



Missions for
America
Semper vigilans!
Semper volans!

SM Heard, TRCS representative on the planning committee for the Aircraft Owners and Pilots Association Regional Fly-in, provided information about the expected attendance and the role of CAP.

The Coastwatcher

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

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Issue 11.07

21 February, 2017

CADET MEETING

21 February, 2017
No Meeting

SENIOR MEETING

21 February, 2017
submitted by
Capt. Chris Magee, USMC

Maj Paul Noniewicz briefed the Squadron on the details of the 18 January training exercise.

Maj deAndrade presented a program discussing the precautions necessary for cold weather operations. Topics included airborne ice, carburetor ice, wind, appropriate clothing, pre-heating, runway conditions, aircraft inspection and fuel appraisal.

TRAINING EXERCISE

18 February, 2017

A TRANEX was held last Saturday in preparation for the upcoming evaluation by the United States Air Force. Sixty-five wing members were involved in the event, either as trainees or trainers.

The day started with a search for a missing aircraft between Groton and Rome, N.Y. Then a mission person report launched another search. Three ground teams and three aircrews were involved in the two searches. To frost the cake, the Coast Guard requested a survey of the Connecticut River from Hartford to Long Island Sound.

Five TRCS seniors participated. Maj Farley was a mission pilot, Lt Pineau flew as an observer, Maj Noniewicz directed the Air Branch and trained Maj Neilson for the Air Branch directorship. Lt Col Rocketto trained as a public information officer.



Maj Farley fills out the interminable pre-flight paperwork while SM Heard and SM Spreccave await with an air of quiet expectation.

CURRENT EVENTS



Ejection Seats

A Dangerous Way to Save Your Life

About 7,500 aircrew members have saved their lives using an ejection seat. But the procedure is fraught with danger. The jerk, the rate of increase of acceleration, is around $(200 \text{ m/s}^2)/\text{s}$ results in a 15g force. Consider the pilot's head which with helmet weighs about 15 pounds. This is increased to 225 pounds during the ejection. Imagine a 225 pound weight on the top of your head and you can surmise how damage to the neck vertebra might occur if the head is not positioned exactly right. A 175 pound pilot would weight 2600 pounds, just over a ton, all of which is supported by the bone structure.

Compression fractures of the spine occur in about 30% of the ejections. Broken bones due to limbs flailing in the air stream occur. Concomitant hazard are bruising, abrasions, hypoxia, and frostbite. The parachute landing, whether on land or water is another source of injuries.

Historically, downward ejections seats such as used the the early F-104 are deadly when ejection is necessary immediately after take-off. Tall pilots in the MiG-15 would have their legs amputated because there was not enough clearance between the seat and the instrument panel. Pilots in the F-104 wore spurs which fitted into a device which dragged their legs backwards to avoid this hazard. Modern designs have all but eliminated such dangers. Currently, about 92% of the those whom eject survive.

Modern ejection seats are almost totally automatic. When they are triggered, hatches or the canopy is blown off the aircraft. Pitot tubes measure the speed of the aircraft and make a

decision on which ejection mode is suitable depending upon the weight of the pilot, the speed of the aircraft, and the altitude. For example, suppose a a pilot is flying at 45,000 ft. Upon ejection, the seat will separate and the pilot free falls. A small drogue chute will deploy to stabilize the pilot so that he is not subjected to violent tumbling. The main parachute will not open until a reasonable altitude, say 15,000 feet is reached reducing the chance of hypoxia or frostbite. At some point, the survival gear is released and suspended by a line. If the landing is on water, a raft will automatically inflate on touchdown. If on land, the kit lands first, reducing the weight on the parachute and slows the landing.



A Modern Seat Tested in an "Antique" Aircraft.

A recent article in *Aviation Week and Space Technology* relates that Martin-Baker, one of the big three manufacturers of ejections seats (the other two are United Technologies and Russia's Zvezda) uses two modified versions of the Gloster Meteor jet for its testing program. The Meteor was the only Allied jet used in World War II, mostly to destroy the V-1 pulse jet cruise missiles. The design is 70 years old and the same type of aircraft which the company used in its original tests tests for jet propelled aircraft.



