

# WINTERMAIL

EAA CHAPTER 25

MINNEAPOLIS / ST PAUL, MN

FEBRUARY 2015

## *We Will Eject at 10,000 ft. if Still Inverted*

*By Lou Martin*



*F-100's in flight*

In October 1961, I was a 33 year-old Air Force captain and assigned to the 416th Tactical Fighter Squadron at Misawa Air Base in Northern Japan. They were flying the North American F-100D Super Sabre and I was thrilled to finally be assigned to an active jet fighter squadron.

Misawa Air Base was established by the Imperial Japanese Army in 1935, and in 1942 the Japanese *(Continued on p. 4)*

## *Hidden Hinges*

*By Patrick Hoyt*

One option for my current project is the use of "Hidden Hinges" for the flaps and ailerons. These consist of several small sections of steel tube, with each piece having a bolt welded to it. The flap and aileron spars are captured within these sections of tube, while remaining free to rotate, and the bolt runs through a hardwood

*#1  
Jigging  
in Drill  
Press  
for  
Tack  
Welding*

*(Continued on page 6)*



**Craig's "Flight Lines"  
Feb Meeting/Jan Minutes**

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**Final Approach Trivia Quiz  
For Sale/Wanted**

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# Flight Lines



—from Craig Nelson,  
EAA Chapter 25 President

February's winter is upon us as I gaze out the window in front of my desk to see a gray sky filled with sleet and snow. With that said, I have definitely noticed a longer day and stronger sun of late which sends hints of encouragement for the summer flying season that is approaching. I fly the Kitfox in winter but it is drafty and

frosty inside. Aircraft performance and the smooth air are great, but I'll swap that for warmer, more comfortable flying weather.

Our visit last month to the Minneapolis Community and Technical College's Air Traffic Control Training Center was very enjoyable and informative. Program Coordinator Trena Mathis, the instructors and students were wonderful hosts as they explained their program and let us sit with them at their consoles while they completed a training script. We got a firsthand view of what ATC procedures are and how they are taught. I would like to thank the ATC Training Program Team for hosting our visit and to Peter Denny who set up the tour.

The Chapter 25 Board met on January 6 to do some strategic thinking on how to improve the experience for our members and grow the chapter. There was excellent discussion and good input. One outcome of this discussion is the recognition that we are a "builders" chapter... we have a solid history of members building and then flying their airplanes. To help celebrate this history we will be pursuing two activities. First, we want to create a "Homebuilders Wall" at the BSAEC which will contain pictures of aircraft that have been built by chapter members. John Koser has been developing a list of these homebuilders and will expand his effort to create this display. If you have completed and flown an aircraft, please send a picture of it (with you) to John for use on the display.

The second activity is to expand our June picnic into a "Family Day" event where chapter members fly in their airplanes with a particular focus on the homebuilders bringing their planes. Mary Hoyt has volunteered to coordinate this event. Stay tuned for more information as the plans are developed.

I am pleased to announce that we have finalized our college scholarship commitments for 2015. We will be partnering with The Dahlberg Foundation and Aircraft & Marine Insurance Agency to provide the following aviation related scholarships:

\$1250 to UND (matched by the Dahlberg Foundation)

\$1000 to Mankato State (matched by Aircraft-Marine *(Continued on page 7)*)

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# ON FINAL



Minneapolis/St. Paul

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# ***This Month: Wed Evening Feb 18th—BSAEC at Airlake***

**Grill on at 6:00 pm, Meeting at 7:00 pm**

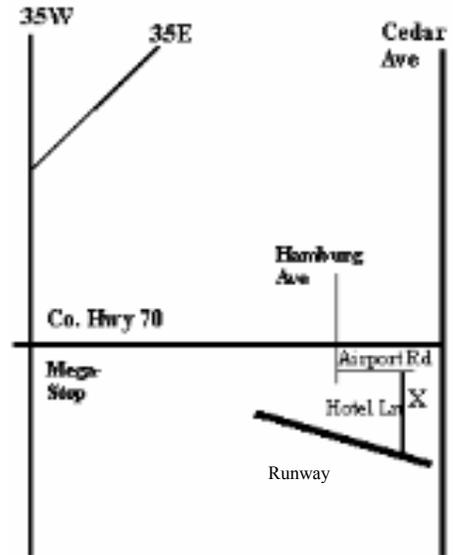
Please bring something to share: pre-cooked brats, hot dogs, hamburgers, condiments, deli salads, beans, chili, chips, cookies, plastic utensils, paper plates, cups and napkins, soft drinks and water. We also need a couple volunteers to cook!

