



The ThunderWord

Thunderbird Field EAA Chapter 1217

March 2023

Scottsdale, Arizona

PRESIDENT'S CORNER

Greetings from my corner of the hangar! At our February Chapter meeting Austin Staub from Performance One Aviation gave a talk on some of the cool stuff his company does. It was interesting to learn that even though the name has changed the company formerly known as Phoenix Composites has been around since before the turn of the century. If you need anything done on your experimental aircraft from condition inspections, repairs, upgrades or construction they can do it. More info at www.p1-aviation.com.

This past month has had two big Arizona aviation events, the Buckeye AOPA Air Fair and the Cactus Fly-In. I elected not to go to Buckeye but the people that did had a great time and spoke highly about the vendors attendance. I did fly down to the Cactus Fly-In and enjoyed perfect weather and a great turnout of cool planes. I got to catch up with a lot of old friends and learn about new planes and projects.

See you around the aerodrome!

Curtis

MARCH CHAPTER MEETING

The March 2023 meeting of Thunderbird Field EAA Chapter 1217 will be held on Thursday, March 16th beginning at 7 pm. The location is the Paradise Valley Community Center on 40th Street just north of Bell.

This month's guest speaker will be Chapter member Bill Unternaehrer. Bill worked for Honeywell as an electrical engineer for 30 years. He was involved in projects such as the world's first digital autopilot, the world's first ring laser gyro inertial reference system and the world's first GPS approach. Bill has more than 12,000 hours of pilot time and 7500 of

instruction given in various aircraft. He holds type ratings in the Cessna 500 and 525 as well as the Hawker 125, Falcon 900 and King Air 300. He currently owns a Vans RV-12 based at DVT.

IMPORTANT - MEETING LOCATION

The location is **Paradise Valley Community Center, 17402 North 40th Street**. It is on the west side of 40th Street just north of Paradise Valley High School. Basically 1/4 mile north of Bell on 40th Street. We will meet in the large multi-purpose room. You can park on the south side of the building and have more parking options that are closer to the door. Look for the signs.

One of the hardest parts of running the Chapter is finding meeting room location. The terminal Thunderbird and Stearman rooms are really nice but there are scheduling problems and it is not always available.

Guests are always welcome!

APRIL FLEA MARKET

We will be having an aviation flea market at Deer Valley on Saturday April fifteenth before it gets too hot. We plan sell lots of items that have been graciously donated to the chapter. You are also encouraged to bring a table to sell off those excess treasures that are clogging up our hangars, garages and workshops.

The event will be taking place at hangar 57-01 in the shade. To participate bring a table and some change, everyone will be responsible for there own stuff. Some help is defiantly to set up, price and ride herd on things. If you can help email eaachapter1217@aol.com.



The winner of the People's Choice award at the Cactus Fly-In was a perfectly restored Boeing Stearman crop-duster that is now a pampered pet

65th CACTUS FLY IN

Saturday March 4th was the date for this year's Fly-In at Casa Grande Airport. Wave after wave of storms had left many folks wondering if this year's event was going to happen. On Friday your president flew down in his RV-8 and the weather was perfect 70 degrees and calm winds. Early birds attended a great hangar happy hour hosted by TCB Aviation with a complementary Mexican buffet and all the free drinks you could inhale.

Saturday dawned a cool 39 degrees and calm winds but the forecast was for a quick warm up to 72. The attendance for airplanes and spectators was back to what it was before the pandemic. It was really a fun well run event! On Saturday afternoon they had a late lunch/early dinner that was very well attended.

Instead of a featured speaker they had people from the audience talk about their planes. Pat McGarry talked about his restored Army Hiller

helicopter, Arlo Watkins talked about his Cessna Airmaster and a fellow from Sonoma that had flown a Stearman to the show talked about his coast-to-coast flight in a Taylorcraft BC-12D he made when he was sixteen. For not having a script his talk was amazing. A few years earlier he had talked about flying his Beech Debinair twice around the world without an autopilot!

Chapter 1217 member Bill Lewallen won Grand Champion with his Beech Staggerwing and Mike Rutledge got the People's Choice for an immaculately restored 600 hp Stearman that was still in its duster configuration. Mike spoke a few months back at a Chapter meeting about the Night Stalkers Army unit he headed up.

It's great to see this event get back to the way it was. Be sure and put it on your calendar for next year.



