



## WHAT I WISH I HAD KNOWN ABOUT BUILDING MY OWN AIRCRAFT

**Allen W. Inks**

As you may know, I recently completed building a Pipistrel Virus SW kit and it had its first flight January 4, 2018. The kit was marketed as a 200 hour kit. I'm a reasonably handy guy with a fair amount of tools. I used to belong to a flying club and did a few years of weekly maintenance on aircraft under the supervision of an A&P, so I thought I knew a few things about working on airplanes. The kit came with the composite fuselage and composite wings fully molded around the internal structural elements, so it wouldn't be like I was going to forming dozens of wing ribs or bucking thousands of rivets. So, it was only 10 hours of work a week for 20 weeks, right? Easy.

Still, I thought, I haven't done that much composite work. And I hear all these stories of other people building airplanes that took much longer to complete than they thought. Heck, it might take me 40 weeks...maybe even a year.

That was 4 years 7 months ago...

In the end, there were really no steps that were that hard. But the instructions at times didn't make a lot of sense. Some of it was because the aircraft kit was made in Slovenia, and some of the translations involved just don't bear any semblance to what we call them in English. For example, what's a "heart of steel"? Turns out, that's the machine translation of the



Slovenian word for a wire cable thimble. And what is a "CABLE EYE PANEL MOUNT"? Turns out, that's a rubber grommet. Which leads to the first thing I discovered:

**1. Don't expect immediate answers.** When building, and you have a question ... it will invariably arise on a Friday, just after the manufacturer's technical support staff have gone home for the weekend. And 50% of the time, it's a holiday weekend for them, so they won't get your voicemail

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Volume 60 Issue 2

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### Next Event

**Feb 10**

**Lunch 1130**

**Program To follow**

**Chapter 35**

**Clubhouse**

Runway 35 is published monthly as a free service for our members and our flying community by EAA chapter 35.

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### Featured Speaker!



**Lancair International**  
**Moving Lancair to Uvalde, TX**  
**and the exciting new MAKO!**  
**(rescheduled)**

## PRESIDENTS COCKPIT

**Steve Jones**

**Director's Meeting.** Your Board of Directors met prior to the January meeting to review Treasurer Dee Brame's outstanding work on the 2018 budget. The board reached several key decisions. Chapter 35 will send two up-and-coming leaders to the Leadership Summit this fall at Oshkosh. We also have enough operating funds on hand and revenue forecast to keep our membership dues and monthly meal prices at their current level. This is a tribute to the fantastic work our committee chairs, managers and directors have performed to keep our expenses down. The board has set aside funding to make improvements to the memorial garden, expand our Gone West memorial onto the western wall, and acquire a plaque to recognize our many outstanding Master Pilots and Mechanics. Brian Goode announced this will be his final year managing the Country Store. If you have aspirations of stepping up to support a vital function of your chapter, see Brian or me.

**Master Pilot Award.** Schedule permitting, we will be honored to host the presentation of the Master Pilot Award to Jim Humphries at the Chapter Clubhouse, Saturday March 10<sup>th</sup>. This will coincide with our March meeting and Hangar Tour. I'm announcing this early so you can save the date. Fifty years of safe and successful flying is a phenomenal achievement, and deserves our attention.

**January Meal.** Joe Roberts led us in the invocation, then fifty-two members and guests gathered to enjoy, as Freda Jones put it, "the best pulled pork sandwich this side of I-35". I believe she nailed it. Freda and a host of volunteers got us off to a great new year with a wonderful meal! I'm going to stop joking about how the government could learn a thing or two about managing a budget from our Facility Team. I will say this: We're not going on a budget holiday at Chapter 35. We are open for business!

**A Visit by Lancair!** You will want to be here for the February meeting! Lancair is still planning to tell us about their new ownership, the move to Uvalde, and their newest aircraft, the Mako. Again, weather permitting, they're planning to fly the Mako in to San Geronimo to showcase it.

**A Last Minute Flight and a Surprise Opportunity.** Our presenters for Take Flight!, an organization dedicated to introducing young woman to aviation careers, were themselves called away by their aviation careers. We're looking forward to rescheduling and hearing their vital presentation as soon as we can make it happen. Coincidentally, Richard Hogan, aircraft designer and CEO of CommuterCraft, was in town to meet with Bario Aviation, a beta build site and builder integration facility for the new Innovator aircraft. Richard gave us a rundown on the aircraft goals, design tradeoffs, performance, and plans for bringing your own carbon fibre kit aircraft from fantastic idea to finished airframe in three short weeks. With a variety of builder-assist options available, Richard expects that a new builder could have an aircraft flying in as little as three

months from start of build. For more information, visit his site at <https://www.commutercraft.com>

**Home for Wayward Builds.** In November last year, John Egan, HQ EAA Chapter Manager, reached out to all Texas chapters with a unique offer: a Sonex builder was unable to complete his build and wished that a Texas chapter could take over the kit. With our focus on supporting our local school districts, Chapter 35 made a compelling case to accept the donation. We were not selected. There's a positive note, here: As a result of the massive response, John is instituting a program to formally match wayward builds to enthusiastic chapters. We are making a difference!

**The Dee Howard Foundation supports EAA Chapter 35!** After observing our Young Eagle Rallies at Stinson Airport and San Geronimo Airpark, Wayne Fagen, chairman of the Dee Howard Foundation invited Chapter 35 to participate in the San Antonio Aviation Hall of Fame dinner, and recommended a grant in the amount \$250 for Chapter 35 to continue supporting our Young Eagles program. Phil and Susan Vaneau will attend the dinner and represent Chapter 35, and so will his Christen Eagle! Phil has been invited to showcase experimental aviation and his aircraft has been given a position of honor, parked under the wing of a 433d Airlift Wing C-5M Galaxy.

**Get Involved.** You could be our next Country Store Manager. You'll learn from the best! Our outgoing manager was instrumental in the success of several Cessna regions, and manages a phenomenal store for Chapter 35. Your chapter needs you now, more than ever. Come find us at the next meeting, or wandering the hangars, drop an e-mail or pick up the phone. Let us know where you would like to contribute to this outstanding chapter.