**Program:** Chapter member Brian Huberty, who is with U.S. Fish & Wildlife Service, will give a presentation titled “Unmanned Flying Objects - Drones, Birds, Bats and Maybe a Few Aliens”.

**Saturday, Feb 21: Young Eagles** Contact Kris Olson if you can volunteer, pilots and ground crew needed: 651-675-6826, ksimpson2@yahoo.com

**May 30-31: Discover Aviation Days, Anoka Airport**

**Directions to BSAEC (Chapter Hangar at Airlake):** South on I-35 to Hwy 70 (Megastop), then East to Hamburg Ave (3rd stop sign.) Right turn and South to airport perimeter road. Left on airport perimeter road then right on Hotel or India Lane. If the surface is firm, please park on space between hangars.



## ***EAA Chapter 25***

### ***Meeting Minutes for January 21, 2015***

***Presiding Officer, Craig Nelson, President***

### ***BSAEC at Airlake Airport, Minnesota***

The meeting was called to order by President Craig Nelson at 6:30 pm at the Air Traffic Control Training Center at the Minneapolis Community Technical College.

Ch. 25 Annual Membership Renewals – Chapter 25 members must renew their membership on January 1 each year. A membership packet containing the 2015 Membership Form and a return envelope was mailed to members of record on December 31, 2014. To date, only 45 of 132 members of record have returned their forms. So members that have not returned their form are encouraged to do so as soon as they can.

Calendars – EAA 2015 picture calendars are available for \$10.

June Chapter Meeting Fly-in – Mary Pennington-Hoyt has volunteered to organize a Ch. 25 fly-in picnic for our Chapter meeting on June 17, 2015. Please put this on your calendars. Mary organizes fun social events.

The faculty and students of the ATC Training Center presented us with a demonstration of their training for the evening topic. The ATC Training Center moved from Flying Cloud Airport to wonderful facilities at the MCTC in June, 2014. The faculty consists of Trina Mathes, Training Coordinator, Doug Soderberg, Dave Kangas and Paul Duschene. All have extensive experience as air traffic controllers and instructors. Fifteen students are enrolled in the 2 year program which covers both an en-route and local airport tower syllabus. They have class all day Monday and Wednesdays and ½ day on Friday. Tuition is \$14,000 for two years of training. Graduating students hope to get hired to go to the FAA’s Oklahoma City Air Traffic Control Training Center for 3 – 5 more years of training before placement.

ment. The school had an 85% placement rate.

Trina explained to us that, unfortunately, this will be the last year of the Training Center program. FAA announced in January, 2014 that graduating students would no longer receive favorable treatment; therefore the program is closing at the MCTC. Trina encouraged all Ch. 25 members to write their Federal legislators to support H.R. 5675, the Safe Towers Act.

The students then gave Ch. 25 members a simulated demonstration of airspace control, helpfully explaining what all the graphics on their scopes meant, their thought processes and the steps they needed to take to maintain aircraft separation. They demonstrated extreme professionalism and efficient radio communication. Some students served as pseudo pilots to simulate a realistic day in the life of an air traffic controller. The evening’s presentation went well beyond expectations.

After the presentation, a number of Chapter members who live south of the river met at Doolittle’s Woodfire Grill for food and socialization.

Respectfully submitted,

Kim V. Johnson, Secretary and Membership Coordinator

## ***Final Approach Trivia Quiz***

***By John Schmidt***

An aircraft mechanic looks at your Cessna 172, and informs you that he'd like to perform 'eddy-current testing.' What is 'eddy-current testing'?

***Answer on page 6***

# Eject at 10,000 ft.

(From Page 1)

Navy assumed control to study the feasibility of using it for long-range bombing raids on the U.S. mainland, however this objective was never achieved. Near the end of the war, the base was used for training kamikaze pilots. In July 1945, B-29 bombers destroyed 90% of the base infrastructure, rendering it inactive. After the war, the U.S. took control and it became the home base for the 49th Fighter Group flying F-51s, F-80s, F-84s and F-86s. It was an active support base during the Korean War with F-100s arriving in 1959. When I arrived it housed two squadrons of F-100Ds, a squadron of F-102s, a squadron of RF-101s, a Japanese Air Self Defense Force flying F-86Fs and support aircraft flying T-33s and C-47s.

