



*Missions for America*

*Semper vigilans!*

*Semper volans!*

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01 SEP-Proposed start date for fruit fundraiser

15 SEP-SUI date 1800 hours

19-20 SEP-LISP

### **SENIOR MEETING**

*04 August, 2020*

*Staff Reports*

All relevant departments reported that they are ready for the upcoming SUI.

Lt Kopycienski reports that 86% of all Squadron members have qualified for ICUT.

The Squadron will have an aircrew on call for the CTWG SAREX on 15 August.

Approximately 12 members of the Squadron will be participating in the National Conference on the weekend of the 15th.

Florida Indian River Groves has notified us that the promotional material for the fruit fundraiser has been shipped. Lt Col Doucette has submitted paperwork to CTWG for approval of the fundraiser.

### **CADET MEETING**

*05 August, 2020*

Meeting cancelled due to wide-spread power failures.

## **REPORT ON WEEKLY OPERATIONS AND ACHIEVEMENTS, MISSIONS, PROMOTIONS, ACTIVITIES**

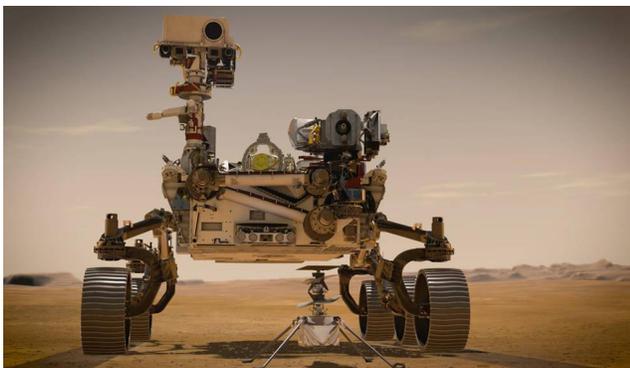
*CTWG Special Mission  
submitted by  
Lt Tina Trotochaud*

On Thursday July 30th, Lt. Thornell and Lt Trotochaud, Cadets Seth Trotochaud, Daniel Martin and Ben Kellley met at 0700 and drove to Bethel, Connecticut and picked up 15 boxes of food at Walnut Hill Church. They then spent three hours delivering them to homes in Danbury and Brookfield. The mission went smoothly and was much appreciated by the recipients of the food. After stopping for lunch, they returned home at 1500.

### **CURRENT EVENTS**

*Ingenuity  
A UAV on Mars*

The *Perseverance* spacecraft which has just landed on Mars is getting a lot of ink in the daily press. The usual hoopla is reserved for mission which will be engaged in the search for signs of life. But nestled under the belly of the *Perseverance* rover is a small solar powered helicopter, named *Ingenuity*, designed to study flight conditions on the Red Planet.



*(Credit: NASA-JPL/CALTECH)*

Upon command, the UAV will be released from *Perseverance* which will then drive away. The UAV will then assemble itself. After a series of checks, a number of short test flights will be flown followed by a full scale tests lasting approximately one month. Flights will run about two minutes each with a full day needed to recharge the batteries.

Power is supplied by electricity generated by solar cells which also provide heating to keep the craft operational during the Martian nights when temperatures drop below 100° Fahrenheit.

Communications will be a two way relay from NASA's Deep Space Network to a relay satellite orbiting Mars to *Perseverance* to *Ingenuity* and in reverse. The instructions for an *Ingenuity* mission will be sent *in toto* and stored aboard the helicopter. Direct control is not possible due to the time of transit of the signal since a radio signal traveling at the speed of light takes an average of 14 minutes depending upon the relative positions of the earth and Mars. An inertial navigation system will be used to direct and track *Ingenuity*.

*Ingenuity* weighs about four pound and has a pair of coaxial rotors four feet in diameter. The specially designed rotors will spin at about 2,400 rpm which will keep them subsonic in the low density Martian atmosphere. This compares to about 500 rpms for a helicopter on earth.

The flights face fundamental problems. Lift is dependent upon the density of the carbon dioxide atmosphere which at the Martian surface is equivalent to an altitude of 100,000 feet on earth. This is somewhat offset by the fact that the gravitational field of Mars is about 1/3 that of the earth so the weight of the UAV is only around 1.3 pounds on Mars. Engineers tested *Ingenuity* in a gas chamber in which the atmosphere of Mars was

replicated. A clever "gravity off-load system" suspended the vehicle in the chamber which reduced its apparent weight to that which would be found on Mars.

