The Flying Wire

Chapter 124
Experimental Aircraft Association

Volume 56 Number 5
May 3, 2017

Board Meeting - 5:30 pm

Dinner – 6:15 pm ($7 donation)

General Meeting – 7:00 pm

www.EAA124.org

www.CafeFoundation.org

www.EAA.org

EAA Chapter 124
5550 Windsor Road
Windsor, CA 95492

--- Mail ---
PO Box 6192
Santa Rosa, CA 95406

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May 3, 2017 Program

Joe Borzelleri: Sutter Airport

Joe is a lifelong pilot who bought and rebuilt his first cub around age 17. He is in avid pilot flying his cub regularly, and part of the "cheap suit flying club". A couple of years ago when the Sutter Airport was struggling, he headed up a team that took it over for the county, and has been running it successfully for the last few years.

Dinner Menu

Dinner is a nod to Cinco de Mayo, Build your own burritos, salad and cookies. $7 at the door.

Events Calendar

Please send info about upcoming events!

Please send us information if it comes your way!

EAA 124 Young Eagles: May 13th at Cloverdale Airport

Rancho Tehama BBQ: Friends of the Rancho Tehama Airport are putting on a BBQ at Steve Barnes' hangar in Rancho Tehama 1:00 PM Saturday May 6th.

Steve's hangar is located mid field on the south side if the runway. Someone should be monitoring 122.9 for advisory.

Bob Gutteridge: bob_gutteridge@pacbell.net
Stuart Deal: eaa124newsletter@sonic.net

Aircraft Structures of the MVP

(By Stuart Deal)

Way back when, when the drama of the beginning of the twenty first century was still fresh, I took Lynn Hunt's "Aircraft Structures" class at SRJC. Bob Gutteridge and Duncan Reed also attended, sorry if I forgot other folks.
The term paper assignment was to write up an airplane from a "structures" point of view. I had been dreaming up a plane that I decided to write up for this class and thought it would be a fit in this venue, so here it is:

My choice for discussion of aircraft structures is an airplane I call the MVP. Someone might think that these letters stand for Mostly VolksPlane. I won't confirm or deny this. Bud Evans has designed and published plans for, two airplanes, still popular with homebuilders called the VP-1 and VP-2. These are the one and two seat versions of the Volksplane. I have designed a derivative of the VP-2 that I call the MVP.

There is only one aerodynamic structure of the MVP this the same as the VP-2, the rudder. Both the wing and the horizontal stabilizer (in this case a stabilator) are completely different structures, but using the same choice of airfoils.

The MVP uses an elliptical planform and uses a thick section NACA 4415 airfoil (also used on many Air Tractor models). Struts are avoided by use of a cantilever wing spar. This is a built up "I" spar placed in the thickest part of the airfoil cross section. Around the spar are the ribs and the fabric covering.

Ribs

One easy thing about the original VP-2 is the "cookie cutter" 1/4" Douglas Fir plywood ribs with lightening holes. The easy way to make this is to create a guide and user a router to cut out the ribs. These were glued onto a front and back spruce spare which is held in place by compression struts.