The F-100 first flew on January 24, 1956 and delivered to operational squadrons that same year. The last F-100D was produced in August 1959 after a production run of 1,274. The initial cost for each aircraft was \$664,000, (\$5,269,841 in today's dollars). The aircraft experienced several major deficiencies that were not easily corrected. There were problems with the electrical system, autopilot integration with the Low Altitude Bombing System (LABS), afterburner fuel system, occasional inadvertent bomb releases and in-flight refueling probes, to name a few. There were so many field modifications that maintaining them in combat-ready status was a real problem. It was equipped with a P&W J-57 turbojet engine of 16,000 pounds thrust (with afterburner), a wingspan of 38 feet 9 inches, a maximum speed of 770 mph at sea level and 864 mph (Mach 1.3) at 36,000 feet. Its initial climb rate (clean) was 19,000 feet per minute, a service ceiling of 36,100 feet and absolute ceiling of 50,000. It had a normal range of 534 miles, but up to 2,000 miles with external fuel tanks. Its empty weight was 21,000 pounds, with a maximum takeoff weight of 35,000 or higher. Our F-100Ds were equipped with four internal 20-mm cannons and wing mounts for the Sidewinder air-to-air infrared missile and tactical nuclear weapons.

As I became more familiar with the F-100, I was fascinated in the marvels of its construction and diligently studied the pilot and maintenance manuals. The pilots assigned to fly this prestigious fighting machine knew they were on the cutting edge of our defense posture and were a proud lot, and it was an honor to be assigned to their unit. They openly accepted me as one of their own that fulfilled my dream of becoming a member of a front-line jet fighter squadron. In December 1961, the squadron commander told me that he had arranged for me to go to Itazuke Air Base for F-100 ground school and when there obtain as much time in the simulator as I could. The ground school course was designed primarily

for mechanics and presented more detail than normally offered to pilots. However since I was an Aircraft Maintenance Officer, I had no problem in absorbing the material presented and thought it would advance my capability of ensuring the aircraft in my charge were properly maintained. The simulator was fantastic and approached the utility of a full flight simulator, even though it did not provide a visual scene or motion. However, all the



*Similar to my appearance when checking out in the F-100F in 1962. Lou Martin Lt.Col. USAF (ret)*

instruments were operative and it had a built-in sound effect system that, when the canopy was closed, created the feeling that you were flying a real aircraft. Another benefit was that the F-100 pilots from Itazuke were not too fond of flying it so I had it almost to myself. I was able to secure a F-100 flight instructor to look over my shoulder during my first few simulator periods, but he soon lost interest and left stating, "Hell, Lou, you're doing great and won't have any problem in flying the airplane, so I'll just leave you alone to enjoy yourself." I would spend two to three hours each day, after ground school, flying the simulator and was welcomed by the civilian technician hired to maintain it. I think he enjoyed my interest in his excellent training device and it gave him a break from reading magazines. I not only flew all the maneuvers that I would be exposed to when flying the actual aircraft but also memorized all the normal and emergency procedures.

My first flight in the F-100 was with my squadron commander, Major Noland, that included a detailed flight briefing and procedures for ejecting from the aircraft. (As PIC, he would announce, "Eject," and after he blew the canopy, I was to eject immediately and not hesitate, as he would follow seconds later.) He also requested I recite, from memory, the "Bold Face" Emergency Procedures. We then proceeded to the aircraft on a cold day in January 1962. Major Nolan said that he was impressed by my knowledge of the aircraft and could see that I did not waste time in Itazuke. I performed an Aircraft Preflight Inspection under the watchful eye of my instructor and climbed the ladder to the front cockpit. The cockpit was more spacious than the T-33, which I had been flying and considerably higher up off the ground. My heart was racing with euphoric excitement as I looked down at the maintenance men gathered around on the ramp with the sole purpose of

*(Continued on page 5)*

# ***Eject at 10,000 ft.***

*(From Page 4)*

assisting me during my first flight in an F-100. The engine start was straightforward and the J-57 engine was soon emitting a tuned hum as it stabilized at 55 percent RPM. After the crew chief performed his check of the hydraulic system, I closed the canopy and called for taxi and takeoff instructions from the control tower. I advanced the throttle to get the aircraft moving and engaged the nose wheel steering by depressing a small button on the control stick.

