

EAA Chapter 790

Lake in the Hills, IL

790.eaachapter.org

## Five Years into a Tango 2 Project

*Mike Perkins*

The Tango 2 has been a joy to build so far. This project is a much different sort of challenge than the construction of my Kitfox back in the 90's. And it's not the difference between tube-and-fabric construction versus fiberglass but rather the difference in intended missions.



*It's not too often that my shop doors are open with bugs, cold weather, humidity, and blowing leaves. But early spring is a great time.*

The Kitfox has been flying for 22 years. It's been a great for local flights, Young Eagles airplane, fly-outs with Mary out to fly-in breakfasts which are plentiful in summertime Central Illinois. However, the Tango is a go-far airplane, so when it's completed Mary and I don't expect to be at home nearly as much. *(Cont. on Page 6)*

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## *Editors Notes:*

*This is the last call to sign up for the Annual Banquet Reservations. Enclosed is the form, please fill out and mail to Tom LeGates. The Banquet is being held again this year at the Crystal Lake Country Club. Meals are half priced (the chapter is picking up the rest), so it's a great time to renew your membership as well (form attached).*

*This issue I will be displaying Bio's from some of our members. The theme for this years' Chapter is to focus on the membership.*

*Any information i.e. building plans, flying designation experiences, youth in aviation etc. Please forward for the Newsletter.*

*Check the website for any current information between Newsletter editions.*

Annual Awards Banquet - Saturday, February 25, 2017  
6-9PM Crystal Lake Country Club

Guest Speaker-Bill Cherwin UAL and Lima-Lima Flight leader

For this year's event, we are returning to the Crystal Lake Country Club. We have decided to reduce the price this year for members and their personal guest. All meals are priced at \$20 each for the member and one guest (spouse/significant other). Additional guests are \$40 each. These are all-inclusive prices.

Meal choices will be Filet of sirloin, Chicken de jonghe and Pan roasted salmon. The meal will include a Caesar salad, baked potato, seasonal vegetable and caramel sea salt cake for dessert. Coffee is also included, all other drinks are available at the cash bar, which will open at 6 P.M. Dinner service will begin at 7:15. The Country Club requests suitable attire, no blue jeans please!

To sign up for the Banquet, **go to the chapter website or fill out the form** below and mail to:

Tom LeGates

Member: \_\_\_\_\_ Menu Choice \_\_\_\_\_

Spouse/SO: \_\_\_\_\_ Menu Choice \_\_\_\_\_

Guest: \_\_\_\_\_ Menu Choice \_\_\_\_\_

Contact Information (Phone/Email) \_\_\_\_\_

Guest: \_\_\_\_\_ Menu Choice \_\_\_\_\_

Contact Information (Phone/Email) \_\_\_\_\_

MENU CHOICES:

1. Filet of Sirloin
2. Chicken de Jonghe
3. Pan Roasted Salmon

Amount Enclosed \_\_\_\_\_

# EAA Chapter 790 Membership Form - 2017

## or sign up on the Website under Chapter Membership

First Name: \_\_\_\_\_

Last Name: \_\_\_\_\_

Spouse: \_\_\_\_\_

EAA Membership Number: \_\_\_\_\_ (Must be an EAA member)

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Home Phone: \_\_\_\_\_ / \_\_\_\_\_ - \_\_\_\_\_ Cell Phone: \_\_\_\_\_ / \_\_\_\_\_ - \_\_\_\_\_

Email Address: \_\_\_\_\_

Own Aircraft: yes or no                      Model or Type: \_\_\_\_\_

Aircraft Project: yes or no                      Model or Type: \_\_\_\_\_

### For Young Eagles

If you have completed Youth Protection training, what was the date \_\_\_\_\_

If you have completed the background check, what was the date \_\_\_\_\_

### Dues

\$25.00 Family/Individual Renewing Membership \_\_\_\_\_ \$10.00 Family/Individual First-Time Membership \_\_\_\_\_

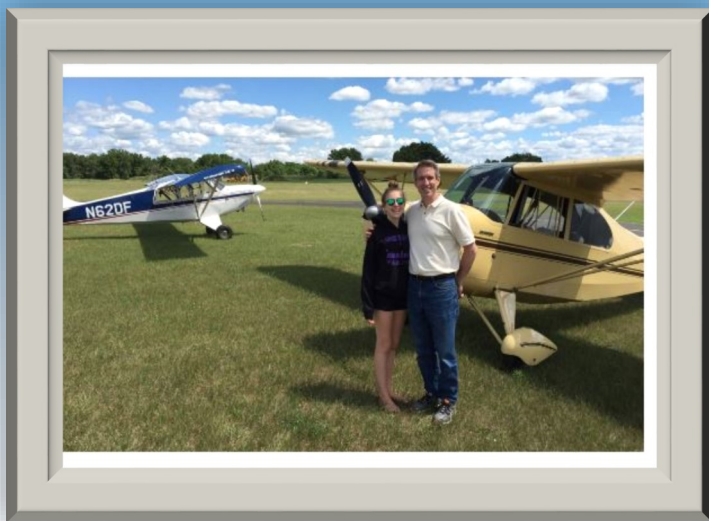
\$10.00 Out of State Membership \_\_\_\_\_ \$10.00 Student Membership \_\_\_\_\_