## NEW MEMBERS!

**Please welcome:**

**Allan and Andrea Foster.** The Fosters are from San Antonio. Allan is building a Wheeler Express and may be contacted at [afoster1@hotmail.com](mailto:afoster1@hotmail.com)

**Walter and Kamallata Jones** The Joneses are from Fort Sam Houston. Walter is currently serving in the Army and may be contacted at [KC7HEX@hotmail.com](mailto:KC7HEX@hotmail.com)

**Robert and Danka Grauel** The Grauels are from San Antonio Robert retired from the USAF as a Security Forces Canine Instructor and is currently employed as a DHS, TSA, Canine Instructor. You can see Robert on some evenings and weekends at 8T8 flying model airplanes. You may contact Robert at [rgrauel@gmail.com](mailto:rgrauel@gmail.com)

**Michael Kill** Michael is from San Antonio and is a General Contractor. He hopes to get his Private Pilot License but in the meantime is flying model airplanes at 8T8. You may contact Michael at [michealkill40@gmail.com](mailto:michealkill40@gmail.com)

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#### FEBRUARY MENU

Main Course: Beef Stew. Remember how a hearty bowl of beef stew would warm your bones after a day of slogging through endless drifts of snow, uphill, both ways? Sort of like last month. We do!



We're bringing on the beef! Succulent, tender beef, surrounded by carrots, potatoes, celery, onions, steeped to perfection in the finest beef stock. You're drooling, aren't you?

Side Dishes: red beans and rice

Served with: sour dough bread

Desserts: requesting pies, cakes, cookies, brownies or anything you like.

To drink: water, soda, iced tea, lemonade and coffee.

If you bring something, please let me know. We're happy to reimburse or give you a complementary meal ticket - your choice.

Thank you again to the fantastic Facility volunteers. We had people shredding pork and serving an endless line of hungry patrons.

#### Chefs

- ◇ Freda Jones - Shredded Pork Tenderloin
- ◇ Lew and Nancy Mason - Raison Cake
- ◇ Chuck and Peggy Fisher - Lemon Cake
- ◇ B.J. O'Dea - Chocolate Chip Cookies

#### Servers

- ◇ Roxanne Beavers
- ◇ Peggy Fisher
- ◇ Mary Ann Schlattman

## INKS CONTINUED

(Continued from page 1)

or email until Tuesday. So plan on having several projects running more or less concurrently, so while you are waiting on the response to questions about one part, you can be working on something else.

The next thing I discovered, particularly with a fairly exotic kit like mine (there have been a number of Pipistrel aircraft imported into the US, but very few were built from kits; most were built at the factory) is that:

### 2. You are now the technical expert.

People will inevitably have questions about how you did things, or why you made an apparent deviation from standard instructions. It is a very good thing to have an organized collection of your correspondence with the factory, notes from phone calls (who you talked to, date, time, subject matter, and substance of conversation). I had a wonderful spreadsheet of all those things. Tied to page number of the procedure if applicable.

There are two corollary things to know:

2a. Back up all this collection; if you are keeping it on a computer, back the information up frequently.

2b. VERIFY that your backup process is working ... that you can actually get to the backup copy of the organized data. I was backing things up, regularly.

When my computer's main hard drive died, I was unable to restore any files from the backup files I thought I was recording on my external hard drive.

But this leads me to my next lesson learned.

**3. Join the Community.** Having other builders working on the same or similar model aircraft as you is an invaluable asset.

I was fortunate that two other people in the US started building the same kit I was, and we all started within a few months of each other. When we stalled on building, we each chose a different part of the kit to work on while waiting for an answer from the factory. As work progressed, we would each have questions about procedures in the various different areas. When we got answers from the factory, we shared them amongst ourselves, so that when

someone moved on to another area of the aircraft build procedure, they would have copies of correspondence about many of issues and the guidance from the factory to resolve those issues. Of course, this is similar to the experience many builders of more plentiful aircraft have – there are others who have already built a similar aircraft, and can offer advice. Of course, that's one of the reasons for having a local EAA chapter, to support builders, and help offer advice.



The Chapter Directory has a list of our chapter's members, and also includes the names of aircraft they fly or build, so that would be a starting point. It doesn't have a field for avionics, but I would encourage members (at least those who have installed their own, or otherwise might have some advice about avionics) to include a remark in their Chapter Directory listing as to the avionics you might have advice about. For example, I installed a Dynon Avionics package in my Virus SW. I can answer SOME questions about it, and

some of the other avionics systems I installed, although I am not a guru by any stretch of the imagination. But, at least some of the stuff I installed works (still in test phase, not worked through everything).

Where can I find a guy or gal who has the equipment and training to help me measure the SWR on my radios? I don't know...

Another source of information about who your fellow builders are is your dealership network, forum pages, type clubs, etc.

Another bit of information that I lost when my computer died was my computerized build logs. Fortunately, I had printed out a paper copy of my work to date just a few weeks before. And about that time, I decided that while Kit Log Pro builder's log is nice, it took me a LOT of time to type up the description of stuff we had done on our kit. So about that same time, I started recording stuff in a spiral bound notebook, intending someday to transcribe it into the Kit Pro log book. Well, that day has never come; the DAR thought my spiral-bound notebooks were a perfectly fine builder's log, I'm flying now, and I'm not motivated to go back and do that transcription thing. [editor's note: the new chapter website is being designed to support an online, free, builder's log]

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## INKS CONTINUED

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For one thing, the entries in spiral-bound notebooks are not limited in length; in contrast, entries in Kit Pro log program have a specified maximum length; I wasted a lot of time over the years trying to figure out how to say something in fewer words, and still be clear in that logbook entry (at this point in this article, I think it's no secret that I'm much more prone to verbose than taciturn). When I switched to spiral notebooks, that waste of time went away. Also, pencil and paper are much more tolerant of epoxy on my gloves than are a computer keyboard.