Two Meteor T.7/F.8 Hybrids used by Martin-Baker as test aircrafts, G-JM/WA638 & WL419. The Meteors are not stock. The forward section is a Meteor T Mk.7 but has an F.Mk.8 aft fuselage and tail to improves directional control.

However, Andy Gent, Martin-Baker's chief pilot notes that the Meteor is almost ideal for the testing. The long tail boom and low fin are unlikely to interfere with a test and the two engines, widely spaced on the wings are unlikely to inject gases from the rockets which launch the seats. Martin-Baker has employed the same two Meteors for the last 40 years or so. The company has also purchased a large supply of spare parts and airframes. Since the adoption of a new type to replace a proven and adequate design would be an unnecessary expense, no replacement types are foreseeable.

A company mechanic, Benny Lynch volunteered for the first live test in 1946 and subjected himself to 16 more ejections before leaving the test program. Today, the tests are focused on an improved seat for the F-16 and F-35 aircraft.



Benny Lynch Pioneered the Way

AEROSPACE HISTORY

A Short History of Ejection Seats

Escaping from an aircraft *in extremis* started when the survivors crawled out of the wreckage of their crashed planes. Parachutes have a history dating back to the Renaissance but their first widespread usage for escape from an aircraft appeared in World War I. The crew in German observation balloons would bail out when attacked by Allied aircraft. Soon Germany supplied parachutes to the crews of their scouts and fighter planes. The Allies eschewed parachutes. The technology was not fully developed and the “ground grippers” felt that

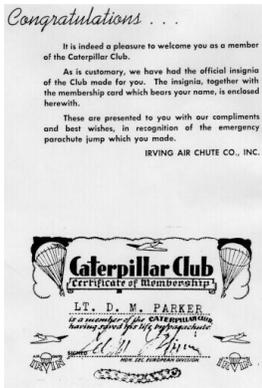
would not only be bad for aircrew morale but the it would encourage pilots to abandon aircraft that might be saved to fly again! Allied airmen either rode the airplane down or in some cases, if on fire, leaped to their deaths. This was the fate of Maj. Raoul Lufberry who once resided in Middletown, Connecticut.

Shortly after the war ended, Leslie Irvin and colleagues, working at McCook Field, Dayton, Ohio developed the first of the modern parachutes: packed in a soft bag and equipped with a ripcord and drogue. That same year, 1919, Irvin formed his “Air Chute Company” and started a company which to this day, produces a range of parachutes for skydivers, paratroopers, special forces, and cargo delivery.

A year after the founding of the company, William O'Connor is reputed to make the first emergency bail-out. Lt. Harold Harris, a McCook Field pilot parachuted from his uncontrollable Loening W-2A in 1922. Shortly after Harris's jump, an informal club was formed whose membership required the emergency use of the parachutes lifesaving silk canopy and shroud lines.



Today, manufacturers of parachutes such as Irvin and Switlik award certificates and the “caterpillar badge” to those airmen who have “jumped.” The record holder for the most bail-outs is Charles Lindbergh who was forced to abandon his aircraft on four different occasions.



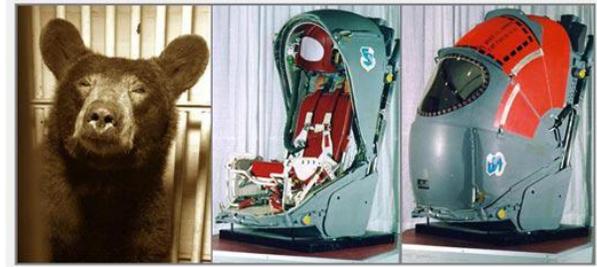
World War II brought the use of faster aircraft. Climbing out over the cockpit coaming an jumping off the wing could mean being struck by the tail. Many pilots, if they could, would roll the plane inverted, disconnect their harness, and just drop out. However, Germany and Sweden investigated the use of compressed air to eject the pilot from the aircraft. In 1940, the Germans fitted an ejection seat to a Heinkel He 280 jet. Helmut Scheme was the first to use this system in 1942 after his control surfaces iced up.

Sweden tested a compressed air system in 1941. In 1944, the Swedes utilized a gunpowder charge to blast the ejection seat clear of a Saab 21. The system saved it first life when Lt. Bengt Johansson ejected after a mid-air collision.