Sitting in the number one position for takeoff, I went through the Before Takeoff Check including the canopy locked and freedom of movement of the controls. When cleared for takeoff I taxied into position held the brakes, ran the power up to 100% RPM, checked the engine instruments for proper readings and with the nose wheel steering button depressed, released the brakes. As soon as the aircraft started rolling, I moved the throttle lever into the afterburner position and felt and heard a “kick-in-the-ass” as we accelerated rapidly down the runway. (Up to this point, everything was similar to my 30 hours of flying the fixed-base simulator, but nothing could duplicate the thrill and excitement I felt in shooting down the runway at breakneck speed.) I knew I was supposed to monitor the instruments during the takeoff roll, but in what seemed like seconds the airspeed was approaching 140 knots. I pulled back on the control stick, to raise the nose to about ten degrees pitch and let the beast fly off the runway. With my mind racing to equal the speed of the aircraft I heard a voice coming from the rear cockpit cautioning me to raise the landing gear before exceeding 220 knots, which we were fast approaching. When the gear and flaps retracted, I discontinued the use of the afterburner, and the jet quickly accelerated to the climb airspeed of 350 kts. With the vertical speed indicator pegged at the top of the gage, we busted through some snow showers, broke out on top at around 10,000 feet, and were heading for clear blue sky in about a 45-degree climb angle. (What a machine! There is no way a pilot could have more fun than this with his clothes on!)

I leveled off at 25,000 feet and was just beginning to feel out the aircraft, in gentle turns, when we received a call from the supervisor of flying to return to Misawa due to snow showers approaching from the west. I kicked out the speed brakes, reported over the airport at 10,000 feet and flew a simulated engine out approach (SFO). I held around 300 knots airspeed during the descending 360-degree circle and since we were still quite heavy, I slowed to about 220 knots on the base leg and 190 knots on final approach. My touchdown was a little long, but with the drag chute deployed and a 10,000-foot runway, stopping was not a problem. Major Nolan was pleased with my performance, but I did not want

to tell him that my mind was still on the takeoff roll and just mentally into the climb phase when I shutdown the engine at the end of the flight. I could see that I required more mental fine-tuning before my next flight. My next flight was in the back seat with a Major Dave Gosser. He was a few years my senior, conveyed a very pleasing disposition and gave me the impression of the type of individual I would like to have as a big brother. After checking the aircraft over, we settled down in our respective cockpits and after a normal engine start taxied out for takeoff. Dave asked me if I would like to make the takeoff from the rear seat, but I told him I would prefer to sit back and watch an expert “Hun Driver” make the takeoff without the pressure of trying to be mentally ahead of the aircraft. With a chuckle, he said he understood. Observing the rapid unfolding events from the rear cockpit was extremely helpful and I was confident that my next flight from the front seat would be less stressful and my brain would be able to match the rapid acceleration from an unleashed Super Sabre in afterburner. Once airborne, Dave turned over control of the jet to me and a couple minutes later, we leveled off at 35,000 feet. We checked the operation of the afterburner, which took a lot longer to ignite than at sea level. He then lowered the nose and we went supersonic. I was amazed that when exceeding the speed of sound there was no noticeable indication other than a higher indicated airspeed on the Mach meter. The purpose of the flight was a functional check of all components. The aircraft flew great and we did not note any squawks, but Dave said that there was one more system he wanted to check before heading back to Misawa --- the autopilot performing a Low Altitude Bombing System (LABS) Maneuver.

The LABS maneuver is a computerized system designed for delivering a nuclear bomb, from low altitude which allows the pilot to escape the area before the explosion. Prior to flight the pilot inserts settings in an onboard computer and when approaching the target descends to 500 feet while zooming in at 500 knots. When crossing a predetermined Initial Point (IP), he starts a stopwatch count down while flying a precise heading. When the inserted run-in time expires, he engages the afterburner and starts a 4 G pull-up into an Immelmann. (A cockpit instrument should then be utilized to guide him through the maneuver.) Keeping the horizontal needle centered would indicate a constant 4 G pull; keeping the vertical needle centered would indicate he was maintaining the proper course. With the aircraft going straight up, the bomb will release automatically and continue zooming upwards before falling back to earth and detonating. (A bomb release light will illuminate when the bomb has left his aircraft). The pilot completes the 180-degree Immelmann by rolling wings level at 10,000 feet and, when still in afterburner, dives toward the ground, accelerates to supersonic speed and races along the ground at tree top-level to escape the nuclear bomb blast.. The autopilot was integrated to *(Continued on page 6)*

# Hidden Hinges

*(Continued from page 1)*

block to secure the structure to the wing.