The basic relationship governing lift is

$$F_{\text{lift}} = \rho A v^2 / 2.$$

The Greek letter rho represents atmospheric density, A is the area of the airfoil and V is the speed of the fluid over the airfoil. So the upward force has to equal the downward weight of the aircraft for steady flight. As you can see, this requires specially designed rotor blades and a high rotational speed because rho is a very small quantity.

The success of this project could offer opportunities to build long-range flying reconnaissance vehicles which will extend coverage of the Martian surface by orders of magnitude. An aerial image allows for different high resolution views of interesting formations, especially areas inaccessible to ground based rovers. The path which rovers take may also be studied in advance and dangerous areas avoided. *Ingenuity* is a remarkable attempt to develop a new technique for extra-planetary exploration and its success will offer planetologists a new and valuable tool.

Go to:

<https://mars.nasa.gov/technology/helicopter/> to view testing of how *Ingenuity* is unfolded and released from *Perseverance*.

### AEROSPACE CHRONOLOGY FOR THE WEEK

Aug. 4, 1954 – While on a training mission with Capt. Leo Baca, USAF, Flt. Lt James L. Dell, a Royal Air Force pilot on exchange duty with the 20th Fighter Interceptor Squadron at Westover AFB were forced into a holding pattern by bad weather.



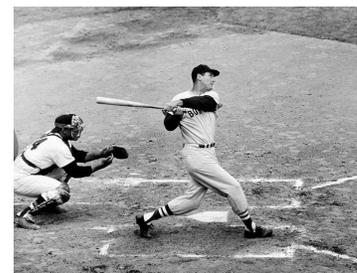
*F-86A assigned to the 29th FIS. (Credit: Larry Davis)*

Running low on fuel, they headed for Rentschler Field in East Hartford. Both F-86 Sabres ran out of fuel. Baca managed to glide to a safe landing but Dell could not make the field and tried to eject. The canopy jammed and he had to beat it with his fists to get it to release. Finally, he ejected. The aircraft crashed in South Glastonbury. The canopy landed in the yard of George Hall, the Chief of Police. Dell landed without injury

Aug. 6, 1953 – Ted Williams returns to the Red Sox after serving a tour of duty as a Marine aviator in the Korean War. This was the second time that "The Splendid Splinter" had his baseball career interrupted by flight duty. He had lost almost five years of play during service in World War II and Korea.



*Ted Flying and Ted Homering (Credit: AP)*



Aug. 7, 1963 – First flight of the Lockheed A-12, the Central Intelligence Agency Mach 3 reconnaissance aircraft. The aircraft was the first in a series that led to the more famous SR-71 Blackbird. She had no official name but the pilots called the A-12, Cygnus in line with Lockheed's practice of using an astronomical theme in naming aircraft. Fifteen were produced.



(Credit: USAF)

Aug 8, 1929 – *The Graf Zeppelin* (LZ 127) leaves Lakehurst, New Jersey on a passenger trip which will circle the earth. Arguably, *The Graf* was the most successful commercial dirigible ever built. Half the cost of the voyage was paid by the Hearst news papers and four staff members were aboard. One, Grace Marguerite, Lady Hay Drummond-Hay became the first woman to fly around the world.

The Graf had a singular feature. She was the only rigid airship to use blau gas as a fuel. Blau gas is an illuminating gas similar to propane. Its value as an airship fuel is that that it is only slightly more sense than air so as it is consumed, little change in buoyancy results. Ordinarily, if a heavier fuel, petrol or diesel is consumed, the aircraft becomes lighter requiring the valving of lifting gas to maintain altitude. Blau gas consumption has little effect on buoyancy and a longer time aloft results.

How did the two aircraft compare. The A-12 flew with a one man crew versus the SR-71 two man complement. As explained in the accompanying illustration, the A-12 was lighter than the SR-71, could fly higher and faster but did not have the range and payload capacity of her younger brother.

The Graf was the first aircraft to make a non-stop crossing of the Pacific and was the first aircraft flying regular intercontinental service and made 64 round trips to Brazil. The hangar near Rio still exists and is used by the Brazilian Air force.