Chapter Vice President Terry Emig and Mike Evans at the hangar picnic at Cactus Fly In



Pat McGarry brought his antique Hiller helicopter to the Cactus Fly-In



Bill Lewallen's Grand Champion Beech Staggerwing at the Cactus Fly-In

CONTROL SURFACE FLUTTER

By Tony Bingelis originally published in EAA Sport Aviation, July 1979

WHAT IS FLUTTER, flutter is what a flag does wildly on the flag pole on those days when it is too windy for you to fly. But to better relate it to our subject, it should be described as a potentially destructive vibration or buffeting of an aircraft due to an out-of-balance condition of one or more of its control surfaces.

Now, imagine one of your control surfaces acting like a flag in the breeze . in flight at 100 or 200 mph. How long do you think it would stay with the airplane? Not for long, I'll wager!

Most of us are aware that the flutter problem is a complex one and it has been around aviation for a long time. So long that flutter specialists must be wallowing around knee deep in the accumulation of flutter fodder generated from years of research and testing. Fortunately,

there are a few useful assumptions and certain recognized 'good practices' which have been sifted out and any builder willing to apply the guidelines can do much to avoid having a flutter problem. But before I continue, lets discuss a few terms and phrases.

Static Balance - A condition that exists when an object (wheel, propeller, control surface, anything) remains stationary while supported on, or suspended from its own center of gravity. Relating this more specifically to our subject, it also means balancing a control surface while it is at rest (not in flight). Automobile wheels, as you know, can be balanced statically (while at rest). A more effective way, however, is dynamic balancing (spin balancing). The dynamic balance of aircraft surfaces is similarly effective but homebuilders really have no practical way of working out the dynamic balance of a control

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Pat and Deborann McGarry with their Hiller at the Cactus Fly-In

surface subjected to the stresses of flight. For this reason, they must fall back on what might be called a 'good practices concept' and assume that, for all practical purposes, when a control surface is properly mass balanced in its static condition, it should also be in dynamic balance. If, in principle, the main objective of dynamic balance is to prevent or minimize

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torsional stress in flight, we can accomplish this adequately by evenly distributing the mass balance weight along the span of the control surface.

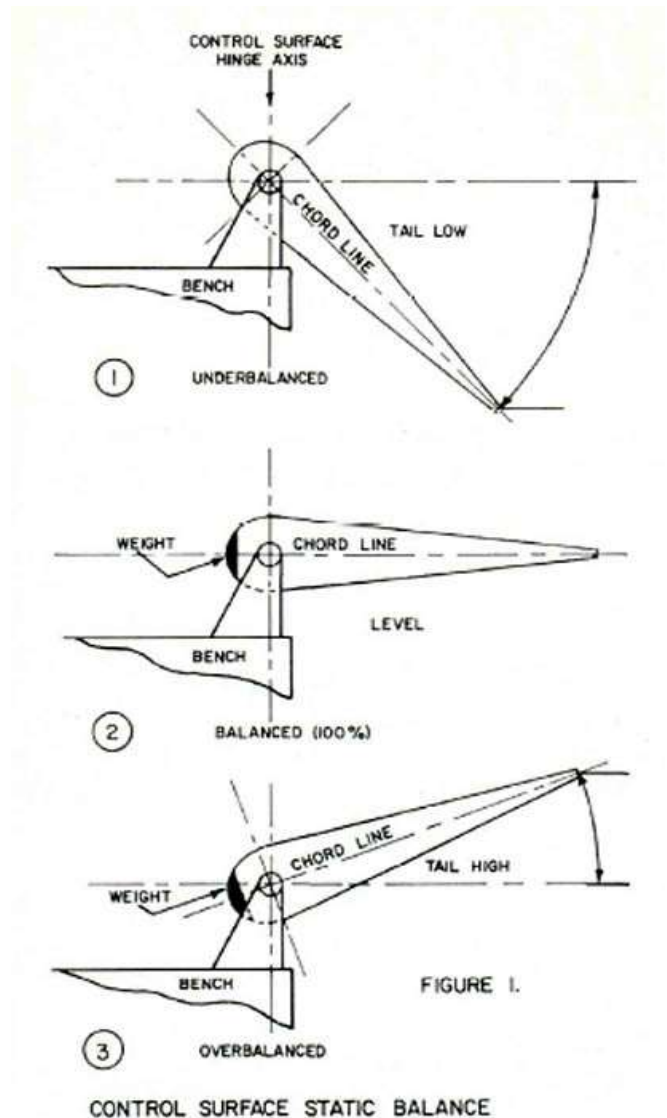
Broadly speaking, to attain a static balance state in a control surface, we add lead weight to the nose until the center of gravity falls on the hinge axis. Let me expand on this a bit.