The British then took the lead when they introduced the jet-propelled Gloster Meteor into the Royal Air Force. The early Meteors had no ejection seat and the pilots commented on the difficulties and dangers when abandoning a Meteor. A high casualty rate substantiated their arguments. So the Martin-Baker Company developed a seat powered by a solid propellant charge. The use of solid propellants became standard but they were limited in that the human body could not withstand the accelerations needed to escape from the faster generation of jet aircraft. Experiments using rocket propulsion commenced. In 1958, a Convair F-102 Delta Dagger was the first aircraft fitted with a rocket-propelled seat.

Stanley Aviation, Inc. developed two novel systems for escape. The Stanley Supersonic Capsule was originally developed for the Convair

B-58 Hustler. The crew sat in seats which could be encapsulated yet still fly the aircraft. If needed, the capsule could be ejected, protecting the occupant from the supersonic air blast and then deploying a parachute for a safe landing. The General Dynamics F-111 was also equipped with capsule ejection seats.



The Bruin and the Pod

Capsule testing used bears as experimental subjects. The bears mimicked the conformation and weight of a human and provided reasonable data as to the efficacy of the capsule system. On March 21, 1960, an encapsulated bear named Yogi was ejected at 35,000 feet and an airspeed of 879 miles per hour. Yogi survived the eight minute decent. The feat was celebrated in a poem by A. J. Noon part of which is reproduced below:

*An eruption of fire and sparks filled the cockpit,
Our Yogi was jerked straight out,
The plane, from above, she had to admit,
Was quite pretty below her snout.*

*Rocket motors fired and her chair climbed
higher,
Then the slipstream caught her hard,
Our supersonic bear, not a natural flier,
Was about to be mentally scarred.*

*With another loud bang a drogue chute went out,
Trying to inflate in the wind,
And Yogi prayed for salmon or trout,
She wouldn't even mind it tinned.*

*Her number was up, or so she believed,
But she had no sins to repent,
So she lay there waiting, quite rightly aggrieved,
At mans' mysterious intent.*

Luckily for Yogi, the drogue chute found air,

*It pulled out the main chute as well,
She suddenly became a floating bear,
Drifting down in a composite shell.*

The second novel system designed by Stanley was installed in the Douglas A-1 Skyraider. It was an “extraction system,” not an ejection system. A rocket was attached to a tether which was attached to the pilot's seat. When activated the rocket fired and towed the pilot and seat out of the aircraft, automatically deploying a parachute at rocket burn-out. The first human extraction was made in 1966 by Harry Schmoll, a parachutist at the Naval Aerospace Recovery Facility, El Centro, California.



The 1966 test of Stanley's Yankee Extraction System. The aircraft is a T-6G Texan which is still registered in Illinois!

Perhaps the most unusual device was Kaman's SAVER (Stowable Aircrew Vehicle Escape Rotoseat), a gyrocopter developed to assist airmen to avoid capture. Essentially, after ejection, the seat deploys a set of non-powered rotors and control surfaces and activates a gas powered engine mounted behind the seat. The forward speed of the seat spun the rotors, providing lift, and allowing the pilot to fly, hopefully, to a friendly area.



SAVER (Credit: Popular Mechanics Magazine)

Not all ejections seats fire up. The B-52G has upward ejection seats for the pilots, electronic warfare officer, and gunner. The two navigators are ejected downward. If a sixth crewman was aboard, such as a training officer, he had to make his own way out! This creates a serious hazard in the case of a low altitude bail-out.

The original F-104 Starfighters were equipped with this system which led to the deaths of 22 Air Force pilots including Capt Iven C. Kincheloe, Jr. Kincheloe earned ace status in Korea, was the first pilot to reach 100,000 feet, flying the Bell X-2 and was selected to fly the North American X-15. In 1958, his engine quit on climb-out but he was too low for a downward ejection so he attempted to roll the aircraft inverted. He almost succeeded but had lost too much altitude so his parachute had no time to unfurl and he was killed.

The test shuttle Enterprise and Columbia were equipped with pilot ejection seats but the crew in the lower deck would not have had this option. At any rate, most of the launch and return segments of a flight were unsurvivable if an astronaut abandoned ship so ejection seats were not a viable option and none, except the original test articles flown by two man crews, were so equipped.

