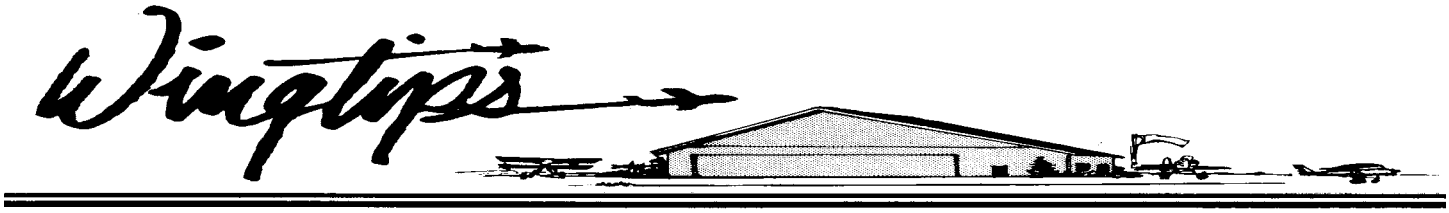
CHAPTER 55 EXPERIMENTAL AIRCRAFT ASSOCIATION

OCTOBER 2005



Meetings are the 2nd Saturday of each Month
Chapter 55 Hangar - Mason Jewett Field
Pres: Mike Arntz 694-4601 Vice Pres: Tom Botsford 663-1318 Treas: Gregg Cornell 351-1338
Sec: Drew Seguin 333-4531 Editor: Warren Miller 393-9385
Web Manager: Craig Tucker Web Address: www.eaa55.org

Climb and Maintain Flight Level 55

Fall is here, the days will be getting shorter, the tree's will be turning new shades of brilliant color -- what a wonderful time of year for flying. Also, it's time to start thinking about your chapter and the upcoming elections in December. This year the officer positions will expire. Two people are needed to step up to be our election committee whose job it is to contact potential candidates for the positions of:

President
Vice president
Secretary
Treasure

The positions will be two-year terms. We need people who want to see the chapter go forth and be strong -- people who are interested in the chapter and will put it first and foremost with their priorities.

Renee says nothing to report for young eagles this month.

Remember take a friend with you when you fly.

Mike Arntz
President

OCTOBER SCHEDULE
Board of Directors' Meeting
Wednesday, October 5, 2005
Chapter 55 Meeting
Saturday, October 8 2005
8 – 9 Breakfast / 9:30 Chapter Meeting

BREAKFAST W/CHAPTER 55

October Team	November Team
Pete Chestnut	Don Chubb
Frank Goeddeke	Mary Gowans
Dave Groh	Chuck Hacker
Debbie Groh	Sharon Hacker
Terry Lutz	Bill Purosky
Jim Palmer	Edward Manturuk
Bart Smith	Dave Paul
Ernie Lutz	James Smith
	Robert Veltman

EAA Board of Directors Meeting

Board of Directors Meeting – September 7, 2005

The meeting was called to order at 7:05 PM ✈ Attendees: Drew Seguin, Jack Toman, Gary Long, Doug Koons, Deanna McCallister, Bill Purosky, Richard Bacon ✈ Drew Seguin chaired the meeting as the president and vice president were not in attendance ✈ The Secretary's report was approved. ✈ Treasurer's report was held for later review as Gregg was not present. ✈ Mason Aviation Days summary was reviewed and discussed. No action was taken ✈ Doug Koons believes he has corrected the mold problem in the restroom by replacing a leaking bushing in the water heater. We're pulling for you Doug. ✈ Doug has also plugged nail holes in the roof in the ongoing effort to stop leaks. ✈ Drew is disappointed to hear his repair efforts on the restroom fan have proven ineffective. He vows to make another run at the hill. ✈ A motion was made and carried to make a gift to Connie Kowalk in recognition of her tireless support of the chapter, both for the MAD event and throughout the year. Thanks. ✈ We need volunteers for the Chapter 55 Christmas Extravaganza, to be held at Vevay Township Hall in December ✈ The meeting was adjourned at 8:14 PM.