**4. Have extras.** It's a whole lot less stressful if you have more fasteners than you need for a particular job.

My kit was "complete" The fasteners I needed were supplied to me. EXACTLY the fasteners I needed. I had 42 black painted broad-head METRIC pop rivets needed for fastening down my windscreen. I needed all 42 of them. AND, the process is to lay down a bead of caulk around my window opening, position the windscreen on top of the caulk, and then rivet it in place to compress the caulk... before the caulk set. If I mis-pulled a rivet, it would be several days before the factory could send me one; I tried a half a dozen supply stores and shops online (including Fastenal). One of my cohorts building a Pipistrel Virus SW in Bastrop, TX, had related the story of his rivet puller breaking midway through this process, and having to rush around town trying to find a rivet puller before his caulk set up. So I called the factory and ordered 200 extra rivets (planning ahead to a window replacement in ... hopefully.... Many dozen years). I also made sure that I had a spare rivet puller available when I started installing rivets. I also managed to wheedle a sack of extra nuts and bolts from the manufacturer, 10 long bolts/screws in M3, M4, M5...M13, etc. In longer lengths, we could cut the bolts to length. They were mostly used by the time the aircraft was done. Talk to YOUR manufacturer about spares included with your kit (if fasteners are supplied). Particularly if you are using fasteners that you can't pick up at an appropriate local dealer, like the odd-ball metric rivets I have.



**5. Loctite will cause Plexiglas/Lexan to crack, as will gasoline.** My kit does not use AN fasteners; there's no castellated nuts with cotter pins. Most fastenings are made by a bolt or screw, with a Nyloc self-locking nut. In addition to the nylon insert of the Nyloc nut helping secure the nut in place on the bolt, this is backed up with a dash of Loctite 243, in most instances.

Including the locks fixed to the Plexiglas side windows/doors. I knew that getting gasoline on the windshield and windows was bad; a warning about Loctite somewhere in the instructions would have been nice.

**6. Ouch!** Carbon fiber that has been impregnated with epoxy, should be smoothed out carefully, so that no little loose threads remain raised at the edge of the cloth fabric. Once cured, those fibers are seriously sharp.

Don't ask how I know. Just check the edges of the cloth you have put down - before and after curing - be prepared to sand if you don't find it while it was uncured. Don't say, "Oh, that's way back in the back, I won't stab myself on it" Sure, maybe not this year. But next year, inevitably, a spring go flying through the air and land way back there. Now you are fishing around there for it. Be prepared with a bandage.



**7. Wait to buy Avionics.** This one is obvious. I knew it before I started building: Buy your avionics at the last possible time, because all the really neat and cool stuff will come out just after you spent your money on the previous generation stuff.

I was very early in my kit that was going to take me "MAYBE" a year, when I got a discount certificate for buying some stuff from Aircraft Spruce as a result of my attending an EAA seminar on composite work. So I spent in on avionics, which is what I needed. Well, it certainly helped me when I was laying stuff out to have the cables and components available before spaces got crowded in the aircraft. But 4 years later, my avionics are just now being used, and they are out of warranty. In fact I had a failed ADAHRS unit, and had to send it back to Dynon to be taken care of. Fortunately, I had gone to EAA AirVenture last year and talked with the Dynon guys. I had

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## INKS CONTINUED

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just started powering on the displays and system components, and saw that unit misbehaving. I explained to the manager at Oshkosh that the unit had spent the whole time in a box on a shelf in my hangar up until a couple of weeks before Oshkosh. Stand-up people that they are, Dynon fixed the ADAHRS unit at no charge other than shipping the unit to them.

Finally, a little tidbit about Phase 1 testing. I had the EAA Amateur Built Certification package, which includes a sample program letter, in which the proposed testing are would be a 25 radius of such and such an airport. I had talked to my DAR about seeing if, instead of having a test area centered on my airport (5C1, Boerne Stage Field), I could have the 25 mile radius centered on TATAR intersection, near Comfort. Boerne Stage Field was within this radius, as are San Geronimo, Kerrville, and Fredericksburg (Gillespie County) airports. He thought it might be possible, but said we'd have to check with the FAA MIDO.

Well, I was going downtown for something else anyway, so I grabbed my sectional map with two circles drawn on it.... One with a 25 mile radius of Boerne Stage Field, one showing a 25 mile radius of the TATAR. I visited the MIDO, and spoke with Ford Lauer (Manager, San Antonio MIDO) to review my proposed program letter.

I showed him the chart and explained my logic behind having my test area radius center on the TATAR intersection, rather than a particular airport. Mr. Lauer said it was fine, it was good to be further away from the built up areas immediately south of Boerne. Then he wondered why I hadn't selected my flight test area to include Castrovilla in the airports I wanted to be able to fly to. I explained that it was more than 50 NM from Gillespie County airport (Fredericksburg).

**8. Choose your test area where you actually want to fly.** Mr. Lauer said that the flight test area doesn't have to be limited to a 25 NM radius circle of your home airport. You can move it to center on another logical spot, such as what I had proposed with TATAR. It can be bigger than a 25 NM radius. In fact, it doesn't have to be a circle. You could take your chart, and draw a pro-

posed test area of any shape on it, and submit that. "We just don't want you operating over populated areas."



I might have done that (drawn a more expansive test area on a chart and submit that) but I was flying to Hong Kong the next morning (commercial, not in my newly built airplane) and had already been awake for more than 24 hours taking care of last minute details to get ready for that. The 25 NM radius circle centered on TATAR worked for me, and that is all I had energy for at the time, so that is what I went with in my program letter.

**9. Finally, unless you are Chuck Yeager, use a second pilot.** The

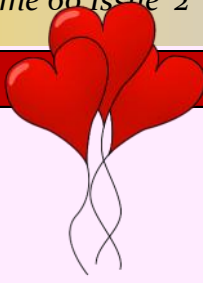
new FAA AC90-116 Additional Pilot Program for Phase 1 Flight Test is a really good idea.

In the 10 days following my first flight in my new aircraft, I flew more hours than I had in 2017 and 2016 COMBINED. I had basically stopped flying during construction. And when it came time to maneuver the aircraft, to do stalls to determine approach speeds, etc..... I was rusty. I went up the week before, with an instructor in a very similar aircraft (Pipistrel Sinus Flex, which has interchangeable short and long wingtips; with the short wing tips it is on, it's flight characteristics are pretty similar to my Virus SW. That flight helped, but what allowed me to relax and smile on that first flight was the knowledge that the guy (the flight instructor) sitting next to me had hundreds or thousands of hours in similar motor gliders, and he was relaxed and enjoying the flight. It may not be as macho as soloing the first flight, but I highly recommend it.