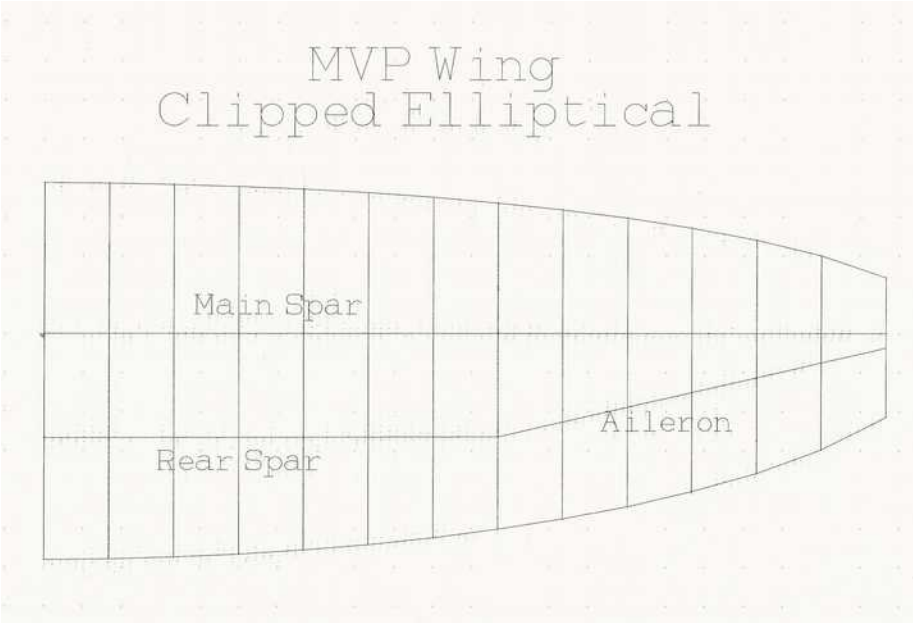
The MVP uses the same material but relies on a custom computer program to generate CNC (computer numerical control) instructions for cutting the ribs in elliptical proportions. The program calculates the outline of the airfoil as fractions of the chord length of one. This is multiplied by the chords of the different rib stations which all have their thickest section along the spar line. The ribs are placed at ten inch intervals from the fuselage.

Wing Spars

The spar is all laminated Douglas Fir which is carefully sealed to prevent decay. The spar caps are laminated "half caps" which are bonded to either side of a one quarter inch waterproof plywood shear web to form an "I" shape. The five degree cantilever for the wing is laminated into the spar caps by pressing flat strips against a form (it looks like a counter with a backsplash) that contains bends at the right locations. The flat strips vary in length depending on the thickness required at the given place in the wing. One single half cap is glued up in the form at a time.

The spar carry through is actually the continuation of the spar

from one wing, through (under) the fuselage and out to the other wing. The side by side seats have the main spar just under the forward end of the seats.



The shear web has three plies in approximately forty five degree orientation to the spar length. The outer two plies are parallel and since the Douglas Fir is weaker in compression, these outer plies are used together to take the outer part of the shear load. This means that an arrow in the grain direction of the outer plies on both wings would meet over the top of the airplane. The joint where the web changes direction in the center of the aircraft is scarfed and reinforced.

While creating the wing spars in their full length seems to make the project larger and less portable, it does simplify manufacture in some ways, not the least of which is checking the wing geometry of the finished aircraft long before installing the wings. The manufacture of wing attach points comes to mind as an engineering complication that could only add weight. If the airplane were as big as a Belanca Super Viking, I would sing a different tune.

A second rear spare is added near the back of the wing to take torque loads caused by lift and aileron deflections. This is a "U" shaped spar built on the same top and bottom forms as the main spar. This rear spar is very light and actually has a turn toward the front of the wing just inboard of the ailerons, because of the elliptical planform. A support connection is made to the main spar near the wing tip to complete the spar structures.