For example, if you were to suspend a control surface from its hinge axis, one of three static balance conditions would become immediately apparent to you.

1. If the control surface assumes a trailing-edge-low attitude, it is statically underbalanced and a tail-heavy condition exists. See **Figure 1**.
2. If the control surface remains in a level (horizontal) attitude, it is said to be statically 100% balanced and its center of gravity (cg) is co-located with the hinge axis.
3. Should the trailing edge of the control surface rise some position above a horizontal plane, an overbalance condition is apparent.

Two of the three conditions described above result in a control surface that will have a fairly predictable flutter-free flight performance. The one that is 100% balanced to a level attitude should consistently give good results. The other surface having a slight nose down attitude is a typical overbalance condition essential for good results in high-performance aircraft. Conversely, the static underbalance, or tail-heavy condition first described, is the least desirable as it may result in unpredictable flight performance.

The conventional flap type (aileron, elevator, rudder) control surface, as constructed, is typically tail-heavy. That is to say, most of its structure is distributed behind the hinge axis. It is this sort of tail-heavy out-of-balance condition that is generally considered to be the major cause of control surface flutter and buffeting incidents. True, speed through the air is also a factor and there is no doubt that flutter is a more frequent occurrence in high performance aircraft than it is with the slower varieties. However, it would be dangerous to assume that slower homebuilts are immune from such a propensity. I'll bet you have heard many times that homebuilts having cruising speeds under 150 mph were exempt from the flutter problem. Don't you believe it! Any airplane can experience flutter . . . even



your light and slow VW-powered job under certain conditions.

Does this mean that you must balance the control surfaces of your project even though the plans don't call for it? Not at all. Undoubtedly the prototype of the airplane you are building was built and flown without having exhibited flutter tendencies and the designer, therefore, found no need to require static balancing of the control surfaces. However, you should understand that, although many

other examples of this same design may have been built and flown, there is no assurance that yours will likewise be free of flutter problems.

The only way you can prove your airplane to be free of flutter tendencies is to flight test it with that purpose in mind. This is a potentially dangerous adventure and must be done only under carefully controlled conditions. You must prove that your airplane is controllable, free from flutter, and will be safe to fly. No amount of reassurance derived from theoretical calculations can substitute for this requirement.

Other Flutter Provoking Conditions

Although there is less risk of encountering flutter in slower aircraft than in high performance types, individual builders can cause changes, inadvertently, which could introduce flutter tendencies. For example, a wing lacking torsional rigidity could induce a bad case of aileron flutter even at the relatively low airspeeds generally associated with low and medium-performance aircraft.

A newly constructed aileron or elevator that is excessively heavy (due to the use of heavier substitute materials or uncalled for reinforcements) can be flutter-prone. Flutter is most difficult to suppress in very large or heavy control surfaces and the balance weight requirement becomes excessive.

Would it surprise you to learn that even time-tested production-line aircraft are not immune to the flutter phenomenon? True! The reason being that anytime anything changes the balance of the control surfaces it may induce flutter in an aircraft that has had no history of such tendencies. For example, there have been instances where flutter developed simply because mud adhered to the control surfaces following muddy field operation.

In an incident reported by the FAA, moisture had collected inside the ailerons during winter operations and had frozen thereby causing an unbalanced condition that was not detected during the preflight . . . result? In-flight flutter and an accident.

During the long days and nights in the life of an aircraft many changes take place. Dirt accumulates inside the control surfaces, patches are added to repair dings and tears, and in time, the surfaces are repainted. All of these things cause a cumulative change in the mass balance of the control surface. At some point, the amount of change becomes just too much . . . and increases the risk of flutter if no steps are taken to rebalance the reworked surface.

Loose balance weights, water absorption in foam structures, improperly located or clogged drain holes are all elements which could contribute to an aerodynamic imbalance situation and result in flutter.

Avoid free play or slack in the control cables. Stiffness in the control system does have a useful damping effect on the control surfaces further inhibiting flutter tendencies. However, this should not be completely relied upon as later, in service, the wear and occasional lubrication could free the system of much of its original friction and result in an increased risk of flutter.

Adding a fixed trim tab to an aileron can further upset a marginal balance condition.

Controllable trim tabs, too, can be a problem. Trim tab control linkage failures and trim tabs with loose or improperly installed and adjusted linkages have caused a considerable number of accidents and near accidents by exciting flutter in the control surfaces to which they are attached. A recent incident of that nature has just come to my attention. Involved was a widely built and proven design . . . the staid ol' Emeraude. Here's how it happened.

