

# CHAPTER 55 EXPERIMENTAL AIRCRAFT ASSOCIATION

## OCTOBER 2004



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 332-2601 Editor: Warren Miller 393-9385

### Climb and Maintain Flight Level 55

At last month's meeting, it was brought to my attention that I had missed one of our members who helped with the Steak Fry Fly In, so I will take this opportunity to thank Carl Dyremple who helped from start to finish.

Also at the meeting, Vicki Vandenbelt volunteered to take the position of Membership Coordinator for the chapter. She will be responsible for putting together membership packages for prospective members, helping with keeping the member list on the website up to date, and welcoming new members and other responsibilities that I might dream up.

Speaking of new members, you guys and gals are not off the hook. My CHALLENGE still stands for all members to bring in one new member each to the chapter before the end of the year so let's get moving - time is running out.

**OCTOBER SCHEDULE**  
**Board of Directors' Meeting**  
Wednesday, October 6, 2004  
**Chapter 55 Meeting**  
Saturday, October 9, 2004  
8 - 9 Breakfast / 9:30 Chapter Meeting

### BREAKFAST W/CHAPTER 55

#### October Team

Charles Brown  
Bill DeGrow  
Mary Gowans  
J.Morris Hickman  
John Kingsbury  
Tim Martinson  
Robert Ognian  
Phil Tartalone  
Jim Andrews

#### November Team

Lynn Brown  
Kenneth Distiller  
Peter Greenfield  
Russ Hilding  
Don Mcalister Jr.  
James Palmer  
Tom Sheehan Jr.  
Roy Thelen

Terry Lutz suggested that the members take up a donation for Leah Volker, our C-130 pilot member who will be deployed over seas soon. The collection is to help off set the costs of body armor for her. The standard issue she has now is size man's small and it just doesn't fit, so she has to have a suit custom made and the government will not pay for it. We passed the hat at the meeting and came up with a few hundred dollars, a start but I'm told the body armor will cost around a thousand; so if you would like to contribute contact Terry Lutz who is in charge of the contributions or any board member. This lady is putting her life on the line for us. By helping to keep her safe is the best way we can thank her for her service.

If you have looked at our website, it has been down for a few weeks and Craig Tucker is working to get it back up and running soon.

On a lighter note Renee has informed me there is a chapter member who has just become engaged - that person is none other than our webmaster Craig Tucker. The chapter extends our congratulations to Craig and the future Mrs. Tucker.

There was talk of the Balloon Rally being moved to the Mason airport. I was recently informed the Mason Area Chamber of Commerce has decided to keep it at trap range where it is currently held. Now My Question to all of you is this; Do you as a whole want to have another large event like we had last year or do you want to just have a pancake breakfast and maybe a steak fry fly in? You, the members make the decision, after all with out your commitment and help, all we would have is an empty building.

I have decided to put in a new column it will be things on the lighter side of aviation it will be called "Greasy Side Up?" it will be for all members input aviation joke and other humorous things about aviation. So look for the first installment of "Greasy Side Up", in this newsletter.

Remember to take a chapter member when you go flying.

Mike Arntz, President

## EAA Board of Directors Meeting

September 8, 2004

Meeting was called to order at 7:01 PM on September 8th. → Mike Arntz, Tom Botsford, Gregg Cornell, Drew Seguin, Ernie Lutz, Bill Purosky, Renee Arntz, Doug Koons, Jim Palmer, and Ken and Vickie Vandenbelt were at the meeting. → The secretary's report was approved → Treasurer's Report was approved. Greg noted that profits from the steak fry more than offset losses from the earlier pancake breakfast → Jim Palmer petitioned the board to rent the builder's hangar space for painted parts for his project. There are two others on the list for the hangar. Mike will contact them and if they are not ready the space will be made available to Jim. A motion was made and carried to rent the additional space for \$60 per month → Some of the new paint is coming off the hangar where improperly applied. Mike Arntz will coordinate efforts to do the touch up work → It was noted that Chapter member Leah Volker's government issue body armour does not fit properly and it would be nice for chapter members to contribute to having some made for her. A collection will be taken at the membership meeting. → 2005 Balloon Rally. We expect to have a decision September 8 on whether it will be held at TEW. If so, Chapter 55 will be involved → GLIAC. Chapter 55 will man a booth on EAA. National is presenting several sessions on Sport Pilot → Young Eagles. The decision was made to plan events for 2005 around targeted groups. → The Chapter 55 website is not on a reliable server. Motion was made and carried to move the server based on recommendation from our Web Editor, up to \$15.00 per month. → Doug Koons suggested closet maid shelving for additional storage in the back room Motion was made and carried to authorize \$1300 for shelving and cabinets → Bill Purosky proposed purchasing a 6 foot grill from Sam's club for \$340.00. Motion was made and carried to purchase the grill and make effort to get rid of the miscellaneous stuff in the hangar → the meeting was adjourned at 8:45