To make these hidden hinges, a piece of 4130 steel tubing of the dimensions specified in the plans is selected. Measurements are made where this tube will later be sliced, and corresponding lines are scribed around the tube using a common hand-held pipe cutter. These lines define how wide the individual hinges will be.

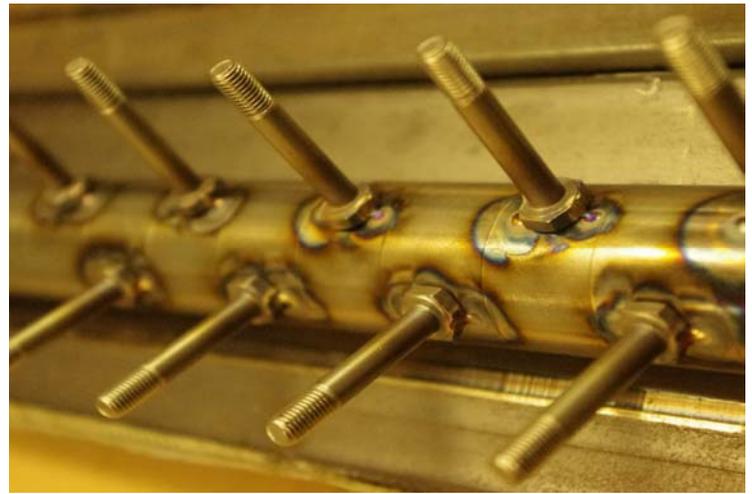
A drill press is used as a jig to hold everything in place for tack welding (Photo 1 on cover). The tube is placed in a V-block, and a Stainless Steel AN4 bolt is lightly chucked in the drill press. When centered, the drill press holds the bolt exactly perpendicular to the tube. After tack welding the first bolt, the tube is rotated and slid into position for the next bolt. In this manner, the most space possible is saved to make welding easier. This process is repeated until a total of 9 bolts have been tack welded to the tube (Photo 2).

During finish welding, I put another tube inside this tube to minimize heat distortion and the chance of burn-through close to the edge. After finish welding, a band saw was used to slice the tube along the previously scribed lines.

Each piece is deburred, and polished on the inside (Photo 3). A good way to do that is by wrapping coarse emery cloth around your thumb, and rotating the hinge back and forth to smooth out any rough areas on the inside. This was followed by polishing the inside of each hinge with a piece of scotchbrite spun with an electric drill. After polishing, the sets of hinges were test fit on the wings using an aluminum tube that will later become the flap and aileron spars (Photo 4).

A total of 9 hidden hinges were fabricated, with 8 being needed for the airplane. One hinge was selected at random for destructive testing. This hinge was clamped in a vise, and the bolt was pounded with a big hammer. The bolt bent, but neither the bolt nor the weld broke (Photo 5). The amount of force needed to deform the metal was considerable, proving that this style of hinge is very strong.

Patrick Hoyt



**#2, Above: Bolts Tack Welded**



**#3, Right: Cut and Polishing the Inside**



**#4, Right: Rough Test Fit on Wing**

**#5, Below: Tested One to Destruction**



## **Answer to Final Approach Quiz (See page 3)**

“Eddy current” is a nondestructive testing method that uses electricity and magnetism or electromagnetic induction to create a magnetic field in the article under inspection. It can be used to test for small cracks, does not require liquids, and can detect surface and near-surface defects. In aviation, it can and is used for spar inspection in wings, corrosion in aluminum skins, bolt hole inspection, or weld inspection, for example.