There are not too many folks around who can tell you, first hand, how sudden and destructive control flutter can be. We do know it can happen and does happen all too often...

2SOLITUDE

Take a crazy idea hatched on a boat in the South Pacific, mix in the unparalleled skills of a specialized group of aviation technicians and engineers, and you have the recipe that created 2Solitude.

The vision was simple: Build an airplane. Make sure you can live in it comfortably, anywhere. And it needs to be amphibious. How hard can that be?

Ultimately, they choose the rugged Antonov AN 2 with its proven utilitarian track record and carrying capacity as a starting point. But this was a land-based airplane, so then the core of the project was to make it float, land and take-off from any body of water. Sounds simple, but it wasn't. Using FAR 23 as a base set of engineering standards for the bespoke floats we created for the AN 2, we focused on performance and safety as we ground through a 4-year design-and- build process. We employed similar tactics for the interior and what will be the plane's re-powering with a Honeywell TPE 331-12 turbine. At each step of this unique and innovative process, achieving the highest standards of safety,

utility and performance were how we graded our success.

Today, though the development continues, they are confident that Stage One of the project is ready for others to see and experience. 2Solitude is a specialty retrofitter of US-flagged Antonov AN 2 experimental exhibition airplanes. They retrofit the ultimate airshow camper that's fun to fly, and will be the topic of conversation around any gathering of aviation enthusiast. With a 2Solitude AN 2, the stops you make on the way to the airshow will be as memorable as the show circuit itself.

They wanted to create a quick and versatile option to offer up adventure travel with the amenities of home when you get there. Air shows with your own hotel room right in the middle of the action? Lugging your camp set up in and out of a bush plane isn't a thing when your bush plane is the camp. Don't like the way the fish or game are in this location? A quick breakdown and an entire map section is an option within minutes. Whether it's a front row seat at Oshkosh, bone fishing in the Exuma's or a morning paddle board on an Alaskan lake they have a flight plan that offer the access 2Solitude. More info can be had at: info@2solitude.com, (403) 589-3299