*Editor's note: Allen's airplane flew for the first time 1/8/18 and only a week later he was able to show off his amazing work flying in to our chapter meeting. Like most builders, Allen had never attempted something like this before. The results are amazing. I think he'd be the first to tell you, you can do this too. And, as more builders learn from experiences like these, each subsequent build gets a little bit easier for the next guy. Support for builders is what EAA was founded for, and remains a critical part of our chapter's mission. Congratulations Allen – she is gorgeous!*



## TO MY COPILOT



### Chuck Fisher

As stared at this blank spot in the newsletter, I realized I would be totally remiss if I published a February issue without mentioning Valentines Day. So here goes.

Although this is about my Valentine, I hope each of you will be able to identify a co-pilot in your life, him or her, and find this hits home for you too.

You see, I like to fly. It's expensive, time consuming, sometimes frustrating, and even a little dangerous. And, though all those machismo movie types we grew up with make flying seem like a great bachelor hobby; in my case I don't think I could do it or would have stuck with it alone.

Peggy isn't a pilot and has no flying background. But for 35+ years she has been at my side for bazillions of airshows, helped pick up my broken RC planes, spent countless days, nights and months waiting for me to return from flights, deployments and crash investigations, then patiently encouraged me as I started to fly on my own nickel as my Air Force career wound down.

There was the night Ron O'Dea and I picked up an airplane in Florida, arriving home one week and 2 hours late due to weather. The 2 hours made it just late enough to have to land in Gonzales due to darkness. After waiting all afternoon for our arrival, she drove all the way there to bring us home that night.

She rode with me through the worst landing of my life; scary and embarrassing to this day. Then she got in and flew with me again.

Peggy drove me up to Fort Worth to buy N10133, to Lampasas to for

maintenance and back to pick it up, and rescued me at Boerne when it was too dark to land back home. She's been with me for fly-ins & fly-outs, spent hours on blazing hot aprons, guided kids to planes, given tours, and been there for pretty near every chapter meeting and event, lugged parts, held tools.... You get the idea.

We fly to Oshkosh when we can, and have been able to for the past few years. Peggy is a good passenger and she's started teaching kids up there about flying and navigation and all the things she's been learning herself. I think she enjoys it, and my hobby has, in some ways become hers too.

She proves you don't have to be a pilot to love spending a day above the clouds, an afternoon watching a good airshow or a warm evening playing a raucous round of full-contact dominos with your flying friends.

But, this isn't just about Peggy. It is about anyone who supports and loves you. I hope as you read this, you too can look across the room, your cockpit or in the warm recesses of your memory and feel the touch of someone who encouraged you in your darkest days and shared with you your brightest. Tell them thank you, for being there for you.

Peggy's not a pilot – but without her I am not sure I would be either.

Happy Valentines Day Honey....and thank you for always being at my side.

My copilot.



## CHAPTER NEWS & FROM MEMBERS

### OUR DIGITAL WORLD



**Have you seen it yet?** Our new website and our Facebook page? If you haven't you should. These are the global face of our chapter. Please take a few minutes to look the up and add your material, comments, suggestions, photos, and more. The



website is <http://eaa35.org> and the Facebook page is at <https://www.facebook.com/eaa35/>. Send your input to Jose Garcia at [eaa35pr@gmail.com](mailto:eaa35pr@gmail.com). It is YOUR organization. Take some time to share it with your friends—maybe they too can be inspired to fly.

### FROM THE EDITOR



I spent a delightful Sunday this week with **Richard Poenish** who has stepped forward to assist and eventually take over editing this newsletter. The technology to assemble this can be a bit daunting, so we'll transition gradually over several months till he tells me "he has the controls".

Richard is building a plane of his own, and I think will bring a welcome builder's focus, and his timing is welcome as this year is shaping up to be a busy one!

### DUSTER

This is the magnificent wooden model Jim Humphries as made of his Starduster (See Jan 2018). Magnificent!



## CHAPTER BUILDER'S - BUILD A KUGEL

OK, admittedly this is a stretch, but I didn't have a builders update, so today we will build....a cake! Darren Medlin submits: The following aviation related recipe is for *Swiss Potato Kugel*, one of the many tasty dishes at our Chapter Party in December. Though not Swiss, our international celebrity (in our eyes) and former chapter president sampled the dish and was overheard to say - "Umm, yes" which I suspect actually meant "Just like Moms!" ... or it may have just meant "Umm, yes.". Anyway, here is the recipe which you can find duplicated in multiple places on the internet. Please see "<https://www.tasteofhome.com/recipes/swiss-potato-kugel>" for a non-aviation version of this dish. **This is also a not so subtle plea for our builders to send progress pictures, hints and updates!**

## INGREDIENTS

- 1 cup finely chopped onion
  - 2 tablespoons butter or margarine
  - 4 cups shredded or diced cooked peeled potatoes (about 4 medium)
  - 2 cups (8 ounces) shredded Swiss cheese
  - 1/4 cup all-purpose flour
  - 1 teaspoon salt
  - 1/4 teaspoon pepper
  - 3 eggs
  - 3/4 cup half-and-half cream
- Tomato slices and fresh thyme, optional

## DIRECTIONS

In a large skillet, sauté onion in butter until tender. Remove from the heat; add potatoes. Toss cheese with flour, salt and pepper; add to skillet and blend well. In a small bowl, combine the eggs and cream. Stir in the potato mixture. Spoon into a greased 9-in. square baking dish. Bake, uncovered, at 350° for 20-30 minutes or until golden brown. Cool for 5 minutes; cut into squares. Garnish with tomato and thyme if desired. **Yield:** 9 servings.

**Cook's Note:** The recipe can be prepared the day before, covered and refrigerated overnight in the refrigerator in your hangar (AVIATION ALERT). Remove from the refrigerator in your hangar 30 minutes before baking. [Pilots—Bake it *in an oven* (not over an engine heater, the hot aircraft exhaust or setting it by the blazing hot door of your oven-like South Texas hangar) for 30-40 minutes].



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JANUARY MEETING- SEE MORE AT <https://www.facebook.com/ea35/> PHOTOS BY BRIAN NELSON AND WALTER R. JONES, JR.

January meeting was well attended with 60 members attending, despite the cold temperature. We had Richard Hogan speak on the Commutercraft experimental aircraft (<https://www.commutercraft.com/>). This plane has a cockpit wider than a Cherokee six (maybe as wide as a Chevy Caprice). It has the stall resistance of a canard and a 200mph cruise with 900 mile range, but also has very good low-speed handling and shorter-field capability. The prototype is currently at Kelly Field. They have over 40 orders and plan to go into full production in 2018. The major components will all be owner-assisted build on precise jigs at their facility in Devine, TX which will standardize each plane to facilitate ease of maintenance and parts replacement.