## EAA Chapter 55 Business Meeting

September 11, 2004

The meeting was called to order at 9:30 a.m. → 54 members and guests present. Thanks to the breakfast crew of Lloyd Brown and Bob Nolpe → Secretary's report was approved → Treasurer's report was approved → Rick Farrell volunteered to get the painting work done on the Chapter 55 hangar. → There will be a trip to the Kalamazoo Air Zoo after the trip. → Donations of \$392.00 were collected by members and guests present to help pay for personalized body armour for Leah Volker. Terry Lutz will take it from here → Phil Tartelone gave a preview of the upcoming Great Lakes International Aviation Conference. Check it out at <http://greatlakesaviationconference.com/> It looks to be a great event. Chapter 55 will be manning the EAA booth and volunteers will get free admission to the event. Contact Bill Purosky → There will be an aviation seminar at Jackson Airport on 10/6. → Ted Lakin reminded the membership that the Fowlerville Fly-in is tomorrow, 9/12, and it's one of the best in the area. → Construction on the Mason Jewett Airport access road will commence on October 11. → The meeting was adjourned at 10:30 am.

## Notes from Cape Juby

By Terry L. Lutz, Chapter 55 Flight Advisor

I recently completed my annual trek to Los Angeles for The Society of Experimental Test Pilots 48<sup>th</sup> Symposium and Banquet. As always, the papers presented covered a wide variety of flight test subjects. This month's notes will cover the more interesting papers of the 28 total that were presented. Some were simply amazing, and some were a little scary. So grab that cup of coffee, strap in, and hang on!

What is it about airplane designers in that upside down world south of the equator? If you recall a few years back, I reported on an Australian airplane that had spin recovery problems. This year the problem airplane was the PAC750XL built in New Zealand. Originally designed as a crop duster, the designers were trying to create a model that could be used for hauling skydivers. They were having trouble meeting the requirement to recover from a spin entry within one turn. And that was at mid-cg. The cg range for the beast is an awesome 1% to 28%, but you would expect that from a crop duster. So they called in Sean Roberts of the National Test Pilot School to iron out the problems. Sean noted that they had moved the engine and prop 15 inches forward. This caused several problems, including an increase in the propeller normal force, asymmetric propeller disk loading at high AOA, and yaw due to precession. If you add up the forces, they equal about the same yawing moment as full rudder deflection. So Sean suggested a 15 inch fuselage extension behind the wing, and adding 15 inches to the top of the vertical fin. Problem solved? Not so fast. Not only was it worse, the airplane spun at a rate of nearly 200 deg/sec, presumably with development money streaming off the wingtips! The vertical fin changes and longer fuselage increased the effectiveness of the rudder to get the airplane into the spin, and the engineers had stiffened the rudder control system so that full rudder was available while in the spin (air loads couldn't blow it back). The fix was to limit rudder deflection to the left, and that settled things down enough to pass the test.

Bill Flanagan, one of the flight test engineers on the initial B-2 flight test program, gave an overview of the flying wing bombers built by Jack Northrop, and compared them to the B-2.

During testing of the prop-driven B-35, and jet powered B-49, stalls and spins were performed with generally good results. The spin recovery technique for the B-49 was rudder with, and ailerons against the spin, which is opposite to most airplanes. One B-49 was thought to have been lost due to a stall/spin condition, but the outer wing panels were found 3 miles from the crash site, with signs of overload failure. The B-2 has a pronounced pitch break at high AOA and high mach number. It is sensitive to rapid throttle movements, and during the test program, there were some high speed pitch oscillations due to shock waves at the top of the engine inlets. The B-2 test program covered 5,000 flight hours with 6 airplanes. While large wings are sensitive to small changes, it is an excellent bombing platform. (More on that later.)

Imagine a balance beam on the floor and you are an Olympic gymnast practicing strutting your stuff. The object is to stay as close to the middle of the beam as you can. But put the same

beam between two buildings a few floors up, and the gymnast finds that staying away from the edge is more important than tracking the middle! This is a new concept in evaluating flight control problems called “Boundary Avoidance Tracking”. The author was able to mathematically show that some airplanes are more sensitive to others in certain tasks, which he attributes to boundary tracking. Boundary escape is a cause that results in pilot induced oscillations, but is not considered a trigger. This paper, as abstract as it might seem, won the award for best paper and stimulated a lot of thought because there currently are no flight test techniques to identify the problem.