Please make checks payable to "EAA Chapter 790" Bring this form and payment to a members meeting, or mail to:

EAA Chapter 790, PO Box 1206, Barrington, IL 60011

## Meet our Chapter Members

### Bob Bruebach



Last winter I was fortunate to find a 2004 model that I love to fly and it will be my ride for a long time. (The Champ was finally sold last week)

I've been flying since 1983. Before 2012, I was renting aircraft and had the opportunity to fly and get my instrument rating in the venerable C172, as well as to experience Decathlons and an Archer. I was able to acquire a hanger at The Landings in 2012 that came with a 1950 Champ 7EC, which I've enjoyed, but I have always pined for an Aviat Husky, a modern version of the Piper Cub. When I acquired the tailwheel endorsement back in 1997 in a Cub, I fell for the centerline tandem seating and the control stick. The next trip to Oshkosh introduced me to the Husky.



Unfortunately, work (financial roles at manufacturing companies) and my teenage daughter keep me from flying as much as I would like, as well as preventing me from attending the chapter meetings. I would like to get more involved with 790 and I'm hoping things slow down when my daughter can drive herself next year. I do enjoy reading the chapter's newsletters!

*Bob*

847/420-6700

bbruebach@att.net

*Welcome Aboard  
Bob! Good luck finding  
the extra time.*



## Meet our Chapter Members

### Cassandra Peterson (Cassie)



Hi! I'm Cassie Peterson, and I've been a member of Chapter 790 for a year or so now. I fell in love with flying as a little girl. My dad briefly owned a Cessna and would take the family up flying on weekends. When I was in college, I decided to take an introductory flight, and as soon as I got my hands on the yoke, I was hooked. After getting my private pilot certificate, I decided I didn't want to stop there. I continued working on my ratings with the goal of one day working for the airlines. I hold a commercial certificate, with ASEL, AMEL, and instrument ratings, and a CFI for instrument and single-engine ratings.

However, at that time, there was no movement in the industry. I was lucky to even land a job as a CFI. After instructing for a while, I took time out to have a family and eventually shifted gears toward working as a freelance writer and English instructor. Unfortunately, as often happens, life gets in the way, and I fell out of aviation for many years. Like many lapsed pilots, I tried a couple times to get back into it: a flight review every once in a while, and even a few soaring lessons along the way. In January 2015, the time was finally right to get back into flying. At first I wondered if I still had what it

takes to get into the left seat, but the skills--and my love of aviation--never left.

After I completed a flight review at Blue Skies Flying Services, my instructor told me that they were looking for additional instructors. So, I brushed up on my teaching skills, and I've been working there since the summer of 2015. I love sharing my passion for flying with my students and especially like helping rusty pilots find their way back into the cockpit. Last fall, I started at the Rock Valley College Aviation Maintenance Technology program, and I'm working toward getting my A&P certificate. I love my classes and getting to learn more about the machines I fly. Once I complete my A&P, I hope to work in general aviation for a while (as a mechanic and CFI), and eventually get into technical writing. I would love to get into aircraft restoration and work on warbirds and vintage aircraft.

While school has limited my flying time, I'm still working at Blue Skies on the weekends and trying to stay involved with the various aviation organizations I belong to, including EAA, Women in Aviation, AOPA, and more. I also occasionally do some volunteer work for the Air Classics Museum of Aviation (at KARR). My favorite EAA activity is working with the Young Eagles program and doing my part to help the next generation of pilots discover their passion for flying.

Outside of aviation, I enjoy spending time with my family, traveling when I can, running, reading, and writing. I still have a lot on my flying bucket list, such as getting my tailwheel sign off and maybe a sea plane rating. I'd like to try flying all sorts of different airplanes, including warbirds and vintage aircraft, and maybe one day have a plane of my own.

*Cassie*

*gclpeterson@gmail.com*

*847/669-1788 Huntley*

**Five Years into a Tango 2 Project** *(cont. page 1)*

If you've ever built plastic airplane models, you know just how the Tango is constructed – there are left and right fuselage-halves and top-and-bottom wing panels. The flaps and ailerons are actuated with concentric torque tubes so that no levers, control rods, or cables have to be built into the wings. All that is in fuselage tunnel at the ends of the torque tubes. The rudder system is entirely conventional.