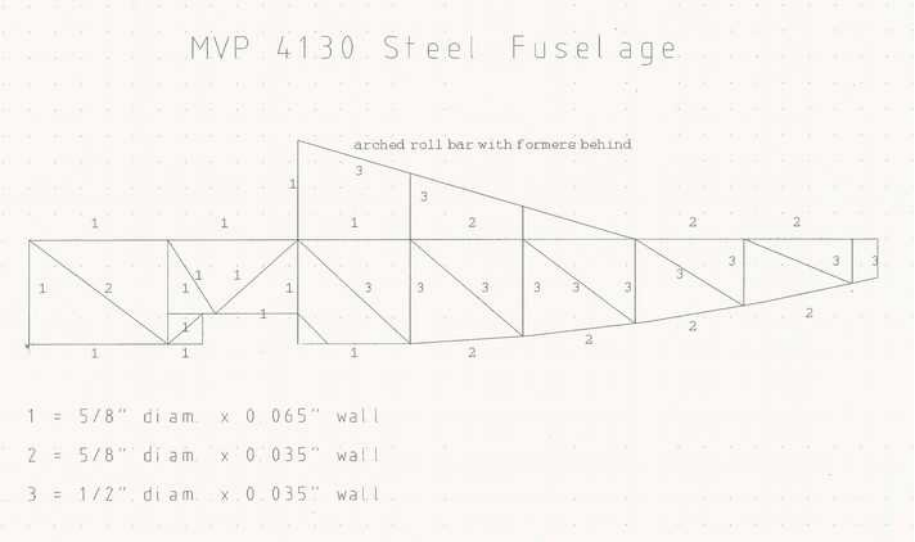
Fuel Tanks

The safest place for fuel is in the wings. While a header tank is simpler, since you get a gravity feed, the wing tank can be larger and safer. The wing tanks in the MVP are twenty inches wide and take the space of two rib bays between the main spar and the rear spar. This allows for a total of about twenty gallons of fuel, which is about four hours range using a one hundred horsepower engine.

Landing Gear

While it could be built either tricycle or tailwheel (conventional). Rough fields and simplicity favor conventional gear. The landing gear uses an oleo strut and reaches forward of the main spar. The location is just outside of the second rib bay or about two feet from the fuselage. This allows a brace to extend to the rear spar. The bolts that hold the gear to the main spar extend through the shear web and hold the brace to the back spar. The distance between the mains is about six feet. Toe brakes make the differential braking easier.

The tailwheel is steerable, small, light and mounted on a spring rod. The connection from the rudder spar exits the bottom of the fuselage and is directed to each side of the wheel with rods and a wheel horn.



Fuselage

The fuselage is 4130 chrome-moly steel tube construction. Gas or TIG welding is recommended, but a larger production volume would support working out the complications of MIG welding. The steel structure is designed to have all the same strength as the spruce and plywood of the original VP-2 design. The tubing choices are based on strength and cost (okay, weight also).

There are three main combinations of tubing diameter and wall thickness used. In the side view drawing you can see tubes marked "1" are 5/8" diameter and 0.065" wall thickness. This is the strongest material for where the original 3/4" square spruce is doubled. The longerons near the front and cockpit structures use this material.

Tubes marked "2" are 5/8" diameter and 0.035" wall thickness. Longerons from the second bay behind the cockpit and back use this material.

Vertical and diagonal cross braces in the lighter tail section user the "3" material which is 1/2" diameter and 0.035" wall thickness.

Steel fuselages typically use diagonal braces to keep the longerons rectangular from the front view. This is instead of any bulkheads. The seat back/luggage compartment could be considered a bulkhead, but it is not structural.

At the back of the cockpit, their is an arched roll bar. This forms the front of the turtle deck. Two more formers and a steel stringer support a complement of lighter wood stringers to create a smooth turtle deck when the fabric is applied.

There are three stringers along the sides and bottom of the fuselage to keep the fabric supported. These have a gentle curve and make a smooth surface for the air and the eye.

Skin

The engine cowling upper and lower sections are made of fiberglass layed up over a plug of the engine and baffling shape.

From the firewall back, the skin is all 2.7 ounce per square yard Dacron fabric. No envelopes are used, just overlap seams with smooth tapes. The tail surfaces are skinned separately and the anti-servo tab on the stabilator has an aluminum skin. Of course, the skin has a beautiful paint job. A light cobalt blue with elegant white stripes would add a spectacular finishing touch.

Controls

Flaps

The MVP is designed without flaps. Since the airframe has a full stall landing speed of just above forty M.P.H., flaps would not add much safety. The primary reason for this design choice is drag reduction from the straight strut braced wing to a cantilevered elliptical wing. Drag is also reduced by the dome canopy blending into the smooth turtledeck. The hope is to retain the low speed characteristics (of the VP-2) and add to the cruise speed with streamlining and greater horsepower.