EAA Chapter 55 Business Meeting

Membership Meeting – September 10, 2005

Meeting called to order at 9:35. Tom Botsford presided in the absence of Mike Arntz. ✈ There were 45 members and guests present. ✈ The Secretary's report was approved ✈ The Treasurer's report was approved as presented for Gregg Cornell by Doug Koons ✈ The Mason Aviation Day committee thanked a plethora of volunteers who made the event a great success. ✈ Thanks to Ralph Taggart and David Jones for contributions to the Chapter 55 Library. ✈ Al St. George gave a presentation on propellers ✈ The meeting was adjourned at 10:30

Tidbits

By Vicki e Vandenbelt

OCTOBER MOVIE NIGHT = MARK YOUR CALENDARS :
Saturday October 22nd. The evening starts in the Chapter meeting room at 7:00pm with a presentation of select training films (these promise to be very riveting!!) hosted by Joe Pirch; followed by the feature film "The Blue Max" to be presented at 8:00 pm. We plan to fire up the popcorn machine. Come one; come all (spouses welcome!!)

THE CHAPTER 55 CHRISTMAS PARTY:
Mark your calendars for Saturday December 10th. The evening starts at 6:00pm. We have a new location this year; Aurelius Township Hall; 1939 S. Aurelius Road; Mason, MI. The hall is just north of Barnes Road.

Current plans indicate that the cost will be in line with last year. Complete details outlining menu and costs should be available next month. You will need to make a reservation by submission of your payment in advance. Due date will be advised in next newsletter.

LET'S HAVE MORE CHAPTER DOINGS:
We hope to announce other events at the chapter throughout the upcoming months. Some may be impromptu with short notice and we will try to reach as many people as possible via email. If you don't have email – you might want to solicit the aid of a fellow member who does and ask that they give you a call if something comes up !!

Do you have any ideas for social doings?? Fly-outs, museum trips, movie nights, card party; or just cook-out or potlucks gatherings ??

SILENT AUCTION FOR TRADE-A-PLANE & EAA MEMBERSHIP:
Still time to consider making a bid for the three unclaimed pilot drawing prizes = (2) one-year subscriptions to Trade-A-Plane and (1) EAA Membership (new or renewal). The "silent auction" forms are on the table in the chapter meeting room. Just place your bid on the sheet; bid as many times as you want … or as many times as needed for the item you want. Bidding will close at end of the general meeting on October 8th, 2005. Trade-A-Plane will go to the two highest bidders & the EAA Membership will go to the highest bidder. Payment to EAA Chapter 55 will be expected prior to delivery of the certificates.

FREE STUFF:
There's still a box of now obsolete issues of Trade-A-Plane; catalogs from several aircraft suppliers; and AAA travel bags (which include Michigan maps, tour book, & camping guide) available at the hanger. Be sure to take a look on Saturday and help us get rid of them!!

Notes from Cape Juby

By Terry L. Lutz, Chapter 55 Flight Advisor

Last weekend, the Society of Experimental Test Pilots held its annual symposium, which also marked the 50th anniversary of the Society's founding. The list of 58 pilots who originally joined included such notables as Scott Crossfield, Neil Armstrong, and Tony LeVier. Among 25 still living, thirteen of the original members were in attendance, a group which included astronaut Neil Armstrong. The usually spry Scott Crossfield didn't make it because he was under the weather. Sadly, of the 58 original members, 7 perished in flight test accidents along their journey through time.

Also in attendance were 3 WW II fighter aces. Most notable was Bud Anderson, the triple ace who wrote the book "To Fly and To Fight". Don Adams was in the Pacific Theater and became an ace in the P-40 and P-51. His first kill was the result of ramming the wingtip of his P-40 through the wing of a Japanese Zero. He is currently Deputy Director of the National Air and Space Museum. Rear Admiral Edward Feightner began his career by flying a Stinson into the Naval Air Station at Grosse Isle and signing up to become a Naval aviator. He flew Wildcats and Hellcats, finishing with war with 9 kills.