Navy Captain Gregory Johnson gave us an update on what has been learned since the loss of the space shuttle Columbia. NASA has collected 40% of the vehicle, and reassembled the parts with the help of NTSB investigators. One of the items collected was the flight data recorder, which was not designed to be crash survivable. However, it was reasonably intact and provided a lot of information. NASA had allowed the shuttle to fly with about 90 sensors internal to the wing that were off line for maintenance. Some of those off line sensors would have been useful during ascent and during entry. The foam covering on the bi-pod ramp from the external tank to the shuttle is the source of the foam that hit the wing, and there would have been extensive video coverage had not some of the launch cameras been inoperative to save costs. To determine exactly what damage the foam caused to the wing, they fired a suitcase sized piece of foam at 700 feet/sec at an angle to the bottom of the wing, and directly at RCC panel #8. There was no damage to the tiles under the wing, but the RCC panel sustained a 10 inch hole, which is the entry point of the hot plasma that destroyed the wing.

As reported here several months ago, NASA will put limitations in place so that the Shuttle will fly only to support the International Space Station until a rescue capability is in place. On arrival at the ISS, a loop maneuver will be performed to allow a complete look at the underside of the Shuttle from the ISS. An extension to the robot arm will allow video mapping of the entire surface of the Shuttle. There will be an on-orbit repair capability for holes in the RCC panels from ¼ to 4 inches across. And there will be specific criteria developed for each entry where problems are noted. If there are any concerns they cannot resolve, the crew will transfer to the ISS, and the Shuttle will de-orbit into the ocean.

Captain Johnson said several things in summary that as homebuilders we must all take to heart:

- Listen to all problems of the vehicle on each flight
- If you analyze, be conservative
- Work toward world class management and organizational excellence
- Don’t go from research to operational capability until ready
- Carefully analyze all waivers, exceptions, and deviations before flight
- Do good work, pay attention, and question everything

Do you remember that gigantic bomb the Air Forces tested in Florida? It was called MOAB, or “Mother Of All Bombs”. Officially, MOAB stands for “Massive Ordinance, Air Blast”.

Guess which came first. They ran 3 tests where the bomb and its sled were rolled out the back of a C-130. The first test was with an inert bomb, and while the extraction was perfect, separation between the sled and weapon was poor. The bomb pitched rapidly nose down, and while it still hit the target, it was at the limits of the control system to guide it. The second test was a live drop. The separation was still poor, and detonation was not “higher order”. After beveling the edges of the sled, the third test (also live), was perfect. The weapon separated in a level attitude, and gradually pitched over to the target. The detonation made a big hole, a big bang, and a big cloud of dirt and dust. But the biggest effect of the bomb came when the Air Force sent videos of the test and pre-programmed cell phones to Saddam’s forces in Tikrit, who promptly surrendered!

Spins are very difficult to predict, particularly for light airplanes. A contractor was hired to spin test the Lancair 400, which has a larger engine and some other changes externally, from the Lancair 300. The company sought to certify the Lancair 400 in the “spin resistant” category. But with the larger engine, the airplane stalled at a higher pitch attitude, and the airplane entered a spin. When the prototype would not recover, the test pilot deployed the spin recovery parachute. That worked, the airplane recovered from the spin, but it was now in a steep nose down attitude with a parachute attached to the tail. And it wouldn’t release. He tried adding power, pitching the airplane up and down, and a few other things, but nothing worked. So he stepped over the side and made a nylon landing. The cause of the unrecoverable spin was thought to be something that we normally consider a safety enhancement, and that is the leading edge cuffs, which make the original airplane spin resistant. But in a steady state spin, the outer wing panels continue to fly, which increases the roll rate in the spin and tends to increase the angle of attack. The cause of the spin chute failing to release was that the strap from the parachute was wrapped around the release mechanism and it couldn’t open.

The B-2 recently conducted a test where 80 500 lb Joint Directed Attack Munitions were released in a single drop. These new JDAMs have no strakes on the side, just some small guidance fins on the nose. The target area was a large square in the desert with shipping containers stacked and positioned to simulate buildings and equipment. The weapons came out in stutter step because the time of flight for each one was different. There were 65 targets on the ground, all of which took direct hits. How did they target the remaining 15? They programmed those weapons to make a “happy face” in the desert! ☺ Pretty accurate bombing, I’d say.