Ailerons

The ailerons are hinged along a line that allows for the wing to narrow nearer the tip. A balance hammer connects to the outer end of the aileron and nestles in behind the navigation and strobe lights along the clipped elliptical wing tip.

The hinge on the aileron is centered on the leading edge, which is rounded to create a minimum of gap with the trailing wing contour.

Rudder

The rudder has plywood ribs press fit and epoxied to a two inch tubular aluminum spar. The spar slides into nylon bushings in the fuselage tail section. A combination motion limiter and rudder horn is mounted in the spar between the bushings. There is a trim tab hinged to th trailing edge of the rudder which is turned by a flat, slotted lever. The pin that rides in the slot movers along a screw thread that is flight adjustable. A leading and trailing edge of white pine supports the fabric and the outer ribs.

Stabilator

Unlike the Volksplane, which uses a spruce spar in the stabilator, the MVP uses a tubular aluminum spar like the rudder. This spar is also set into nylon bushings but they are split to allow the stabilator to be mounted and held on place. A fairing finishes the installation. The anti-servo is hinged at the top and has a control rod that goes through the stabilator to create a reverse motion.

Rudder pedals and a dual stick actuate cables for the controls. Rudder and elevator trim are controlled by small jack screws that move the points of attachment for each control. A small pulley system turns these screws.

Firewall

While a cheap material for a firewall would be 0.015 inch thick galvanized sheet steel, heating galvanized steel creates a noxious smoke that we don't want in the cockpit. In the MVP, the firewall is 0.018 inch thick 316 stainless steel. There is a gentle curve in the firewall around the vertical axis, so the material has no flat drum

head spots. This shape is imposed by a very gentle bend in the front horizontal cross braces.

Production Upgrades

The most obvious production upgrade for the MVP is changing to composite wings, rudder and stabilator. Molds for these could be cut directly using CNC equipment and the engineering already developed. The elliptical wings could be much easier to mold than to assemble out of aluminum.

Composite fuselage skin molds, especially for the cowling, would also be straightforward to develop, however the steel frame is central to the safety of the design and would remain.

Electric trim is an obvious step up.

Conclusion

The MVP uses technologies that may not directly available to the homebuilder. The purpose in developing it is to create a docile, inexpensive airplane that can be certified in the Light Sport Aircraft category when it arrives (ed: that was a while back). Any first construction would be for prototyping the production aircraft.

President's Piece

(by Andy Werback)

Seems like I should be reporting on PCAM activities – that's about all I've been doing the last few weeks. You may note that the C-118 is no longer on the field – A team from Central Casting got together and performed the difficult job of cutting it up into small pieces. The nose is going to Colorado to be used in a display. A big, old airplane – amazing design and construction, we got to see a lot of quality workmanship inside and out.

Thank you Steve Smith for last month's program on flying to Central America and visiting some out of the way places along the way. As always, an amazing trip with lots of great pictures.

By the way, if you're still counting, we wound up with just over 83" of rain here in Sebastopol. I understand that 84 inches is the most anybody has seen here in the last 35-40 years. Quite a change from when I lived at China Lake.