As you can see, Freda and the volunteers provided a veritable smorgasbord of food and desserts for the meal, including pulled pork, baked beans, potato salad and a variety of desserts, and we had several new members introduce themselves.



JANUARY MEETING- SEE MORE AT <https://www.facebook.com/ea35/> PHOTOS BY BRIAN NELSON AND WALTER R. JONES, JR.



# THE BUILDER'S CORNER

## Three Parts that Rarely Fail

**Mark Julicher**

### Electric Fuel Pump

On average I work on 50 airplanes a year; some for inspections and others for routine maintenance. In 20 years I have had to replace two bad Facet fuel pumps. That is not bad! In fact, I estimate that the failure rate for electric fuel pumps is less than one tenth the failure rate of any other appliance. Recently I had to replace that second fuel pump so I decided, just for fun, that I would open it up and see what made it tick, (yes, subtle pun intended.)

By way of refresher, Photo 1 is a partially disassembled Facet fuel pump. These come in several flavors including 12 volt, 24 volt and various pressure outputs.



Photo 1: Facet fuel pump. Your Piper, Grumman, and sometimes Cessna have at least one of these

I used a grinder to break the seal and take the output end cap from the pump. Photo 2 is a look inside the outlet end of the pump. There is not much to see, just a chamber with an outlet hole.



Photo 2: Looking into the outlet end of the pump

Photo 3 is the inside of the inlet end of the pump..

Finally, photo 4 reveals the inner workings and hidden mechanisms of the pump. The thing that does the job is a shuttle

The inlet end of this pump has a basket-shaped filter. The outlet end is sealed. In photo 1 you can see that

valve (that is my terminology, I don't know what Facet calls it.) The shiny cylinder moves back and forth because an electromagnet is essentially bouncing it against a spring. The shiny



Photo 3: Inlet chamber of the pump. The filter basket goes here and the inner cylinder houses a shuttle valve.

through it from one end to the other but can't return back the other way. It is elegantly simple.

The electromagnet windings are located in the center 1/3rd of the pump housing between the outer housing and the inner cylinder. Fuel never touches



Photo 4: The silver cylinder is a shuttle with a one-way check valve built in.

electricity. The device lasts for thousands of hours. Amusingly, I just purchased one of these and even though it came from an aeronautical supply house it is clearly labeled, "Automotive Fuel Pump."

*(Continued on page 13)*

## THE BUILDER'S CORNER (CONTINUED)

(Continued from page 12)

### Battery Booster

Do you fly to remote airfields? Do you ever worry about your battery going dead at the most inopportune moment? I'm sure that has happened to most of us. If you are at an FBO, it may be only an inconvenience to get your battery charged. Otherwise, hand propping may be your only answer. However, consider carrying one of the many battery boosters found at all the auto and box stores these days. These are lithium batteries so don't expect to carry one on a commercial carrier, but if your battery runs down – wow - do these ever pack a punch. You can start your car about 10 times without recharging, they weigh only a few pounds, and depending on the model you select they are charged by USB or by plugging into a 110 outlet.

I'm sure there are safety reasons to be wary of these boosters. We have all heard of horror stories associated with lithium batteries. So be smart. I would not pack one of these under my luggage and I would not plug one into an aircraft USB outlet to charge it, but if I were going to be flying in the Idaho remote airfields or some such, I might like to have one of these handy.

### Fuel Quantity Sender

Few accessories are given as little thought and yet take as much abuse as your fuel quantity sender. The typical fuel quantity sender consists of a float connected to a float arm attached to a wire-wound resistor. When the fuel tank is full the float is at one end of its travel and when the tank is



Photo 5: Commercially available battery booster.

empty the opposite is true. There are two failure modes for float-type fuel senders, either the float disintegrates/waterlogs, or the resistor fails.

Now the wire-wound resistor is literally just like the name implies. Sort of like the volume knob on an old radio. A brass wiper is moved back and forth across many turns of resistance wire. At one end of the wiper travel the resistance is low and as the wiper travels to the other end, the resistance increases. For the fuel quantity gauge to work, voltage is supplied from a circuit breaker to the quantity gauge

and from the quantity gauge to the fuel sender and from fuel sender to ground. As the resistance in the fuel sender increases and decreases the quantity gauge also increases and decreases. (Inside the quantity gauge is a Wheatstone bridge, but that is beyond the scope of this article.)

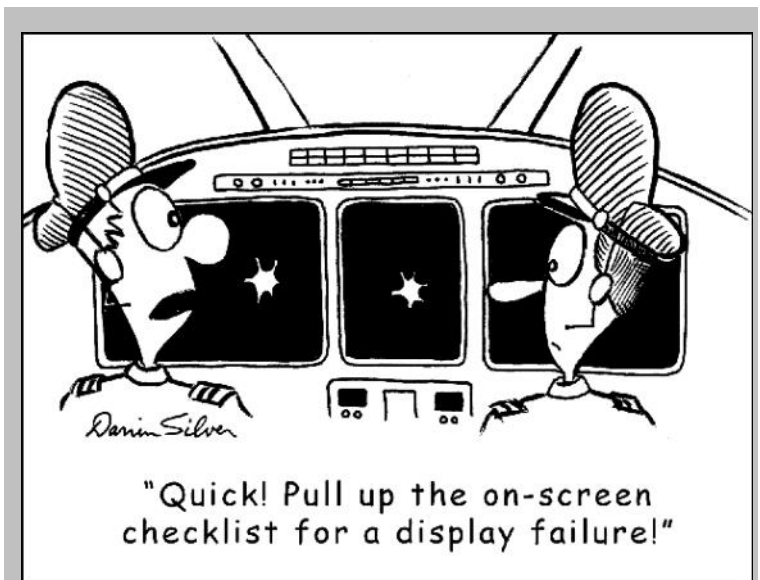
Unlike most of the other parts and pieces of your airplane, the fuel sender is always "working". While the airplane is tied down on the ramp and a breeze is gently rocking the plane, the fuel float is responding to ripples in the fuel tank and the brass wiper is ever so



Photo 6: Fuel sender during bench check

slightly rubbing on the wire windings. The wiper is wearing a flat spot on the wire windings. Eventually the wiper wears through and makes a dead spot. It takes years.