The Royal Air Force had a more cavalier attitude. In the 1950s, their strategic bomber force consisted of three different types: the Vickers Valiant, the Handley Page Victor, and the Avro Vulcan. They were known as the “V bombers, a reference to the initial letter of their names and an allusion to “V for victory.” Originally designed as high altitude bombers, only the pilots were fitted with ejection seats to allow them to clear the high tail.

The other three crew members, navigators and bomb aimers, opened hatches and dropped out the bottom. The danger of anti-aircraft missiles forced a change in tactics. The “V bombers” switched to attacks at very low altitudes. As the British say, the non-pilot crew faced a “bit of a sticky wicket.” Questions were raised in both the House of Lords and the House of Commons.

In June of 1964 the Earl of Kinnoull questioned Her Majesty's Government and asked if they

would reconsider the decision which provided ejections seats for the pilots only. The response involved five peers and filled 17 pages of the transcript.

The issue was a *cause célèbre* and no satisfactory solution was ever developed. A spring loaded non-ejection seat which reversed position and put the crew member in a better position to escape was manufactured. However, cost, technical considerations, the need to keep the aircraft operational, and their limited operational life all contributed to the decision to not install ejection seats for other than the pilots.

The pilots were placed in the nightmarish position of having to make a moral live or die decision in split seconds. To their credit, a number of pilots rode the aircraft down, trying to give the navigators and bomb aimers a chance to escape.

A cost benefit analysis indicates that the ejection seat is a good investment in aviation safety. However, it is a game of chance which any pilot is willing to play. Over 6,000 airmen have survived but the list of failures and crippling injuries give witness that it is a dangerous way to save your life.

NOTEWORTHY EJECTIONS

First Survivable Supersonic Ejection

On February 26th, 1955, just over 60 years ago, a North American Aviation test pilot, George Smith, became the first man to survive a supersonic ejection.



Smith was doing a production test flight on an F-100A prior to its delivery to the Air Force. At 37,000 feet, the aircraft has a hydraulic system

failure and the nose tucked down. Smith could not get control of the aircraft and the speed increased to Mach 1.05 and Smith decided to depart company with his Super Sabre.

Upon ejection, he was subject to a dynamic pressure of about 1,200 pounds per square inch and drag forces of around 40g. He suffered major internal injuries. When the parachute opened, a third of it was ripped away.

Smith was rendered unconscious but mercifully landed in the water about 200 feet from a fishing vessel whose skipper was a former navy rescue expert.

Transferred to a hospital, Smith spent six days in a coma and the underwent a series of surgical procedures to patch up his battered body. His recovery took seven months. The major permanent damage was to his liver. He could no longer drink alcohol, a fate unwelcome for any fighter pilot. He resumed flying and was medically cleared to fly jets and lived for 39 more years.

Underwater Ejections

U.S. carrier pilots and Indian Navy pilots have survived underwater ejections. External Water pressure prevents opening the canopy until the cockpit fills entirely. But by that time, the aircraft has sunk so deep that survival is impossible. The solution is to pull the ejection handles. The seated pilot is shot through the canopy and the drag of the water brings him to a fairly quick stop. The main problem is to separate oneself from the seat an avoid getting tangled in the parachute lines.

One can presume that it would be fairly easy to develop downward escape systems for helicopters. Alas, the chance of surviving a downward ejection at the low altitudes in which helicopters operate is nil.

Upward ejection seats have been fitted into some helicopters. Russia's Kamov 50's ejection system uses explosive bolts to blow the rotor blades off and jettison the canopy. A Zvezda K-37 seat then carries the crew upward and away from the helicopter.

*CTWG's Own Caterpillar Club Member
SM James Skiff*

SM Jim Skiff, Royal Charter Squadron relates that he was flying an F-100D with the 55th Tactical Fighter Squadron, Wethersfield, England. Skiff was engaged in a practice bombing over the North Sea running parallel to the shore at 200-300 feet and 0.8 Mach. The weather was 1500 overcast with tops at around 6,000 ft.



Super Sabres of the 55th TFW (USAF Photo)

Three miles from the target, Jim heard a loud bang accompanied by an engine flame out and fire light warning. He pulled up and exchanged airspeed for altitude while turning inland. The fire light went out but an engine restart failed.