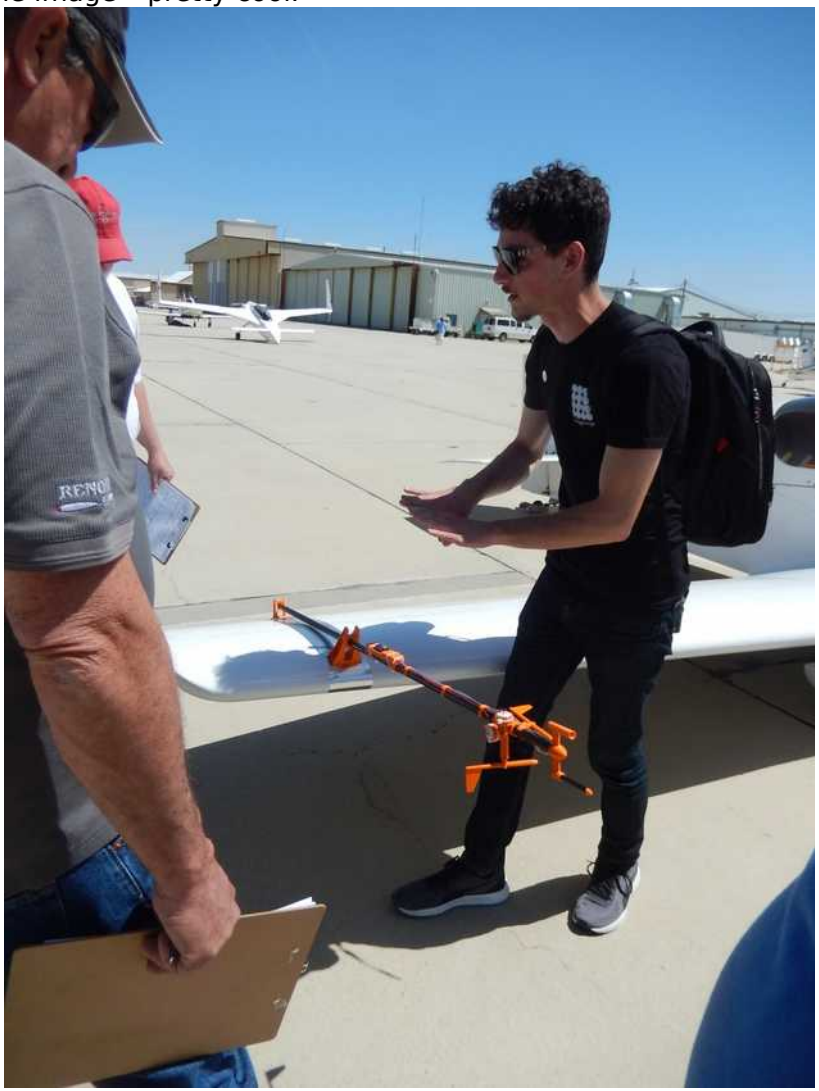
Greg Read, a fellow Lancair builder/pilot from Reid Hillview, invited me to the Mojave Experimental Fly-in for the April 15 weekend. Fortunately, the skies cleared enough for that to happen, and I spent the day there judging airplanes for design, build, test and effort. But it really focused on the experimental nature of these efforts. We had a couple of engines (one was a Honda marine engine adapted with a turbo charger), a fast Reno racer with a supercharger and a fully automatic fuel and ADI control system, and an L-29 jet brought back to life.

Danger Jet – L-29

One of the most interesting entries for me was the Tyler and Chad Sanders' Schweitzer 126 sailplane modified with 2 - 50lb thrust turbo-jet engines – and all the research, design and testing that they had done.

Tiny jet engine just behind the cockpit

Also notable was a portable wireless instrumentation system to document aircraft performance in many dimensions – GPS, INS and air data sampling all combined into one report. They showed a video of the actual aircraft in an inverted flat spin, alongside the video of the instrumented data driving a 3-D model – they were the same image – pretty cool.



Wireless Data Acquisition

- Design Award - SDS EM-5 Engine Control System (Reno racer) – Ralph/Bill Beaton
- Build Award - Turbine Glider - Brian, Tyler, Chad Sanders
- Test Award – Danger Jet L-39 – Jake Riley
- Effort Award – Honda Motor Conversion – Jim Davis
- Experimenter Award (Overall Best) – Wireless Digital Acquisition System – Andrew Angellotti

SDS EM-5 controlling supercharged Reno Racer

We have our next Young Eagle event coming up on May 13 at Cloverdale. Thank you everybody who helped at the April 1 Young Eagles event – that went really well, we just needed a few more Young Eagles to keep us busy. But of course, we will again need a pretty good pilot and ground staff to make this event work.