2SOLUTIDE Version of the Antonov AN 2 on Floats

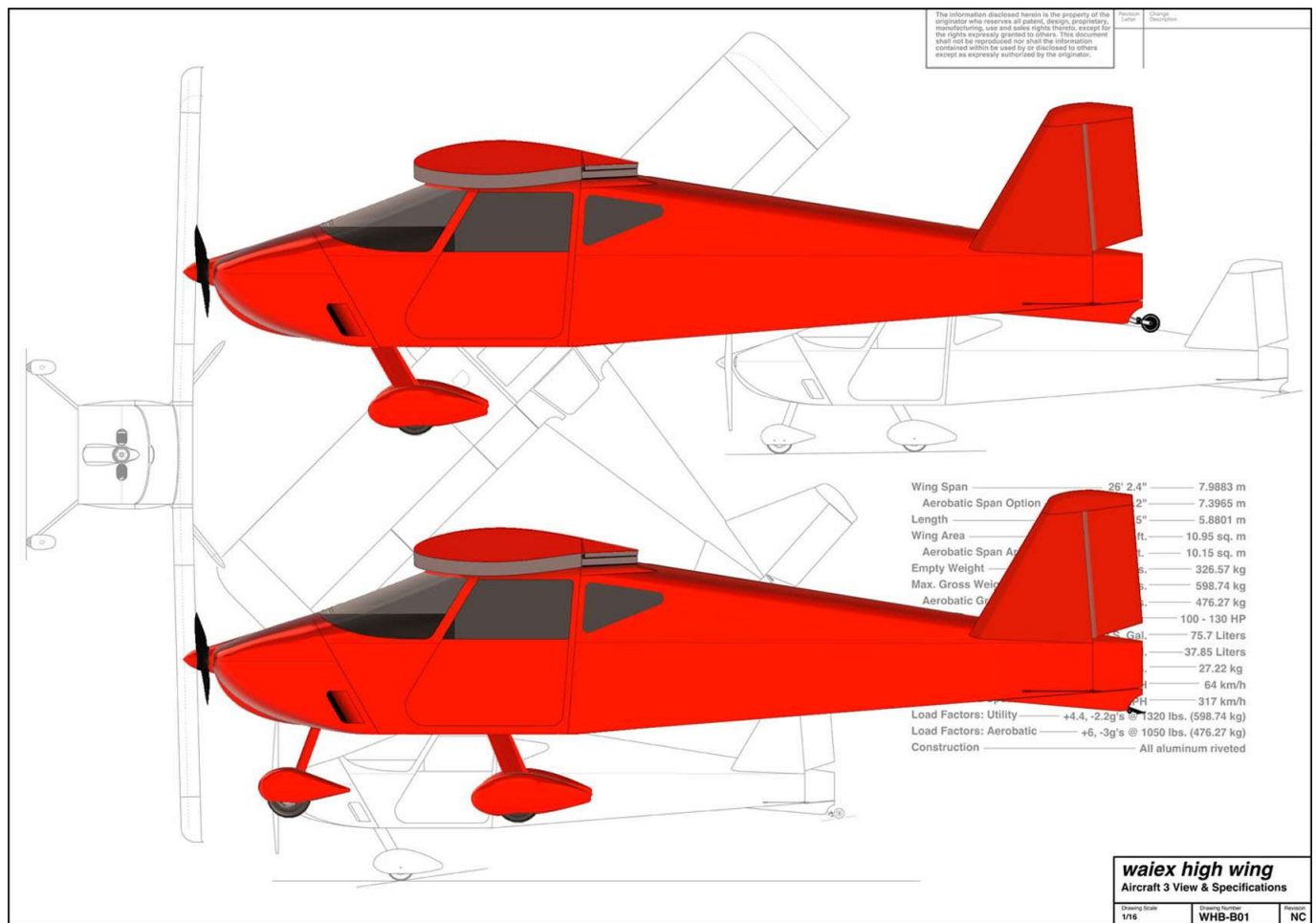
COPPERSTATE FLY-IN POSTPONED

The Copperstate has had a disagreement with the City of Mesa and will be postponing the event until fall. There is a lot of finger pointing going on but hopefully everyone will get on the same page and continue this great Arizona aviation tradition.

SONEX HIGH WING

Sonex Aircraft has announced its newest kit aircraft design: the Sonex Aircraft High Wings.

Designed for expanded utility, ease of pilot access and to appeal to the high wing enthusiast, the Sonex High Wing offers the same Sonex performance and handling in a new configuration. While many kit manufacturers today offer high wing aircraft with a backcountry mission in-mind, we are making our cantilevered wing aircraft in the Sonex tradition of sleek, efficient aerobatic and cross-country performance – The Best Performance Per Dollar! is their motto.





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Jack's Chipmunk at Cactus Fly-In

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Appareo Stratus ESG ADS-B transponder, Stratus 2i UAT w/WiFi, RAM AV-74(-1) Xsponder blade ant., pre-wired cable harness, GPS WAAS ant., GPS triax cable, \$3,000⁰⁰, Goodyear 500-5 6 ply tire, \$80, 4 Barry engine mounts 94510-41, \$400⁰⁰, Dynon D-10A EFIS w/ remote compass & temp probe, \$2,000⁰⁰, Charlie Spinelli, 206 678-5678, Spinelllic@msn.com

CURTIS F11C-2 "GOSHAWK"

Built by John Pike. R-1340 (600 HP). Less than 120 hours TT since new. Becker com & txpdr, Garmin ADS-B, 20 gal smoke tank, 102 gal fuel, <https://CaptainBillyWalker.com> 480-773-2823

AIRCRAFT TOOLS

I have some aircraft tools that I acquired through a friend. I would like to sell them. Dan Burdett 480-600-2865

LONGEZ AND SONEX

Two airplanes for sale at Thunder Ridge air park (AZ28), a 180hp LongEz and a 120hp Sonex. Contact Bertha Partin at bmpartin@gmail.com

COOL PLANES FOR SALE

Only flown by little old ladies to church on Sundays.
<http://captainbillywalker.com/aircraft-for-sale>
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THATCHER CX-4 PLANS & MANUAL

New, never used, donated to our Chapter.
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RV-4 PARTIALLY BUILT KIT

\$13,500 Lycoming O-290-D2, kit for \$3,000 or \$16,000 for both. Wanda Refrow 602-843-9862 w7lov@cox.net

LYCOMING O-360 A1A

Engine built up for RV project never completed. Invested \$50,000. Price very firm at \$25,000. Martin Del Giorgio delgiorgiopels@gmail.com

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Chapter member owned. R & E Cooler Service 800-657-0977 www.oilcoolersvs.com

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Airplane: Private: Commercial, Instrument, ATP, ME; and Lighter than Air: Private and Commercial. Fred Gorrell 602-942-2255, 602-418-2045, fgorrell2@cox.net

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