Then there's the one-piece 20-g wing spar piercing the fuselage and bonded to the airframe with 12 layers of fiberglass. To achieve spar placement within 1/10 degree of the desired dihedral, exceptionally-careful adjustment of the supporting fixtures was required. The wings are wet, having fuel storage ahead of spar for the entire span. But there is also fuel storage behind the spar for the wings' outer four feet, and this approach has the effect of removing some of the fuel load from the wing/fuselage juncture much like tip tanks do. The total fuel load is 59 gallons.

With a predicted 1200-pound empty weight and 2000-pound gross limit, it should provide for a 1000-mile mission while still carrying a full load in the passenger compartment.

The tail is full-flying with a stabilator as used by Cherokees and Cessna 177s. On my project, some very special machining was required to drill the stabilator's fiberglass spar due to some residual resin retained within its hollow midsection. But otherwise the stabilator required very little work as it came from the factory. The stabilator and rudder are internally mass-balanced with lead. They're a little over-balanced right now and will be trimmed by judicious

drilling after the surfaces are painted.

At the suggestion of the factory, I've added rudder trim. But there was no kit for that, so I've designed and fabricated my own rudder trim system. It is based on a 2" diameter capstan driven by a tiny 3000:1 gear motor. Through a pair of cables, the system repositions a pair of levers that act as the stakes for the rudder-return springs.

The seat mounting system was also another free-for-all. The builder's manual literally reads "good luck and be creative." But actually, that statement fit my situation because I had some interesting design objectives with respect to seating. Mary wanted to be able to tilt her seat. I wanted the seats to be exceptionally easy to remove. And everyone wanted the seats to be fore-aft adjustable. So while traveling between Florence and Venice on our Italy trip this spring, I designed lightweight seat rails that could accomplish all those goals and still only weigh 1.5 pounds.

The seats are raked about 38°, so the possibility exists of submarining out of a lap belt. This is a not-often talked about problem when seats are reclined. So I decided on six-point seat harnesses. Five-point harnesses are often used, but six points are gentler on the body. There are even seven point harnesses for negative G's. I chose a pair of six-point harnesses fabricated by a well-known racecar harness manufacturer. I also learned that racing seat belts, using the same seat belt materials we are familiar with in our cars and airplanes, have expiration dates due to aging effects mostly caused by ultraviolet radiation. *(Cont. on next page)*

**Send any of your aviation adventures, pictures, articles, humor or For Sale items you would like to appear in the Newsletter to:**

**"tomsolar@sbcglobal.net"**

### Five Years into a Tango 2 Project *(cont.)*



*The doors are a sandwich comprised of inner and outer shells with the Plexiglas window in between. Epoxy resin and vinyl ester resin were used here simultaneously, the epoxy for the window and vinyl ester around the door perimeter. The overall working time was just 20 minutes for all three layers and the two resins – mix, mix, apply, apply, assemble, and cleco – being sure to keep the two incompatible resins separated. Some practice was required. The airframe here serves as a glue fixture for the door assembly and is proof that clecos are not just for metal airplanes.*

Recently finished are the gull-wing doors with special handles and latches. I didn't want or need anything special, but the kit leaves you on your own there. Fortunately one of the factory guys in Florida is a dyed-in-the-wool tinkerer and inventor, the two of us came up with something really neat and very lightweight, measured in single-digit ounces, and very secure. The result was fore and aft sliding pins and a bottom cam, all operated simultaneously by 1/16" push-pull rods with an over-center mechanism. Separately I developed a pair of fold-out, aerodynamically-slippery door handles – pull, twist, lift – and there is a traditional lever on the inside.

The fiberglass frame for the instrument panel is my current project. I've designed it to be removable for

extended maintenance or airframe modifications – I don't expect to just park the airplane between flights. The removable fiberglass panel frame supports the left, right, and middle aluminum panels. Behind the middle section will be a removable radio rack.



*Pull, turn, lift. Interestingly, the handle shown here is heavier than the pin-and-cam latch mechanism it operates inside the door. But it all functions nicely together.*

Of course everyone is curious what equipment I'll stuff my panel with, but I'm a long ways from making those decisions. For now the panels will remain blank. But I'm leaning toward simple flight instruments with some good engine-monitoring. Simple flight instruments does not necessarily mean round gauges, but it does mean something modest that can be built-upon as missions become more sophisticated.