Thank you Josh, Alan and John Palmerlee for posting these events on the Chapter website and Facebook/EAA124. If you've read this far, please deposit 25 cents!

Fly Mart

For Sale: (12-16)
Tripacer wings- need recovering. $2500
Lycoming O-320, 1230 SMOH Last annual: 2014
Strattus II $500
Engine mount for Piper Pacer. $150
Call Jim DuVander 707-953-0129 jim@duvander.com

For Sale: (11-16) 1974 Starduster too O-360 180 hp - Hartsell Constant Speed Prop - Icom 250 - Intercom – Transponder - 642 TT In Annual - Same owner for the last 16 yrs
Contact Ray or Sher 707-584-9683 or 415-999-0949

For Sale: (10-16) 2009 Van's RV-9A TTSN 590 hours. Engine is a Titan O-320 with dual Light Speed Engineering Plasma II+ ignitions systems, and Sterba prop. Instruments include-- Dynon D 100 EFIS, Dynon D120 EMS, Dynon 2 axis auto pilot with AP74 panel, Garmin 196 GPS, Garmin GTR 225 comm radio, Narco AT50A transponder, Byonics APRS tracking system. Asking price is $70K.
Bob Ferguson 707-539-5665

For Sale: (8-15) disassembled continental A65 – needs crank and camshaft. New engine gauges, ammeter, airspeed indicator, new aluminum prop extension and new brake actuator.
Paid $400 - Byron Barnes 707-980-4818
barnesbyron75@gmail.com

For Sale: (7-15) Seat Parachute - needs a fresh repack but otherwise in very good condition. Will sell it cheap to a member if interested $350. Steve Pizzo, 707-829-7038

For Sale: (7-15) RV-6A Tricycle, Less than 80 TT, 180 HP - $79,900. See Flickr link below. Ogden Utah. Call Angelo at 801-391-3873 https://www.flickr.com/photos/angelosrv6a

For Sale: (7-15) Two Bendix magnetos for 4-cylinder Lycoming (O or IO 320); converted Falco to dual electronic ignition. 1 left, 1 right rotation; both with impulse couplings. Harness, impulse coupling adapters, long mounting studs included. Time in service: 344 hours. Also available: 4 new Tempest massive electrode spark plugs, 4 well-used Champion fine-wire spark plugs, 1 brand-new TSO'd magneto noise filter. $250 each, $450 for both. Peter Lert, peter.s.lert@gmail.com, 707-508-7500.

For Sale: (7-15) Garmin D2 pilot watch with GPS, worldwide airport database. Bought for Atlantic ferry flight that was canceled; worn 1 day to prove it works great, so basically new. Original box and all accessories included. New $450, will sell for $375. Peter Lert, peter.s.lert@gmail.com, 707-508-7500.

(Reprinted with permission of John L Hart FLP)

News/Notes From...

Late breaking news from Sonoma Skypark:

Saturday May 13 from 11 am to 3 pm will once again be our Sonoma Skypark Family Fun Day open house.

We will have complimentary (read that as "free") hamburgers, hot dogs and ice cream, a radio controlled airplane demonstration, lot of airplanes and cars on display, hay rides, paper airplane contest and much more.

If you can volunteer for an hour or two, contact our Family Fun Day coordinator, Robin Tatman, and let her know when you can help and what you would like to do.

We will be prepping food, registering guests, putting out tables chairs and hay bales, then taking them all down and putting them away, flipping hamburgers and whatever else needs doing.

Contact Robin right away if you are willing to help. Her email is robntat@aol.com and her phone is 707-853-2220. Contact her ASAP since she is an airline pilot and will be going out on a trip at the end of the week.

I did mention free ice cream, didn't I? What more could you need.