**A-12 / SR-71 COMPARISON**

CIA <b>A-12</b> OXCART			USAF <b>SR-71</b> BLACKBIRD	
101 FT, 9 IN	LENGTH		107 FT, 5 IN	
55 FT, 5 IN	WINGSPAN		55 FT, 7 IN	
120,000 LBS	MAXIMUM IN-FLIGHT WEIGHT		140,000 LBS	
2,208 MPH	FASTEST DOCUMENTED SPEED		2,193 MPH	
90,000 FT	MAXIMUM TEST ALTITUDE		85,069 FT	
3,000 MI	UNREFUELED RANGE		3,250 MI	
NONE	ARMAMENT		NONE	
1	CREW		2	



*Bartolomeu de Gusmão Airport and the hangar was especially built for the Hindenburg and Graf Zeppelins.*

(Credit: Rcadre)

After a highly successful nine year career, *The Graf* was retired after the *Hindenburg* disaster. The United States, the sole source of helium in commercial quantities, refused to sell it to the war-mongering German government and *The Graf* was eventually broken up so its aluminum could be fed into the maw of the Nazi's aircraft production mills.



*The Graf at Rio de Janeiro* (Credit: Jorge Kfuri)

Last year, the Editor lodged in the City Krone Hotel in Friedrichshafen when he visited the Zeppelin Museum. He was delighted to find that the room's water closet was graced with a mural of the *Graf Zeppelin*, an inspiration to the contemplative time spent sitting there mulling over the history of Count Zeppelin and his airships.



Aug. 9, 1976 – A fortuitous emergency landing! The first prototype of what will become the Sikorsky Blackhawk, YUH-60A is engaged in a fly-off with the Boeing YUH-61A. The winner will win the Utility Tactical Transport System and get a contract worth billions.



*Boeing and Sikorsky Face-off*

(Credit: US Army)

During a night-time test at Fort Campbell, Kentucky, the pilot, CW2 Charles Lovell elects to make an emergency landing due to severe vibrations. Lovell selects what appears to be a corn field but the ground mist has obscured what is actually a pine forest.

As he descends into the woods, the main rotor cuts down 40 pines, some as large a five inches in diameter. The rotor blades remain intact and only one man is injured, bumping his head against the trunk of one of the pines as he exits the helicopter.



*The YUH-60A rests in the cylinder which it cut out in the pine forest.*

A salvage crew clears out the stumps and replaces the main and tail rotors and flies the aircraft out three days later. The Army noted the survivability of the Sikorsky entry and it became one of the factors which led to the signing of a production contract on December 23, 1976.

Aug 1949 – The aircraft that gave the name "jetliner" to the turbine powered class of commercial passenger aircraft makes its first flight. The Avro Canada C-102 Jetliner. It was denied the laurels of first by the De Havilland DH 106 Comet which flew 13 days earlier.



*(Credit: AvroLand)*

The cold war led to its demise. Avro Canada was involved in producing the CF-100 Canuck, an all-weather interceptor and could not handle both projects. Only one Jetliner was produced despite an interest by Howard Hughes to either order some for TWA or have it built under license in the United States. But "high office politics" in both Canada and the United States scotched production. The only Jetliner was ultimately cut up for scrap.

Aug 11, 2003 – The first flight across the Atlantic is made by a computer-controlled model aircraft. A team led by Maynard Hill launched TAM-5, The Spirit of Butts' Farm. The aircraft was named in honor of Beecher Butts, the farmer who allowed his land to be used for practice and Charles Lindbergh's Ryan NYP, first aircraft to be flown solo from New York to Paris.

TAM-5 was the 25th attempt to make the crossing in a project which lasted ten years. The aircraft had a six foot wingspan and weighed just under 11 pounds.

The flight was controlled by autopilot for almost the entire trip, 38.9 hours and landed under manual control with 1.5 fluid ounces of fuel sufficient for 44 minutes more flight.

The fuel was Coleman lantern fuel with an oil additive. Power was supplied by an O.S. engine, highly modified with smaller valves, triple filtration and a pressurized fuel tank.

Navigation utilized a satellite-based system, Argos. Argos is installed on NOAA's polar orbiting and European meteorological satellites and incorporates the doppler shift phenomenon to determine the transmitter position of a properly equipped vehicle or even an animal.



*Hill with TAM-5 before launch. The 14 is his Academy of Model Aeronautics membership number.*

Interestingly, the flight followed almost the same route flown by Alcock and Brown when they completed the first non-stop trans-Atlantic flight in 1919, Newfoundland to Ireland and landed at Clifden, the same spot at which they touched down.

*A number of You Tube presentations are available for viewing. Search for "TAM-5."*