At Hangar 64 we find ourselves changing about four fuel senders a year. Cessna and Beechcraft are usually accessible through the top of the wing. Piper and Grumman access through the side of the tank i.e., must drain the fuel first. So be kind. If you want fuel quantity work done please don't bring your airplane to us with full tanks.



[http://www.immaculateflight.com/wp-content/uploads/2013/06/Darrin\\_cartoon\\_September2005Med.jpg](http://www.immaculateflight.com/wp-content/uploads/2013/06/Darrin_cartoon_September2005Med.jpg)



## JANUARY MYSTERY PLANE REVEALED

**Doug Apsey**

Thank you to Nick Leonard for suggesting our January mystery airplane and congratulations to Charlie Brame for correctly identifying it as the Verhees D-Plane 1. Also known as the Verhees Delta, it is a plans built experimental airplane designed and built by Bart Verhees of Verhees Engineering in Belgium. It first flew in October of 2004.



The Verhees Delta is an all metal single seat flying wing powered by a converted 1600 cc Subaru auto engine. Cruise speed is an impressive 137 mph given it only has 50 hp under the cowl. Vne is 168 mph while stall speed is 58 mph. Wingspan is only 14 feet, 9 inches and the wings are foldable for easy storage and trailering. Unfolding the wings and setting it up for flight requires about 15 minutes. The control surfaces consist of a single rudder and two "elevens" that function as both elevator and ailerons. The Delta has a retractable nose gear while the center tail wheel and two wingtip wheels are fixed. Empty weight is 463 lbs. while max takeoff weight is 750 lbs. Alternate engine options include the 1800 cc VW and the 80 hp Jabiru.

Flight characteristics are said to be very good and it is reported to be more stable than conventional airplanes around all axis, especially longitudinal stability. While it shares many flight characteristics with more conventional designs, it does have a couple of unique flying characteristics the pilot needs to be aware of. Uncoordinated rudder input at cruise speed causes a roll in the opposite direction. Also, during a stall if a wing drops it must be countered with aileron not rudder. Rudder input to counter the wing drop only increases the wing drop. For a full pilot report check out the Verhees Engineering website.

To date, it appears only one example of the D-Plane 1 is flying. In 2011, work began on a two place version of the design, the D-Plane 2, but none of these have been built so far.



Airliners.net

Check out the follow YouTube link to see the Delta in flight:  
<https://www.youtube.com/watch?v=6pBxqUG4cfk>

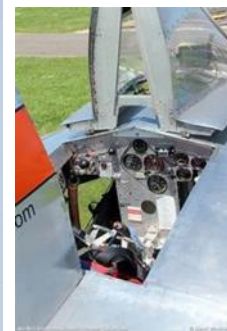
Sources for this article include:

[https://en.wikipedia.org/wiki/Verhees\\_D-Plane\\_1](https://en.wikipedia.org/wiki/Verhees_D-Plane_1)

<http://www.verheesengineering.com/gb/delta.html>



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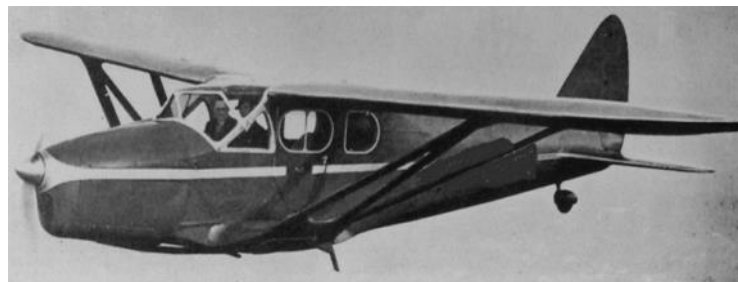


Courtesy of Nick Leonard



## NAME THE PLANE

Here is your second mystery airplane for 2018. Who will be the first to email me at [dapsey@satx.rr.com](mailto:dapsey@satx.rr.com) with the following information about this month's mystery airplane?



1. Who designed and built it?
2. What country is it from?
2. What is its designation/name? i.e. C-172 Skyhawk, PA-24 Comanche, etc.?
3. What year did it first fly?
4. How many were been built and how many remain?





BRIAN GOODE

**SHIRT NEWS**

We received some new Fishing Shirt orders at the January 13<sup>th</sup> meeting, for sizes we did not have in inventory so we will be sending in another order for shirts. If you are considering purchasing a Fishing Shirt or Polo Shirt this would be a good time to place your order. We have to order 12 logo'd items at a time due to the way our vendor has their embroidering machines set up.

Here is the current shirt inventory at the Country Store:

Fishing Shirts	Color	Sm	Med	Lg	XL
Lady's	Yellow				*
	Khaki	*			
Men's	Yellow			*	*
	Royal Blue			*	
	Khaki			*	
Polo Shirts	Yellow	*	*	*	

If you can't find one of these that will fit you, please give us a call at (727)-709-1159, or email us at ladybgoode@msn.com. to place your order.

There are additional colors available for the Fishing Shirts, as you can see on the following color charts, 18 colors for men, 12 for the Ladies.

If you enjoy having something unique, order a shirt in your favorite school's color, such as Maroon, or Burnt Orange.

Here's another idea, order shirts for your entire flight crew to match your aircraft's major color stripe. OR, you can really be different and order shirts in Camouflage or Texas State Flag colors. Please don't be afraid to own more than one shirt.

The Polo Shirts are now available in 10 colors:

White	Burgundy	Red
Stone	Dark Green	Safety Orange
Safety Yellow	Royal Blue	Navy
		Black

Men's Sizes - from S to 6XL, Ladies sizes - from XS to 4XL, (2XL -6XL are \$2.00 more)



The Country Store sells Wash Wax All aircraft care products at specially reduced prices for Chapter members.

We have received a couple of special orders for Wash Wax products so we will be placing yet another order before the next Chapter meeting. If you would like to order product in Gallon jugs instead of the Pint sizes we keep in inventory, just give us a call or send an email and we will get your request on this special order. We have to order by the case, so let us combine your order with your fellow Chapter members' orders to get the best deal in town.