The following is a summary of the highlights of the Symposium, which will conclude with a few notes from the living history provided by the founding members. I took so many notes that I ran out of paper and had to finish up on a pad with Mickey Mouse ears the top. So have a seat, strap in, and hang on!

Wedgetail Flight Test Program – Presented by Doug Benjamin, a Boeing test pilot and former USAF pilot who spent a long time in the "black world". The Wedgetail is an electronic sensor modification to the B737 for the Australian Air Force. It has a large pylon on top of the fuselage, just ahead of the vertical tail. Mounted on top of this pylon is what looks like a surfboard. There was a lot of speculation on how it would fly, and the engineers said it would "fly just like a B737". Well, almost. On the first takeoff, the control forces were much lighter than normal. The pitot tubes that provide pressure for the elevator feel system, mounted on each side of the vertical fin, were in the wake of the pylon. So they were relocated higher up and on the centerline of the fin, which solved the problem. At cruise, the cockpit noise was up to 96 db, due mainly to a sensor array located below the nose. The array had to be redesigned to a more aerodynamic shape. The Australians specified that the airplane be tested to civil certification rules, and Boeing had to do a loads profile on the vertical fin by going to V_D (which is faster that V_{MO}), and putting in full rudder deflection.

T-45 Stability Augmented Steering System – For those of you who aren't familiar with the T-45, it is a single engine jet trainer

used by the Navy. The T-45 is based on the British Hawk trainer. The Hawk originally had no nose gear steering. Instead, the pilot used differential braking to steer. But the Navy wanted to bring it aboard the carrier, and the close quarters maneuvering required that it have a powered nose gear steering system. In the 10 years since the T-45 has been operational, there have been 2 major incidents, and 1 accident per year involving the nose gear steering system. That's a lot of bent airplanes! They showed us some chilling video shot through the HUD, where the pilot makes a normal landing, and then loses directional control and literally goes from one side of the runway to the other, several times. The fix was to modify the nose gear steering electronics. To test the modifications, they came up with what is called a "ROCH" maneuver, or Runway Offset Captures and Hold maneuver. These were done with a 40 foot offset from the centerline, at the following intercept angles and speeds: 6 deg at 50 kts, 5 deg at 75 kts, and 4 deg at 100 kts. This is a good build-up technique, and one that could be used by homebuilders to assess the ground handling of their own airplane. The result is a vastly improved nose gear steering system, which should immediately begin to lower the accident rate.

Apache Ship Trials – The British have modified a US helicopter, the UH-64D for shipboard use. This report outlined various sea trials that they conducted aboard helicopter carrying ships with various superstructure configurations. Surprisingly, the helicopter did pretty well downwind of the built portion of the ship, but the pilots had a lot of problems with visibility. The first was from salt spray, which would build up very rapidly, and cut visibility in half (solved by a windshield washer system), and fogging of the windshield on the inside, which could go from clear to fogged up in about 5 seconds (still working on that one). Once on the ship, and the rotor almost down to zero rpm, they encountered what is known a "blade sailing". This can be a problem with rotor systems that are hinged to move upward, but have no limiting stops. They showed video of the helicopter receiving side gusts of 50 kts as the rotor wound down to zero, which caused the blades to fly up and contact the hub.

