experimental aircraft association

THE LEADING EDGE

NEWSLETTER OF MUROC EAA CHAPTER 1000

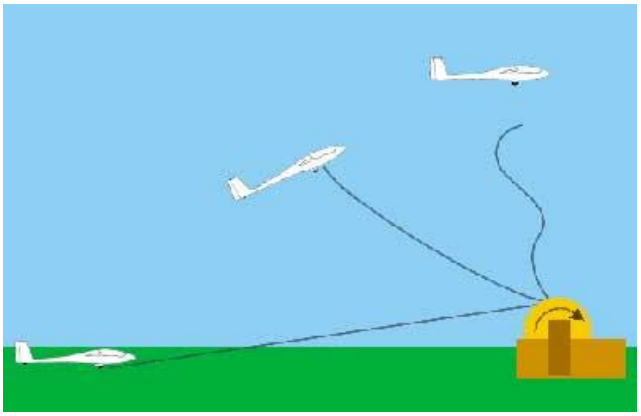
Voted to Top Ten Newsletters, 1997, 1998 McKillop Award Competition

President	*Gary Aldrich*	*661-609-0942*
Vice-President	*Hellmuth Steinlin*	*760-963-5445*
Secretary	*Kent Troxel*	*661-947-2647*
Treasurer	*Doug Dodson*	*661-256-7276*
Newsletter Editor	*Russ Erb*	*661-256-3806*

http://www.eaa1000.av.org *July 2013*

Chapter 1000 meets monthly on the third Tuesday of the month in the USAF Test Pilot School Scobee Auditorium, Edwards AFB, CA at 1700 or 5:00 PM, whichever you prefer. Any changes of meeting venue will be announced in the newsletter. Offer void where prohibited. Your mileage may vary. Open to military and civilian alike.

This Month's Meeting:



Stairway to Heaven:
Salvation At The End Of A Rope
Or
Some Steps to Help Save Personal Flight

Murry Rozansky
Tuesday, 16 July 2013
1700 hrs (5:00 PM Civilian Time)
USAF Test Pilot School Auditorium
Edwards AFB, CA

No, your Board of Directors has not gone nuts and scheduled a **Led Zeppelin** concert. We will be hearing from ***PPO* Murry Rozansky** who will be presenting us a forum that he is scheduled (Wednesday, 31 July, 1130) to give at Oshkosh this year.

As Murry says, there are several main obstacles to growing participation in aviation. His presentation will concentrate on some ways to reduce the cost of flight training. The steps are based on historically proven models and programs that are in use, more so in other parts of the world. The first step is the use of ground launched gliders for basic flight training. Others will be outlined. EAA members are uniquely positioned to make this happen.

Murry is the President of the **Experimental Soaring Association**, a division of the Soaring Society of America. The Experimental Soaring Association will be having their Western Workshop on Labor Day weekend in Tehachapi.

After Murry's presentation we will proceed to the BK Dead Cow Emporium, which has just about recovered from the last time we were there.

- Erbman
For the **Vice Kommandant**

Last Month's Meeting

EAA Chapter 1000
High Cay Partyhaus
Rosamond, CA
18 June 2013
Gary Aldrich, Presiding

Doug and **Gail Dodson's** high desert estate "**High Cay**" was once again the site of the June 2013 meeting of the ***Project Police*** of **EAA Chapter 1000**. The first objective of the evening was to reduce the excess inventory of food from last month's Airport Barbecue (*that sounds better than eat the leftovers*). **Master Grillmeister George "Knife" Gennuso** was back in place doing what he does so well, cooking up tasty vittles for the assembled masses. This effort was immensely successful, with happy tummies all around.

Following the follow-on food consumption was an audio-visual presentation on the big screen of **Doug** and **Gail Dodson's** recent trip by **Glamorous Glasair** to Brazil south of the Equator. With the obvious Jimmy Buffet tunes and a MTV-inspired slide flipping frequency, **Opie's** presentation powered through something like 460 pictures in about 23 minutes. **Kent "Cobra" Troxel** would have been heard to say "Holy Cow! That's like three times the number of slides in an **Erbman** Oshkosh presentation!" except for the fact that he wasn't there, choosing instead to exercise employment in the pursuit of "filthy lucre." It was actually a very effective way to cover a month-long trip in a reasonable time.