Dr. Ken Dial of the University of Montana gave a fascinating presentation on how birds fly with partially developed wings. Dr. Dial has been doing extremely detailed research on birds for many years, and has found techniques to instrument them and measure the forces they can apply in flight and on the ground. The purpose of his current research was to find out why dinosaur fossils found in China had wings with feathers, but obviously the wings were too small to sustain flight for the weight and strength of the animal. Small birds are usually fearless because they have a high power to mass ratio. Large birds (like a dinosaur) are vulnerable to attack and have to run before flying to survive because they have a low power to weight ratio. Dr. Dial tested birds on an instrumented incline,

where he could measure the force the bird placed against the incline. At inclines above 46 degrees, most birds begin to run-flap, but the flapping is not for flight. It's to put more force down on the incline so their feet remain effective. Birds can do this at a fraction of the energy required to fly. Dr. Dial refers to birds that do this as "wing assisted incline runners". The champion incline runners were baby Brush Turkeys from Australia, which could go up inclines greater than 90 degrees, *on the day they were born!* This may be the defense mechanism of the dinosaurs found with wings in China.

Which brings me to SpaceShipOne. I will begin by telling you that we should all say a quick prayer for those guys, because what Burt Rutan and his team are doing is right on the edge of any number of different limits. On the first flight into space, they encountered a several interesting problems. The seat cushions were too compliant, so when the rocket fired, a 3g push into the seat caused Mike Melville to pull back on the stick. The opposite occurred at burn out. Once the rocket was lit and he was accelerating, Mike had to pull 4g's to follow the steering cues on his attitude indicator, which is an electronic depiction of a sphere. During ascent, the airplane goes supersonic and suffers the same control problems that Chuck Yeager had with the X-1. At close to Mach 1, you lose elevator control and have to transition to trimming the leading edge of the stabilizer for control. And remember that the pitch surfaces on SpaceShipOne function as both pitch and roll surfaces. So the whole control problem is quite difficult. If the pilot needs roll control just as he runs out of pitch control, neither pitch or roll control is as effective as the pilot needs it to be.

Wind shears at altitude caused SpaceShipOne to roll on both flights into space. They are not unusual, and NASA spends a lot of time predicting them before each space launch. On Mike's first suborbital flight, the airplane began to roll just as he ran out of normal roll control, so he transitioned to the trim system. But it wasn't very effective and as he held the trim switch, the system shut down due to thermal overload. If you watched the film of the second suborbital flight on September 29<sup>th</sup> and watched what Mike was doing with his hands, he was doing very little with the roll stick, but a lot with his left hand on the trim switches. Still, the airplane rolled almost uncontrollably. But in pitch, the pointy end stayed where it was supposed to.

There are very high loads on the vehicle during entry while in the feather mode. From the on-board cameras the buffeting on the tail is quite high. And the g force on the pilot is high as well, about 5g at its peak. To train for this, they use an Extra 300 and fly a profile that starts at 0g, then transitions to 2g, 3g, 4g, and then 5g which they hold for 15 seconds! That's a lot of work without a g suit, and on your first flight into space strapped to a rocket engine! Mike said that it was incredibly good training, and almost exactly like the actual flight. By the time you read this article, they will have attempted the second flight

to capture the X-Prize. Godspeed to rocket plane pilots Mike Melville, Brian Binnie, and Peter Siebold.

I hope you enjoyed reading this report as much as I enjoyed being there to hear the test pilots who gave the presentations. The winds of winter will soon be upon us, but there are still some good flying days ahead. So take the words of NASA to heart and treat every flight like you were flying the Shuttle. And as always, remember to lend a hand to your fellow pilot when it's needed.

## Chapter 55 Christmas Party

By Vickie Vandenberg & Debbie Groh

Debbie is planning another outstanding event !! As mentioned previously, the party will be held on **Saturday, December 11<sup>th</sup>, 2004**. It will again be held at the Vevay Township Hall; 780 Eden Road; Mason. We will start with hospitality & hors d'oeuvres from 6:00 pm to 7:00 pm with the buffet dinner served at 7:30 pm. Cost will be \$12.00 per person.

Remember also - the last date for making your reservation and payment will be Saturday **November 27<sup>th</sup>, 2004** - no exceptions.

Please make checks payable to: EAA Treasurer, Gregg Cornell.

## Caught in the "55" Web

By Vickie Vandenberg

If you have been frustrated in your attempts to access the chapter web site, you are not alone. We continue to experience technical difficulties. Craig Tucker is working to find us a new web host server. Keep your fingers crossed that our troubles will soon be at an end!! I sure have missed logging on to look for the new items Craig adds each week!!

Thanks to all you have been aiding the improvements by responding to my requests for updated profiles. I hope to roll these into the site as soon as we resolve the technical issues. And - yes ... we will also be working to get updated photos !!

A profile form is included with this newsletter and can be returned to me by mail or email for any profile additions or changes.

## Greasy Side Up

"TWA 2341, for noise abatement turn right 45 degrees."

"Center, we are at 35,000 feet. How much noise can we make up here?"

"Sir, have you ever heard the noise a 747 makes when it hits a 727?"