Flight Testing the Global Flyer – This was presented by John Karkow, who is a test pilot at Scaled Composites. He made the first flight and did most of the test flying on Global Flyer before Steve Fossett flew it around the world. It was a fascinating presentation, and should have been in the running for best paper. The Global Flyer, unlike many of Burt's creations, is not a canard. It has a fuselage, wings, and two very large pods that are mechanically and aerodynamically uncoupled. The airplane has an 83% fuel fraction, W_i/W_f, which is 40% better than Voyager. The Breguet Range Equation goes something like this: $R= L/D(W_i/W_f)/sfc$. The big gorilla in this equation is the weight fraction, or weight initial divided by weight final. In addition to a cruise L/D of 72, Global Flyer took off at a gross weight of 21,996 lbs, of which 18,194 lbs was fuel. The airplane has a nose down attitude on the ground, which they designed in to dump lift easily on landing. But that makes it difficult to rotate, and in fact Steve Fossett needed an extension on top of the stick to make the estimated 50 lb pull required to rotate. Even with that, Steve had a pretty large pitch bobble on takeoff. On the day of the takeoff, they estimated the speed that Global Flyer should achieve at each taxiway intersection of the runway in Salina, KS. The speeds were supposed to be observed from the tower and relayed by radio. But on the appointed day, the gate to the tower was locked! The observer risked life and limb by climbing the fence, ripping his pants and getting cut on the barbed wire to make it happen. Steve Fossett really did lose about 3500 lbs of fuel through the fuel vent system. John described the fuel system and told us how the fuel vent was routed from the tank to the top of fuselage just below the engine. While this was good location, it allowed an air bubble to form over the fuel in each pod, above the vent line. As the airplane climbed, the air bubble stayed at sea level pressure and effectively pushed the fuel out the vent. John showed plots of fuel quantity, fuel used, and fuel level calculated by measuring pitch attitude, and they were all pretty much together. So the test team knew, with a fair degree of accuracy, just how much fuel Steve had. The fix has been designed as a vent immediately above the pod, but it has yet to be tested.

Flight Path Angle and Energy Height Planning – This paper began with a video of an F-16 at 1.56 Mach and 30,000 feet. The pilot was supposed to hit a flutter test point at 1.60 Mach and 20,000 feet. So he rolled into a 30 degree dive and waited for the Mach number to increase that few, scant, tiny 4 hundredths of a Mach. But it never happened, and as the altimeter unwound wildly, the Mach actually began to decrease. And you would expect that as the air became warmer and heavier. So what went wrong? The test team failed to consider the energy state of the airplane. Using energy theory to predict the energy state that the pilot needed to achieve, they calculated the energy height, in terms of speed and altitude, and the dive angle that the pilot would need to achieve in order to covert altitude into energy and meet the test conditions. What this flight test technique does is reduce the number of parameters the pilot needs to keep track of from 5 to 2. It also reduces flight test risk by reducing the number of tries to get the exact test conditions. At the end of the presentation, they showed a picture of an F-16 with the rudder ripped off and the flaperon on the left side ripped off and embedded in the fuselage, the result of a similar high speed test.

Shipboard STOVL Control Law Manual Mode and Autoland Development – This was another great paper, and it harbinger of control concepts to come in the future. You have to have your thinking cap on for this one. The British have a Harrier modified so that they can test advanced control methods. The conventional Harrier has a throttle, a vector thrust control, and a conventional stick, which doubles as an attitude control device in hover flight. But it is a daunting task to change your thinking between the hover and horizontal flight. So they have developed controllers in the cockpit called "inceptors", one on the left that looks like a throttle, and one on the right that looks like a stick. But they operate much differently. The center position is the "hold" position. If you want to go fast, you move the left inceptor forward. At the desired speed, you move it back to center and the airplane holds that speed. It's the same with the stick. If you want to climb, you move it back until the desired altitude is reached, then you center it and altitude is held. Of course, you need a big computer to do all of this. But it represents the future of STOVL flight, and we learned later that this same concept will be used on the F-35 STOVL aircraft.

