix.

This brings us back to the question of why the Wright Brothers were so successful when so many other people failed. After all, neither of them had completed high school, they were not part of the elite scientific establishment, and they lived in the Midwestern backwater of Dayton, Ohio. Jakab's *Visions of a Flying Machine* subtitled "The Wright Brother and the Process of Invention" successfully explains their achievement by examining how Wilbur and Orville were guided by their mechanical skills, scientific skepticism, "Yankee" pragmatism, and the technical spirit of the time in which they lived. Whereas Crouch is somewhat diffident in analyzing their engineering aptitudes, Jakab's spares no ink in a close analysis of the technical issues which confronted them and how they mastered each of them in turn. As a result, Jakab's book is more a philosophy of engineering rather than a discursive history of the process by which Wilbur and Orville built their Flyer. One can understand the Brothers as prototypical engineers and in their career, mark those qualities which are the hallmarks of good engineering practice.

They could clearly define a problem. In the case

of their aircraft, they quickly understood, from their experiences with kites and bicycles and their technical readings, that control was the key to success. In order to produce an airplane one had to experiment with models and manned craft and if the craft were to be manned, they had to be controllable. In a clear vision of priorities, unlike many competitors, they postponed considerations of engines until they resolved the more fundamental issues. Basically, controllability and airfoil optimization could only be done by flying. This realization led to a series of experiments, in 1900, with kites and gliders.



*Wright Kite at the USAFM*

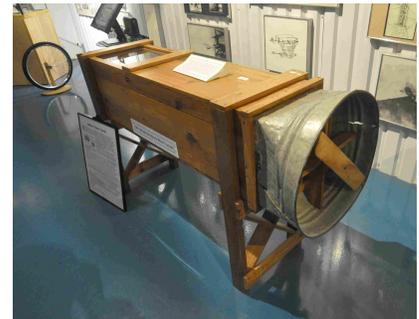
Operating at the remote site of Kitty Hawk, North Carolina, selected for its favorable winds, added logistical difficulties to their technical burdens. They developed the "wing-warping" technique for control but disagreements between the experimental values of lift measured and the theoretical values calculated from the standard tables of their precursors revealed that the traditional data regarding what we now call lift and drag were in error. They also encountered the problem of adverse yaw, a phenomena which caused an aircraft when banked in one direction to point its nose in the opposite direction.

By 1901, they were somewhat discouraged but Chanute visited with them for several weeks and convinced them that, for all their difficulties, they were far in advance of the field. They did not quit and they modified their program to meet the difficulties which arose. Although the Wrights claim to have entered aviation as a sport, the "reluctantly entered upon the scientific side of it" and established a rigorous program for investigating the myriad variations of fluid mechanics such as airfoil geometries and pressure

distributions. They then constructed simple devices for airfoil studies which culminated in their wind tunnel and by late 1901, had rectified the lift and drag tables and could find a rational relationship between their theoretical values and their experimental values.



*Above, a bicycle modified with a force balance and used by the Wrights to test airfoils, a converse wind tunnel. Below: A replica of a Wright wind tunnel on display at the General Thomas Stafford Aerospace Museum.*



Of paramount importance in their progress was their ability to visualize solutions. The "visions" in the title of Jakob's book refers not to some dream of a flying machine but to the specific mental constructs which allowed them to analogize between the abstract concepts of theory and the concrete products of the artisan's craft. It was once said of Kelly Johnson, the engineering genius of Lockheed's Skunk Works, that "he could see air." Likewise, Orville and Wilbur Wright could see, in their mind's eye, the relationships of forces and mechanisms which they turned into a wind tunnel, qualitative and quantitative

measuring instruments, and ultimately, a practical airplane. Jakob argues that a facility for nonverbal

thought was a key element in the Wright's success and my experiences with first class engineers supports this conclusion.

Much of their equipment was made from off-the-shelf supplies as their facile imaginations saw new possibilities in old things. The addition of a rudder, whose movements could be coordinated with the warping of the wings, corrected the problem of adverse yaw. During this period another engineering asset, their skill with tools and their sensitivity for the materials of construction served them well since constant repairs were necessary to keep their delicate machines airworthy. Consequently, during the next year, they completed around 1000 glider flights and started to acquire the aviator skills and experience which are needed to maintain the equilibrium of the aircraft in flight.



*1902 Wright Glider*

Now they attacked the issue of motive power and did so in typical Wright fashion. They calculated how much power they required and then designed and built, with the assistance of their mechanic, Charlie Taylor, a 12 horsepower engine. Their past work with airfoils, and the ability to visualize that an "airscrew" was just an airfoil which rotated and followed a helical path allowed them to design and construct the first practical propellers. And so, on December 17th, 1903, Orville made the initial takeoff, flying a distance of 120 feet in 12 seconds. Three more flights were made that day, the final one piloted by Wilbur logged 852 feet in 59 seconds and the age of aviation was launched.

Within two years, they had perfected the original machine and, in 1908, Wilbur captivated Europe with his flying demonstrations and personality.



*The famous "First Flight" photograph. The photo was taken by John T. Daniels of the Kill Devil Hills Lifesaving Station.*

The period of time during which the Wrights grew up was a time of great technological and cultural change. The railroads opened up the west and telegraphy and telephony opened new possibilities in communication. Automobiles and bicycles gave people a new individual mobility. Everything seemed possible. High school educations were not common and neither of the brothers completed high school. But they were voracious readers, deeply curious, and possessed finely honed intellects.

The Wright Brothers Collection at Wright State University in Dayton and the list of books which they took to Kitty Hawk indicates wide reading in the mathematics and sciences including technical publications in French and German. Their biographers indicate that their readings extended into literature, history, and philosophy.

The Wright brothers were brought up to be confident and self-reliant and lived in an age when such characteristics were prized. They entered into heated debates with each other over technical issues in which the give and take of the dialectic would lead to a solution to the problem under discussion. Yet their close personal relationship did not allow for the rancor which might have developed otherwise. These cultural and personal circumstances, melded to their methodical approach to problem solving contributed to their efficacy as engineers and makes them worth studying as a model of what engineering is all about.