[http://en.wikipedia.org/wiki/Eddy-current\\_testing](http://en.wikipedia.org/wiki/Eddy-current_testing)



## Stuff for Sale/Wanted

For Sale: 2001 American Champion 7GCBC. IFR with Garmin 430 stack and 496 cross feed. Fully equipped, one owner airplane with 560 hours TT and no damage history and in excellent condition. 160 HP Lycoming O320. Call Jon Cumpston at 612-859-1483.

### Airlake Hangar Space Available Chapter 25

- O Aircraft owner will need to join Chapter 25
  - O A hangar donation of \$125/mo is customary and appreciated
  - O Preference is given to homebuilts in the final stages of construction
- For more information, contact chapter officer (see page 2)

## Flight Lines (From page 2)

Insurance Agency)  
\$500 to UND (matched Aircraft-Marine Insurance Agency)

Our sound financial status allows us to offer these scholarships to college students that are pursuing aviation related careers. We will report back once the scholarships have been awarded with information on the recipients.

Our February meeting will be back in the BSAEC. Chapter member Brian Huberty, who is with U.S. Fish & Wildlife Service, will give a presentation titled "Unmanned Flying Objects - Drones, Birds, Bats and Maybe a Few Aliens". Sounds like fun. In March we will explore the amazing capabilities of 3D printing with folks from Stratasys Inc. and chapter members Bob Styer and Jeff Coffey. Please bring a food item to share to our meetings. Also, help with food stocking and grilling is greatly appreciated.

Finally, our 2015 membership renewal process is drawing to a close. If you have not renewed yet, please return the renewal form that was sent to you along with your dues payment to Gordon Duke.

I look forward to seeing you on February 18 at the BSAEC.



**Next Chapter Meeting: Wed, Feb 18**  
**Next Young Eagles Event: Sat, Feb 21**  
contact Kris Olson (see p2) if you can volunteer

## Aircraft Insurance and Hangar Insurance



Contact: Kevin Gruys at 952-890-1124  
email: [gruys@aircraft-marine.com](mailto:gruys@aircraft-marine.com)  
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# Eject at 10,000 ft.

(Continued from page 5)

perform this maneuver automatically.

On Friday, January 26, 1962, I flew in the front seat of an F-100F with instructor pilot Captain Eugene C. Buttyan in the rear cockpit. After a detailed pre-mission briefing, in which he also complimented me on my knowledge of the aircraft and emergency procedures, we headed for our aircraft. Approaching the jet, I noted red streamers hanging from the gun ports and four practice bombs on the wing-mounted pylon rack. I mentioned to Gene that there must have been a mistake in the configuration of the aircraft, since initial training flights are not to be loaded with bombs or ammunition, and we didn't have a time slot for bombing and strafing runs on the Rip Saw Range!. Gene's response, "Hell, Lou, who wants to fly a fighter without loaded guns and bombs hanging from the wings?" When I told him that I had not flown a LABS maneuver or made strafing runs, he said, "Don't worry, Lou. I'll talk you through it from the back seat!"

I completed a supervised Preflight Inspection, followed by a normal engine start and taxi. My takeoff airspeed was 5 knots too high and pitch angle a couple degrees high, but according to Gene, I made corrections without a comment from him. We climbed to 30,000 feet where I performed standard rate turns to predetermined headings, steep turns, pitch and roll maneuvers, airspeed changes, speed brake exercises and throttle changes. When the 270-gallon drop tanks indicated empty, Gene had me perform maximum rate turns so, I could experience the tendency of the aircraft to "tuck under" (tendency to dive in banks). I then flew a series of lazy eights, chandelles, a clean stall and slow flight at 160 knots. The only thing remaining, according to Gene, before heading for the bombing range was to experience the F-100s "Adverse Yaw" characteristic (the tendency of the aircraft to turn in the opposite direction during steep banks, especially at low airspeeds. (Sometimes called a "Dutch Roll").

Gene had me deactivate the yaw damper by pulling the circuit breaker, slowing the aircraft, and gently moving the control stick from left to right. Apparently, I was to observe the aircraft's nose swinging in the opposite direction of bank, which would get worse as the airspeed decreased. However, apparently, I did not get the nose high enough, and had not deflected the stick far enough to produce the effect he wanted. He said, "I have control." He pulled the nose up and moved the stick back and forth almost full travel. The aircraft snapped-rolled and went into an inverted tailspin. While inverted, we were plunging like a rock with the world spinning around like a kids "toy top."

(To be continued next month!)

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