The Pioneers of High Altitude Escape – This was presented by test pilot Joe Kittinger. Joe holds the record for the highest altitude parachute jump: On August 16th, 1960, he free-fell from the gondola of a balloon at 102,800 feet – literally from the edge of space. Joe's paper began by describing how parachutes were first used. Pilots needed them if the airplane came apart or caught fire, and they usually had enough altitude to float to earth. But as airplanes began to fly higher and higher, the conventional thinking about parachute design had to change, and someone had to test them. On October 24th, 1941 Art Starnes bailed out of a Lockheed Lodestar from an altitude of 31,400 feet. It was record at the time. But even though he was an experienced jumper, he experienced a flat body spin. Art Starnes demonstrated that you could survive a free fall from high altitude. He also demonstrated that an experienced jumper could enter a flat body spin. Most military pilots were not experienced jumpers. They were instructed to stay with the airplane until about 10,000 feet and then exit and open the parachute immediately. Dr. Randy Lovelace tested supplemental oxygen by jumping from a B-17 at 40,200 feet. The thinking was that at the high altitudes, opening shock would be less because the air was thinner, and that opening immediately would reduce fatalities from spinning and tumbling. But Dr. Lovelace experienced and extreme opening shock, on the order of about 30 g's. He lost is gloves and was knocked unconscious. He came to at about 10,000 feet and landed safely. Opening the parachute immediately was not the answer. A stabilization system was necessary, as was an automatic opening device. Both were under development when Joe Kittinger made his first jump from a balloon. With aircraft flying higher and higher, and the manned space program in full swing, parachute jumps from extreme altitudes were needed. The first jump was from Excelsior I, at an altitude of 76,000 feet. Wearing a pressure suit, Joe tried to get up from his seat and jump, but his equipment hung up in the seat. He struggled to get free, and in doing so, the stabilizing parachute was damaged, and did not deploy. Joe fell thousands of feet, spinning wildly, and lost consciousness. The automatic opening reserve parachute saved his life. While ascending for his second jump in Excelsior II, the record jump from 102,800 feet, his right glove came loose from the pressure suit, and air began to leak from the gap. He decided to continue anyway, risking damage to his hand and the thought of losing consciousness. When he stepped into space, and into history, the stabilizing parachute kept him from spinning, and he opened his chute manually at about 10,000 feet. His hand was injured, and his face was puffed out a bit, but otherwise he survived (and lived to tell about it in 2005!). The concepts he pioneered are widely used today.

An Oral History of the Formation of the Society – On Saturday morning, the founding members held a panel discussion on how SETP came into being. They got together and decided they needed an organization of test pilots to improve safety and find better ways to flight test airplanes. The big companies thought they were forming a union, and didn't want anything to do with it. Some of the pilots were threatened with firing if they joined. But something was needed. Test pilot Jim Corwin bailed out of a test airplane but his parachute didn't open. It took 4 days to find his body, and when they did, he was only 100 yds or so from the crash site. He was wearing the normal issue tan flight suit, which blended in well with the desert. So one of the first things the SETP did was find a source for orange flight suits, so you could at least find the guy. So many accidents happened in the 50's that they established a procedure where the base telephone operator would cut off the phone of pilot involved. They would send a few of the other wives over to that pilot's house to have coffee, at least until the Base Commander or the Chaplain could arrive. On one occasion, Corky Meyer's wife heard that he had been killed. So she called over to flight test. Corky answered and his wife said, "Somebody told me you'd been killed. Is it true or not?" The truth is the wives of test pilots in those days deserve a lot of credit for what they endured. The early members also had trouble raising money. Founding member Cal Shoemaker was appointed treasurer. He suggested dues at $20. Then $10. Finally $2. But an ad-hoc committee was formed. They went outside, voted for no dues, and overruled the $2. decision! The big break in keeping things going was when they asked the manufacturers to become corporate members. The SETP has been going strong ever since.

I could write volumes more about the symposium, as this scratches the surface. It was certainly a thrill to meet Neil Armstrong, as the picture obviously shows. So until the next time, fly safely, and as always, don't forget to help a fellow pilot when you can.