After the presentation were the elucidating comments by **Doug** and **Gail Dodson, Paul** and **Victoria Rosales**, and **John** and **Danni Wilson**. **Opie** asked to make note that **Scott Lofton** was present, a Skypark member and owner of two (!) Glasairs. **Paul** was adamant in his message that any pilot in the room could do what they did.

To help make his point, he prepared this guide on how to get in and out of airports in the Caribbean:

UPON ARRIVAL:

Taxi/Park as directed by the tower.

Unload the plane of baggage.

Request (and pay for) fuel. We like to have the planes ready to go at departure.

Secure the planes (in the grass if no tie-downs available: we rarely had tie-downs or grass). I had chocks for a while then they disappeared so I was using sticks.

Gather baggage and proceed to the 'Arrivals' gate.

Fill out paperwork as requested by anyone willing to get you through the airport 'maze'.

Prepare the arrival GenDecs for your arrival to the country (number depends on the country…the Dominican Republic wins at five in and five out). Give them to whoever wants one.

Pay fees as requested by the official you are talking with. US Dollars worked fine everywhere except in Martinique (France: Euros)

Gather bags, get a taxi and head to the hotel.

UPON DEPARTURE:

Fill out Departure GenDecs (*"General Declarations*") based on the number you used on the way in.

Proceed to the Airport Office or look for a window that says Airport/Departure taxes. Pay fees.

With passport in hand WITH your Pilot's license sticking out of it, proceed to the Departures gate. Tell the person at the X-ray/Metal Detector you are a private flight (as evidenced by the Pilot's license you just handed them: It's your 'boarding pass'). Once inside, you need to find someone who can take you see Customs/Immigration if it's not readily visible.

Clear Customs/Immigration and give GenDecs when requested. Sometimes they will stamp and return one or two and other times they will keep them.

Here's where you feel like a Rock Star: With everybody sitting in the terminal waiting to board their plane, show a Security Person your Passport, Pilot's License and any receipts for fees paid and ask them to open the door to the ramp. People seated wonder, "Who are those people?!?"

Take baggage to the plane. In my case, leave wife to 'ready the plane'.

Proceed with other Pilots to the Tower where you will file your flight plan. If there was no Airport Office/Departure Tax Office, the tower will collect your landing fees and such (cash only). With flight plan filled out, head back to the plane.

Pack the plane (wife does not lift heavy bags).

Perform thorough Preflight and ALWAYS sump the fuel tanks.

'Don' your fishing vest that has all kinds of survival stuff 'stuffed' into in, then put on your life vest over that.

Hold pilot brief with other pilots to decide procedures on leaving: Who's leading, radio calls, direction of departure etc.

Board your plane and wait for lead to call tower and REQUEST ENGINE STARTUP.

Startup on Lead Hand signal. Follow lead if tower allows a 'flight' else call tower in sequence for taxi instructions.

Line up and wait or takeoff as directed by the tower. ALWAYS thank the tower for 'having you' at THEIR airport :-)

Switch to company once tower 'turns' you loose and discuss how the departure went and how it could have been better.

Fly to next airport and repeat the process :-)

Then from **Opie** we got this guidance:

You Know You've Gone Far When…

You need fuel to get to where you are going

You need to subscribe to a different GPS coverage region

Your GPS defaults to T rather than K

Your GPS defaults to S rather than T !

You are off the map in ForeFlight

You are out of range of XM Weather (not much NexRad out there even!)