Darrel Jones

Interesting Aviation Links
(thanks to Larry and David)

Dangerous Job –Click Here
Nat Quick - Click Here
F-16 - Click Here

EAA Chapter 124 Board Meeting Minutes
April 5, 2017

Meeting was called to order at 5:37 PM by Pres. Andy Werback

Present: Marlon Young, Steve Waite, John Whitehouse, Ben Barker, Steve Barnes, Josh Hochberg, Brien Seeley, Dave Heal, Larry Rengstorf, Dan Steinhoff and Bob Gutierrez.

Andy Werback and Steve Waite addressed nominations for National EAA awards for Newsletter and Major Achievement (MAW). Andy noted that both Remo Galeazzi and Brien Seeley are potential MAW nominees.

Larry moved that the trailer be offered for sale in the newsletter at $200. Brien seconded and the motion passed unanimously.

Andy reported members having expressed concern about the length of general membership meetings. General discussion ensued. Andy summarized the consensus as making best efforts to keep business items short and advising speakers to expect a 45 minute time slot.

The National EAA contacted the chapter about holding a Chapter Leader Boot Camp here in February 2018. Several directors spoke in favor and no one opposed the idea. Andy will follow up with EAA.

Marlon reported that our May speaker will be Joe Borzelleri. Joe helped rescue Sutter Airport and has been running it for the County for several years.

The Treasurer's report shows the chapter steadily near break-even. John noted that revenue from dinner often makes the difference between red or black ink for the month.

Larry said the oil barrel was emptied for a $175 fee. Larry and Mike Tovani mowed the area for the Young Eagles event and generated many compliments.

Josh commented on lessons learned from the successful YE event at the chapter on April 1. Fifty one people were given rides. Josh said there will be a planning meeting on April 25 at Sonoma Jet Center to prepare for the next event in Cloverdale on May 13.

Mike Tovani has assembled the 1017 Roster for final editing. Ben reported that he had a quote of about $341 dollars from the same printer as last year. Marlon moved and Dave Heal seconded that Ben be authorized to spend the quoted sum on the new roster books. The motion passed unanimously.

Meeting adjourned at 6:01 PM.
Respectfully submitted,
Ben Barker
Secretary

EAA Chapter 124 General Meeting Minutes
April 5, 2017

Meeting was called to order by Pres. Andy Werback at 7:15 pm.

The cooks and helpers were thanked by a hearty round of applause for a fine dinner.

Visitors and new members were invited to stand and be welcomed.

Andy offered special thanks to Stuart Deal and John Palmerlee for their work on the newsletter and website, respectively. The Young Eagles events are now posted.

Jim Boyer announced a Friday Night at the Movies coming up on April 7.

The minutes of the March 2017 meeting were approved as read.

John Whitehouse gave the Treasurer□s report and concluded that the chapter is in good financial condition.

Larry reported the oil barrel was emptied. Larry and Mike Tovani mowed the area for the Young Eagles event and generated many compliments.

The Young Eagles Rally on April 1 was a great success. Josh reported that 51 rides were given and several lessons learned for improving future events. This was the first YE event in a long time, if ever, to be held on the Chapter 124 grounds.

Bob Gutteridge announced an updated list of flyout opportunities.

Brien Seeley reported on the Sustainable Aviation Foundation symposium in Redwood City.

In the President's report, Andy gave an update on Remo Galeazzi's Marquardt Charger. He also related an interesting story about Remo's WW2 service as a Patrol Torpedo boat skipper.

Andy encouraged members to consider nominations for National EAA awards, and to help out on various committees.

Steve Smith presented a top-notch, geo-referenced travelogue of his trip to Guatemala.

Meeting adjourned at 9:15 PM.

Many thank-yous to Marlon and Andy for contributing their notes.

Respectfully submitted,
Ben Barker
Secretary

Nasa X43a2

Chapter 124 Contact Information

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EAA Chapter 124
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Windsor, CA 95492

Chapter meetings are held on the first Wednesday of each month at 7:00 pm. FOOD ($7) AND SOCIALIZING (free) from 6:15 to 7:00 pm. EVERYONE IS WELCOME!