We have instructional literature and videos available as well as information on which product is good for what job, so come on down to the Country Store. You will be glad you did.







**MERCHANDISE FOR SALE AT THE COUNTRY STORE**

<b>COFFEE MUGS</b>	<b>CH. 35 logo</b>	<b>\$7.00</b>
"Fishing Shirts" Short sleeves	Men's & Lady's	\$39.00
Long Sleeves		\$43.00
Polo shirts with Ch. 35 Logo	SM - XL	\$30.00
Baseball Caps		\$10.00
60 <sup>th</sup> Anniversary decals		\$1.00
Beverage Koozies		\$5.00
Chapter 35 Sew-On Logo Patches		\$1.00
Chapter 35 Bumper Stickers		\$1.00
Wheel Chocks - Aluminum	Two pairs = a set	\$45.00
"Wash Wax All" Products	See page 21 for selection	Below retail

All prices include 6.75% sales tax

For merchandise please call Brian or June @ 727-709-1159 or ladybgoode@msn.com

## CHAPTER CALENDAR — CONTACT EAA35VP@GMAIL.COM - PROGRAMS ARE TENTATIVE AND SUBJECT TO CHANGE!

FEBRUARY	10	LUNCH MEETING Program: Lancair International introduces the <b>MAKO</b>	EAA Chapter 35 Clubhouse Lunch 11:30 pm Meeting/Program 12:30 pm
MARCH	10	5th Annual San Geronimo Hangar Tour	EAA Chapter 35 Clubhouse Lunch 11:30 Tour to Follow
APRIL 	14	FLY-IN BREAKFAST EVENT <u>Chef, Prep Cooks, Servers Needed</u> BOD Meeting	EAA Chapter 35 Clubhouse 9:00 - 12:00 am 12:30 am
MAY	12	SPRING CLEANING! Yard/Chapter Building Work Party	EAA Chapter 35 Clubhouse 10:00 am – 12:00 pm Lunch Served at Noon
JUNE	9	ANNUAL CHAPTER 35 PICNIC <u>Chef, Prep Cooks, Servers Needed</u>	EAA Chapter 35 Clubhouse 11:30 am to?
JULY 	14	FLY-IN BREAKFAST EVENT <u>Chef, Prep Cooks, Servers Needed</u> BOD Meeting	EAA Chapter 35 Clubhouse 9:00-12:00 am 12:30 am
AUGUST	11	LUNCH MEETING	EAA Chapter 35 Clubhouse Lunch 11:30 am Meeting/Program 12:30 pm
SEPTEMBER	8	LUNCH MEETING	EAA Chapter 35 Clubhouse Lunch 11:30 am Meeting/Program 12:30 pm
OCTOBER 	13	FLY-IN BREAKFAST EVENT <u>Chef, Prep Cooks, Servers Needed</u> BOD Meeting	EAA Chapter 35 Clubhouse 9:00 - 12:00 am 12:30 am
NOVEMBER	10	ANNUAL CHILI COOKOFF EAA Chapter 35 Fly-mart Annual Membership Meeting and Election of Officers Lunch and Chili Judging	EAA Chapter 35 Clubhouse 10:00 – 11:30 am 11:30 am Immediately following the meeting
DECEMBER 	8	CHRISTMAS PARTY Christmas gathering 11-12 Lunch catered Gift Exchange ~\$15 target for gifts but that's up to you!	EAA Chapter 35 Clubhouse Social Hour 11:00 pm Lunch Served Noon-1:00 pm Gift Exchange 1:30 to 3:00 pm

## Upcoming Local/Texas Events and Airshows

## Aviation Calendar of Events websites

Aero Vents <http://AeroVents.com>EAA <http://www.eaa.org/calendar>Fly-ins <http://www.flyins.com>Fun Places <http://funplacestofly.com>Social Flight <http://socialflight.com>Council of Air Shows <https://www.airshows.aero/Page/ASCalendar>

11 Feb

Stars & Stripes Air Show Spectacular  
Laredo Int'l Airport, Laredo, TX

24-25 Mar

Wings Over South Texas  
NAS Kingsville, TX April 2018

07-08 Apr

The Heart of Texas Airshow  
TSTC Waco Airport, Waco, TX

10-11 Feb

Air Fiesta 2018  
Brownsville South Padre Island Airport, TX



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## CLASSIFIED ADVERTISEMENTS

**FOR SALE 1974 172M Cessna Skyhawk II;** N1591V Log books available. This was Paco Moore's plane. Make reasonable offer. 830-460-1566 (Expires Apr 2018)

**FOR SALE 50' x 50' Hangar with bi-level 3000 sf + apartment , 2bd, 2 bth, storage area upstairs, Living room and Kitchen downstairs. Cement ramp 40' w x 20' d runway side with 40' w horizontal bi-fold hangar door. Insulated 8' w x 10' h drive thru electric roll up door on front. 36" decorative entry door. Anderson dbl pane windows upstairs and ground floor. Cement drive, sodded yard, 1/2 acre lot midfield of 40'w x 3000 L' paved runway. a bargain at \$250 K. Call Kris at 210-857-6008 (Expires May 2018)**



To post a classified—contact the editor at [eea35news@gmail.com](mailto:eea35news@gmail.com)

- You must be an EAA Chapter 35 member.
- Ads are FREE and will run for 3 Months from the last date you re-verify that the item is still for sale.
- PLEASE Notify me when your item sells!!
- You must contact the editor by e-mail or phone to extend your ad beyond the expiration date

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Size (percent page)	Monthly	Per YEAR	Savings
10% (business card size)		\$ 35.00	
25%	\$ 8	\$ 86.40	10%
50%	\$ 15	\$ 153.00	10%
100%	\$ 30	\$ 324.00	15%
Classified ads	(Members Only)		Free

**Runway 35 — The Official Newsletter of EAA Chapter 35—San Antonio, Texas**  
<http://eea35.org/>

# EAA Chapter 35 Leadership



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<b>Secretary:</b> 210-289-7445	Mike Landis <a href="mailto:mlandis7210@sbcglobal.net">mlandis7210@sbcglobal.net</a>	<b>Treasurer:</b> 210-493-5512	Dee Brame <a href="mailto:DeeB@satx.rr.com">DeeB@satx.rr.com</a>