You know what a GenDec is, and you have 100 copies of your own boilerplate

You know how to fill out an ICAO flight plan and have 30 copies of your own boilerplate

You have no problem providing an "estimate to the boundary" even if you don't know where the "boundary" actually is

Visiting the tower cab to file a flight plan doesn't seem unusual

Reporting your altitude as FL 075 is actually correct

Paying a handler to file your paperwork actually seems worth it

You learn the difference between cerveza and cerveja, buenos dias and bom dia, no & não, obrigado and obrigada

- Russ Erb
Not the Minister of Propaganda
Chapter 1000
"We have more zero's in our chapter than any other!"

Kommandant's Korner

I trust all you patriotic ***PPTAF*** Troopers found a way to both stay cool and celebrate 237 years of this experiment we call the United States. **Mrs. Kommandant** and I spent a quiet 4th by completing a short bike ride before the blast furnace got started, then helping Pixel cringe on the couch during the evening's (illegal) fireworks displays in our neighborhood. An interesting dichotomy…celebrate the freedom we enjoy through the

rule of law while simultaneously breaking some of those laws.

On a more aviation-like theme, the **Fightin' Skywagon** will be heading northward later this weekend for a quick visit with daughter number two and husband Mike. This spur of the moment excursion made possible by the freedoms of sport aviation…and the need to stock up on Harris Ranch beef. The plan will be to dispatch early Sunday morning, spend the day in Byron, CA and its environs and wing our way back early on Monday with a breakfast/shopping stop at 3O8. If someone needs pieces of dead cow, I will accept requests by any available means until we depart from Harris Ranch around 0930 on Monday. Pixel has volunteered to stand watch over the meat from her perch in row two of the VC-180.

The trip up the California central valley will afford another opportunity to evaluate our ADS-B equipment. A recent update in the GNS530W software raised a question as to whether the GTX330ES transponder is really providing the required ADS-B "out" signal to qualify as a full participant in the system. (I know, you're saying "what does the GNS530W software have to do with the GTX330ES?"…it's complicated, we'll talk.) The result of limited testing in the local area seems to indicate there may be more required development of the system before a reliable TIS-B traffic uplink is achieved. I have pretty much decided to freeze the Skywagon's avionics configuration to allow Garmin and the Feds to finish…or at least minimize the perturbations in the ADS-B deployment. Once again, I've highlighted the hazards of early adoption of advanced technology….you're welcome!

Another learning opportunity presented itself when ace mechanic and chief "**Flying Dog Ranch**" pilot, **Bill Irvine** and I performed a bit of preventative maintenance in hangar 703 last weekend. This event was spurred by a rather frustrating attempt to adjust the timing of the Cessna's magnetos during last month's annual inspection. Apparently, when the mags were installed on the engine at overhaul, the "clock position" of the mags favored maximum cowl clearance vice ease of maintenance. Bill suggested that we remove and reinstall the little sparkers in such a position to allow good access and adjustment in the future. To do this task, I obtained a "timing" pin that can be used to hold the mag in rough timing while being installed. This worked fine on the right mag, but when we did the engine run-up we determined that the left mag was not "doing its thing"…indicated by an outbreak of silence when the right mag was switched off. Now, Bill was too kind to mention that the left mag installation was done by yours truly after watching the expert do the right mag. So, we dragged the beast back into the hangar and I let Bill re-install the mag. Thus, after about 4 hours into the "30-minute job" we had a functioning dual ignition system once more…and one that will be much easier to work on in the future. Did I hear someone say, "No good deed goes unpunished"? Seems like I say that a lot.

Well, enough news for this month. See you all at the next meeting!

Fly Safe and Check Six,

- Gary Aldrich
Kommanding

Chasing Rabbits

Or

The Joys of Troubleshooting Engine Problems

In May I pushed out the **Combat Bearhawk** for its Functional Check Flight (FCF) following a highly successful condition inspection, where the only repair was replacing a $6.50 rod end bearing. That seemed odd…nobody gets through a condition inspection or annual inspection that cheap. Makes you wonder, hmmm….

Well, what happened next would make up for my lack of expenditure. In the process, I would learn a lot, most of it related to fixing problems that weren't broke. I had actually done something during the condition inspection to cause the problem, but I wouldn't realize that until after spending about half an AMU chasing problems that weren't problems.