Directions: The site is located on the west side of Sonoma County Airport. Take the Shiloh Road exit from Highway 101 in northern Santa Rosa. Turn left at the stop light (west) and continue to a “T” intersection. Turn left again and follow the road to the EAA sign on the left.

Members are invited to submit articles of interest. You will be notified whether or not an article will appear in the current issue.

Please email articles to: eaa124newsletter@sonic.net
or mail to: Stuart Deal
430 Secretariat Ct
Santa Rosa, CA 95401

Deadline for newsletter submissions is the 20th of each month. Articles submitted after that date will be included in the newsletter at the discretion of the editor. All articles are copyrighted. To reproduce any article, please contact the editor.

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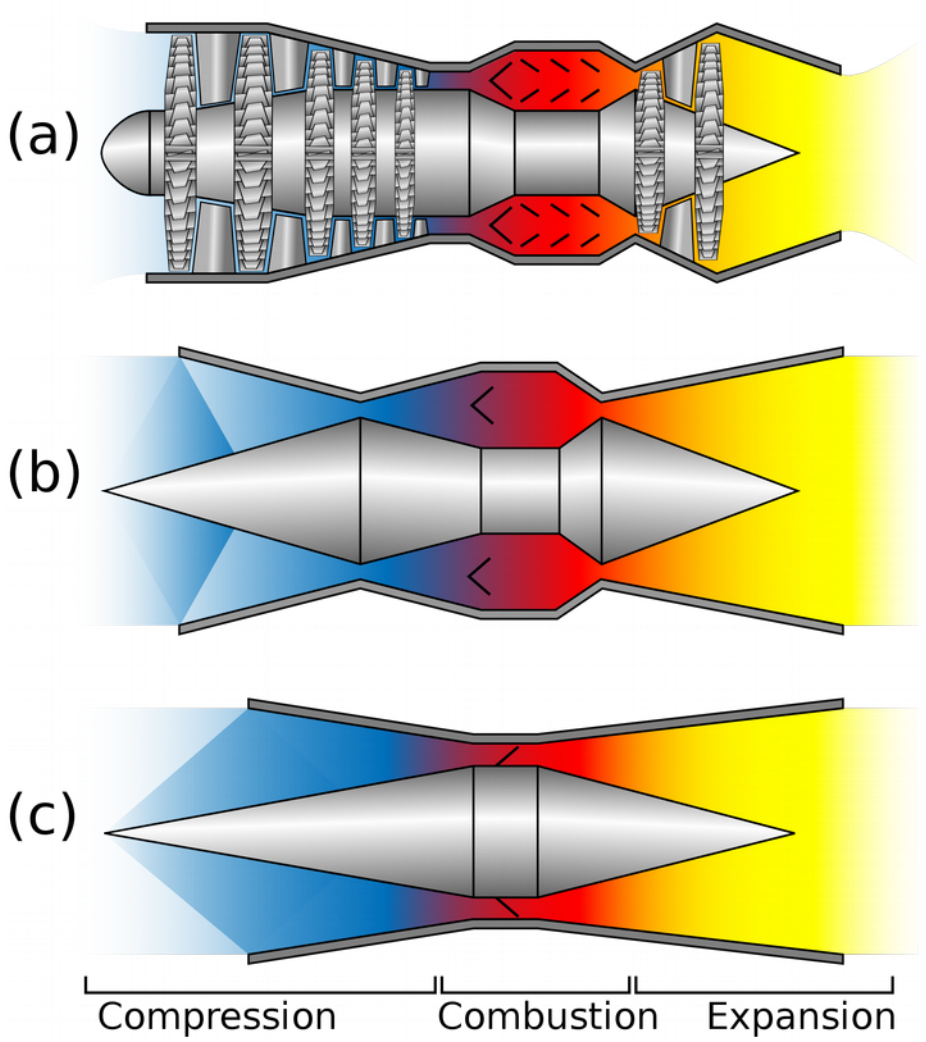

a) TurboJet, b) RamJet, c) ScramJet