The fuel system is plumbed up to the firewall. I'm using "the better fuel system" approach that Ole and I have perfected over the years. So both wing roots have a Facet pump that feeds the fuel selector valve. The valve will be set to "both" for anything but maintenance or special in-flight situations.

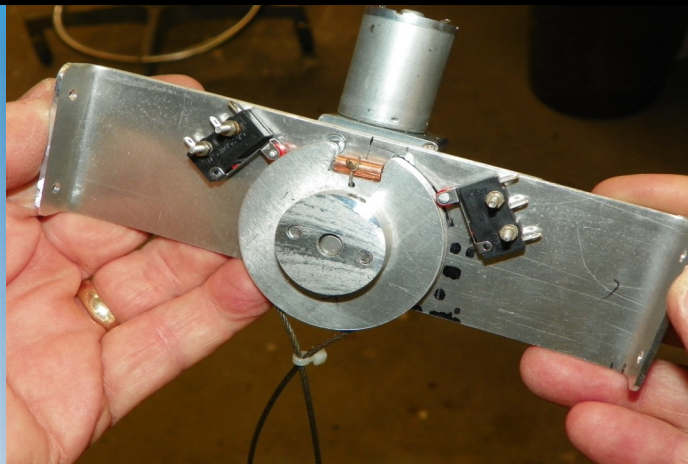
*(Continued on next page)*

### Five Years into a Tango 2 Project *(Cont.)*

An electrical high-pressure pump mounted in the tunnel will back-up the mechanical pump. Choosing which pump is to feed in cruise will be done by electrically-selecting the wing pump. The SOP will specify that for flight below 1500 feet AGL, both wing pumps and the electric high-pressure backup pump will be selected. Annunciation will occur with loss of fuel pressure from either wing pump or loss of high-pressure fuel supply. For extended-range flights, there is the possibility for a cockpit-mounted supplemental fuel tank so a stubbed-off tee is provided.

The aircraft was designed for a Lycoming IO-360, but many other types have been used. However, I decided long ago I would use an engine from the recommended lineage. Another goal has been to be able to burn mogas for flitzing-around the local area economically. Of course that decision has some drawbacks since some other intended missions will require more power than provided by a stock IO-360 running 87 octane fuel. So Ole and I are discussing a high-compression engine but dual-rating it. That would mean creating one operation table for mogas and another for 100LL. The premise will be to limit manifold pressure while using mogas.

**P.S. Mark your Calendar for Feb 18 Workshop visit to Vic Bugnits Zenith CH701 in Harvard, IL. 7105 Shields Rd. 10:00 AM 708/567-1176**



*A custom capstan was necessary in the fabrication of the rudder trim system, which turned out to be very lightweight. The gear motor (under the capstan and mounting plate) was a \$15 purchase from Amazon.*

That's the hardware.

Regarding people ware, I've had a nice young man, Caleb, helping with some of the work since July. He's just now finished A/P school in Springfield although he's yet to take the FAA tests. So I almost have a certificated A/P working with me, although he seems mighty interested in turbines. But alas, Caleb will begin attending the U.S. Army's fine boot camp in Georgia in August. Until then I have him about two Saturdays a month. Aside from adding parts to the airplane, he adds to my attention to the project. But the best thing is that while we work we have a wonderful time talking.

*Mike Perkins*

**Send any of your aviation adventures, pictures, articles or humor you would like to appear in the Newsletter to:**

**"tomsolar@sbcglobal.net"**



## February Events

- \* Feb 4-Fly out to Clow 10:00 AM
- \* Feb 7-Board Mtg LITH
- \* Feb 18-CH701 Project Showcase-7105 Shields Rd. Harvard 10:00 AM Vic Bugnits 708/567-1176
- \* Feb 25-Annual Banquet 6 PM Crystal Lake CC

## FOR SALE

by Chapter Member Dave Boone

**LANCAIR ES KIT** • \$55,000 • **ACCEPTING OFFERS** • Lancair ES "Fast Build" kit for sale (still in crates). Purchased 2001. Stored in hanger. This kit has all components except engine and interior. A&P owner has completed the horizontal tail. Fast Build firewall, wings and tail . Wing mate. Construction tables available. I am getting ready to move and have no place to store the project. Project located in Northern Illinois. • Contact David A. Boone, Owner - located Crystal Lake, IL USA • Telephone: 815/540-8327 . 815/455-4555 • Posted December 7, 2016 •



Below are the new logo's which are being considered for the Chapter. These two were picked out of several submitted and are the final contestants. Lets us know which one you like the best if you have not already voted. Send your votes to Paul Ranieri "p.ranieri@comcast.net"

#1



#2



Coming in the March Newsletter-  
Update on Electric and Hybrid Power flight

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