WTFO?

I started up the engine for the FCF and the first thing I thought was "That's funny. I thought the engine ran smoother than that." The engine is a Lycoming O-540 with six cylinders, and six cylinder engines are known for running smoother than four cylinder engines because the power pulses are only separated by 60 degrees of crankshaft rotation instead of 90 degrees.

While I was trying to remember how smooth the engine used to run, I continued through my checklist until my attention was grabbed by the little illuminated LED on the panel marked "Check Engine", which translates to "Look at the engine monitor, Dummy!" I looked at the engine monitor to find an alert saying "780 DIF". Further inspection showed that the EGT for cylinders 1-5 was about 1230 degrees F, but cylinder 6 was running at about 450 degrees F.

Usually when I see a very low EGT, I suspect an ignition problem, such as a fouled spark plug. However, I had just inspected all of the plugs and reinstalled them clean. Add to that both ignition systems were on, so either both plugs had fouled simultaneously (unlikely), or both ignition systems had the same partial failure simultaneously (very unlikely). Not only that, the Lightspeed electronic ignition uses a waste spark system, meaning that sparks are sent to cylinders 5 and 6 at the same time. In one cylinder the spark ignites the power stroke, while in the other cylinder the spark fires harmlessly at the end of the exhaust stroke. Since cylinder 5 was still running properly, I figured it couldn't be an ignition problem. Still, for completeness, I turned off the left ignition, turned it back on, then turned off the right ignition, and turned it back on. As expected, no change.

At this point I knew something was wrong. I shut down the engine and gave it a visual inspection. Nothing was amiss. I fired it up again to make sure I wasn't seeing things. The same fault happened again. Figuring I would need to do some research before I could do any more troubleshooting, I shut the engine down again. I then tried to push the airplane back to the hangar, only to find out that by myself I couldn't push it up the slight rise from the taxiway to the hangar ramp. Therefore I got back it, fired it up one more time and taxied the airplane up onto the hangar ramp.

Borescoping

I had just done a compression check during the condition inspection and cylinder #6 was showing 78/80. I had also borescoped all the cylinders and found no anomalies. Even so, I got the borescope out again and took another look in the cylinder. Everything looked normal.

Intake Obstructions?

During the condition inspection I had noticed that the intake pipe to #6 cylinder was loose. The connection tube in the oil pan (the one the large rubber hose goes over to connect to the intake pipe) was loose. It is normally swaged with a bead into the oil pan, but for some reason this one had become loose. I had noticed this last year, and just twisted it until it jammed into place. This apparently worked last year, so I tried it again this year.

The loose intake tube in the oil pan

Since I had futzed with this intake tube, I thought I might have somehow introduced an obstruction in the induction path that was reducing the amount of fuel-air charge that was getting to the cylinder. I removed the intake pipe, inspected it, and found nothing. Little did I know I was so close to fixing the problem, but I reinstalled the intake pipe and did another engine run. No change.

Sticking Valves?

After doing some more research, I determined that the problem must be the infamous Lycoming Morning Sickness. No, this doesn't mean that my engine was about to give birth to a cute little O-235. It is a common name for a condition caused by a sticking exhaust valve. Usually this comes from carbon from burning oil getting in to the exhaust valve guide and causing enough friction that the exhaust valve springs can't fully close the exhaust valve. As the engine warms up, the clearances in the valve guide get bigger as the valve guide expands and the valve starts working normally. I tried another engine run and found that #6 cylinder would not work well at idle RPM, but would seem to function properly when the engine warmed up and I increased the throttle up to run-up RPM. However, if the problem really was a sticking valve, then the problem should have stayed fixed once the engine warmed up. When I would pull the throttle back to idle, #6 cylinder would go back to not working.

Even so, several knowledgeable people told me that this must be the problem, so we did the operation necessary to fix it. This involves a bizarre procedure for pushing the exhaust valve into the cylinder, reaming the valve guide, pulling the valve stem out the spark plug hole, cleaning it, then pushing it back in and fishing it back up where it should be. That excitement alone is worth its own article, but since it didn't fix my problem, we'll move on to the next fix that didn't work either.