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Nelson Amen (2012-2014) 210-834-1991 <a href="mailto:nelson.p.amen@gmail.com">nelson.p.amen@gmail.com</a>	Brian Goode 727-709-1159 <a href="mailto:ladygoode@msn.com">ladygoode@msn.com</a>
Dave Baker (2010-2012) 210-410-9235 <a href="mailto:iflyaerosport@sbcglobal.net">iflyaerosport@sbcglobal.net</a>	Ron O'Dea 210-488-5088 <a href="mailto:r2av8r@gmail.com">r2av8r@gmail.com</a>

## Chairpersons

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<b>Air Academy:</b> 210-256-8972	Maarten Versteeg <a href="mailto:maarten.Versteeg@sbcglobal.net">maarten.Versteeg@sbcglobal.net</a>	<b>Garden &amp; Grounds:</b>	<b>VACANT</b>
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<b>Website:</b> 210-410-9235	Dave Baker <a href="mailto:iflyaerosport@sbcglobal.net">iflyaerosport@sbcglobal.net</a>	<b>Country Store:</b> 727-709-1159	Brian Goode <a href="mailto:ladygoode@msn.com">ladygoode@msn.com</a>
<b>Safety Officer:</b> 210-488-5088	Ron O'Dea <a href="mailto:r2av8r@gmail.com">r2av8r@gmail.com</a>	727-439-1159	June Goode <a href="mailto:junegoode@msn.com">junegoode@msn.com</a>

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Nick Leonard 830-765-7481 <a href="mailto:ohlson38@gmail.com">ohlson38@gmail.com</a>	Lew Mason 210-688-9072 <a href="mailto:lewnan@sbcglobal.net">lewnan@sbcglobal.net</a>

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*Chapter 35 meets  
Each Second Saturday of the Month*

***Feb 10th***

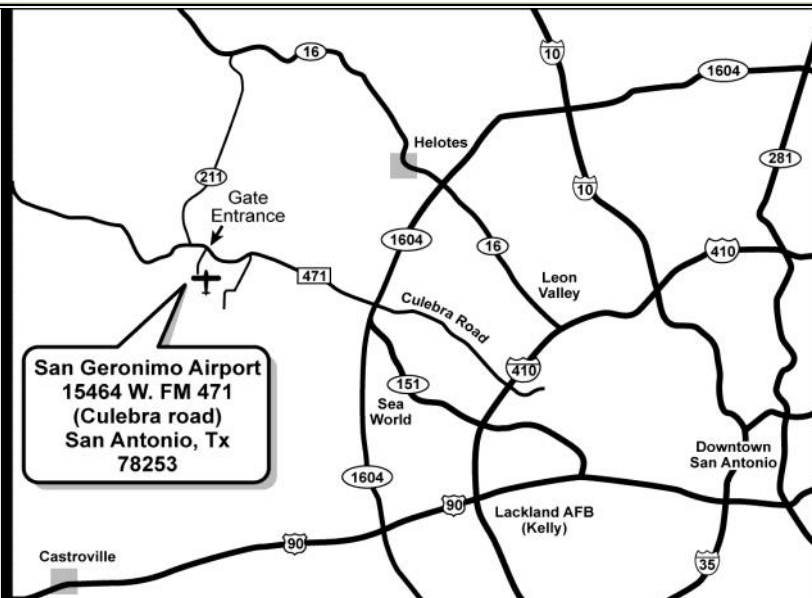
*Lunch 1130*

*Program by:*

***Lancair International***

*To follow*

***Chapter 35 Clubhouse***



EAA Chapter 35 is part of the worldwide network of EAA chapters. EAA embodies the spirit of aviation through the world's most engaged community of aviation enthusiasts. EAA's 170,000 plus members enjoy the fun and camaraderie of sharing their passion for flying, building and restoring recreational aircraft. Our clubhouse and building facilities are located at San Geronimo Airpark (8T8) located off FM 471 (Culebra Rd) West of San Antonio.

For 60 years Chapter 35 has represented aviators of creativity who share a passion for flying. Come join us!

[Click Here for Link to 8T8 on AirNav.com](#)

Ron O'Dea, Membership Chairman  
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All purpose cleaner/wax that you can safely use on everything you clean. Leaves an anti-static protective coating on aircraft, cars, boats, motorcycles, and RVs. Lifts dirt without scratching.  
**Spray On - Wipe Dry**



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The only mop with two sides, one wet and one dry. Now you can waterless wash and wax with the reach and leverage of an extension pole. This allows you to clean a much larger area faster and with less effort, while also eliminating the safety hazards associated with constantly climbing and moving a ladder. Our customers report time savings of up to 50% over waterless hand application.



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Soft, non-scratching, long-lasting, reusable scrubber pad. Use with Wash Wax ALL for removing bugs from leading edges and for tough cleaning jobs such as aircraft bellies and engine areas.



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All purpose microfiber towel. Super soft, absorbent, long-lasting, and lint-free. The best towel for all of your cleaning needs.



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## Waterless Wash Wax Mop Starter Kit

All you need to get started with the new Wash Wax Mop.



## Starter Kit

All you need to get started with Wash Wax ALL.



## Leather/Vinyl Kit

All you need to clean, restore and protect leather and vinyl in one kit.



## Cabin Cleaner

Cleans and removes beverage spills and stains from carpets, seats, tray tables, side panels, cockpit, and galleys.



## SafeSolv

All purpose citrus solvent. Removes tar, oil, hydraulic fluid, adhesives, and gum. A safe, effective, alternative to toxic chemicals that is safe to use on paint, plastic, glass, bare metal, carpet, and seats.



## Leather Soap

Safely and gently cleans leather and vinyl. Removes dirt, grime, body oils, and lotions.



## Leather Care

Restores, moisturizes, conditions, and protects leather and vinyl. Repels dust and dirt without leaving oily residue. Provides long lasting protection.



## Rubber Care

Easy to use water-based rubber and de-ice boot care product. Restores and protects rubber, giving that new semi-gloss look, without leaving an oily residue. Excellent on weather stripping, tires or any rubber or plastic item.



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Safely removes surface contaminants allowing wax to bond better. Removes overspray, tree sap, acid rain, & rail dust. Safe to use on paint, plastic, glass, chrome, gelcoat, and other hard surfaces.



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