The minimum safe bailout altitude for the F-100 is 2000 feet at an airspeed of around 220 knots. He initiated a slight upward climb, reducing speed the around 175 knots. The upward climb was important "...because with positive rate of climb at ejection initiation should be in the chute above that altitude as apposed to descent which will provide full chute at altitude below initiation."

As I left cockpit I had the sensation that I was tumbling backward, concerned about tail strike and do not recall seat separation since I was probably leaning forward. The shock of the parachute opening was minimal since I had ejected at minimum speed. On recall, nothing was unfamiliar to which I attribute to good ejection egress training by very competent NCOs.

The ejection sequence was "as advertised" and he

dropped out of the clouds almost immediately and about a half mile inland.

It was good luck to end up on dry land since it was in December and I may not have survived long in the North Sea. I had worn no exposure suit since one was required on outside gliding distance from land. The North Sea claimed the Super Sabre.

Upon landing in a field, I was met by some locals who took me to the nearby village where I was picked up by a British Helicopter from the nearby base, RAF Conningsby. From there, a US helicopter transported me to RAF Lakenheath for a quick physical and swift return to RAF Weathersfield. It was pretty much an all-day operation and I got to the home drome just in time for happy hour.

Jim expressed his gratitude to the chute rigger and egress maintenance personnel, rewarding them with bottles of their favorite adult beverages.

Bad Days in the Ejection Seat

Not all ejections are normal as was Jim Skiff's. In 1991, Lt. Keith Gallagher was serving on board the USS Abraham Lincoln as the bombardier-navigator in an KA-6D. During a negative g maneuver, a faulty ejection seat fired and he ended up with his head upper torso in the airstream, his lower body still in the aircraft, and his parachute deployed and fouled on the tail. His pilot, Lt. Mark Baden, flew back to the carrier and landed. Gallagher suffered severe but non-permanent injuries and after a convalescence, resumed flying duties.



The Intruder trapping. Note Gallagher's body protruding from the canopy and the parachute wrapped around the empennage.

The accident investigation revealed that the seat failed to operate as designed due to a faulty part

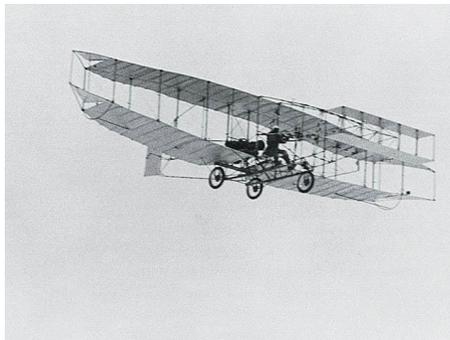
which had been weakened over time by repeated negative g maneuvers. The safety investigators then found a half dozen similar incidents, some of which had resulted in fatalities. All seats were inspected and the understrength part replaced.

AEROSPACE CHRONOLOGY

22 FEB, 1987-First flight of Airbus A320 introducing fly-by-wire control to the commercial market.



23 FEB, 1909 -The Silver Dart is the first airplane to fly in Canada.

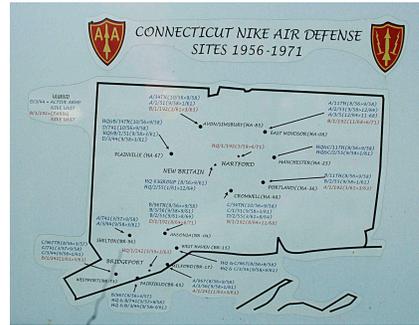


24 FEB, 1939-Pan American Airlines accepts the first Boeing 314 Clipper.



Clipper Moored in San Francisco

25 FEB, 1956-The first launch of the prototype Nike-1 SAM is made at White Sands Missile Range.



Nike-Ajax at Camp Niantic memorializing the CTNGs 1st Battalion, 242 Artillery and the 1st Battalion, 192nd Artillery. The plaque shows the Connecticut sites of Nike missile batteries during the Cold War.



26 FEB, 1946-The Eighth Air Force ends its World War II operations in England.



Over 26,000 combat dead and 17 Medals of Honor

27 FEB, 1969-Colin Campbell Mitchell, developer of the steam catapult, is reported as having gone west.

28 FEB. 1925 -Testing the earth inductor compass, Lt. H.P. Whitten and Navigator Bradley Jones fly from Dayton, Ohio to Boston, Mass. using only navigation instruments.