Valve Lifters?

After that highly unsuccessful effort, I again went back and talked to several knowledgeable people. We decided that maybe it was the valve lifters. There was a little support to this idea because the hydraulic plungers in the valve lifters were some of the few parts that weren't refurbished or replaced back when we "rebuilt" the engine. They had tested as serviceable so they were reused. I formulated the theory that one of the lifters had suffered a partial failure. It would leak down too fast to fully open the valve at idle RPM, but at higher RPM it couldn't leak down as much so the valve would open normally. It was a nice theory. It just wasn't true. Looking back now, the job of the hydraulic plunger is to take up the valve train lash, which is between 0.028 and 0.080 inches. Since the valves move about a quarter of an inch (0.250) normally, I'm not sure now how that little bit of plunger movement could make a difference.

I pulled the two hydraulic plungers for the #6 cylinder out and gave them the "bounce test" as called for in the overhaul manual and they both passed. I soaked them in carburetor cleaner (B-12 Chemtool) for a couple of days

and re-installed them. Another test run of the engine showed that this wasn't the fix. I then spent $77 to order two new hydraulic plungers and installed them. Another test run of the engine further confirmed that this wasn't the fix either.

Spark Plugs or Wires?

At this point I was running out of options that I could think of to try. At an EAA Chapter 1000 Board meeting, **Opie** and **The Kommandant** suggested that I should try replacing both spark plugs. The theory was that one plug wasn't firing for some reason. If it wasn't the plugs then maybe it was the spark plug wires. I really didn't think this was the problem, but I had run out of other ideas to try. **Opie** supplied me with some spare spark plug wires that he had for the test.

I had at least 12 or more extra spark plugs, ones that I had removed from the engine previously. I got out the ohmmeter and measured the resistance of all of the spare plugs. I then measured the resistance of the spark plugs removed from the #6 cylinder and found them to be right in the range of all of the other plugs.

I measured the resistance of all of the spark plug wires for cylinders 2, 4, and 6 and found them all to be similar.

I put in two different spark plugs and rolled the airplane out for another ground run. Cylinder #6 was still loafing along. However, this time I took the time to turn off each electronic ignition system in turn to see if I could determine which plug might not be firing. If a plug is not firing, then when the other system is turned off, there will be no spark in that cylinder and the EGT will go back to ambient temperature (cold). I cycled back and forth several times between ignition systems and found absolutely no difference. As such, I concluded that it couldn't be the spark plug wires either, so I never tried the spare wires that **Opie** provided.

This Is Where I Came In…

Once again, I was out of options. I thought maybe I should check for obstructions in the intake or exhaust path again. I figured I hadn't made an exhaustive (*pun allowed*) search of the path, so I could try it again. I envisioned several scenarios that would possibly cause the symptoms seen, but none of them were really satisfying for explaining how it worked or how the problem came about.

I removed the intake pipe again and made a careful search for debris, finding nothing, of course. I started to take the exhaust pipe off to inspect, but I realized I would have to take the entire left exhaust system off to inspect it. I figured the probability of this being the problem was very low and not worth the effort.

Did It Just Get Brighter In Here?

While looking at the intake pipe, two things occurred to me that I had missed before. One was that I thought I really ought to fix that loose intake tube coming out of the oil pan, just because it would be the right thing to do.

The second thing was that I took a good look at the top of the intake pipe, where it mates to the intake port of the cylinder. At the top end of the intake pipe there is a flange bent over. Another part, also called a flange, goes around the pipe and bolts to the intake port. This should press the intake pipe tightly against the gasket and intake port of the cylinder. I again noticed that the recess in the flange that holds the pipe to the intake port on the #6 cylinder was a little deeper than all of the rest. As a result, when the flange was properly torqued in place, the intake pipe could still rattle around in the flange. I had first noticed this when "rebuilding" the engine and thought it odd. All of the other pipes fit tightly to their respective intake ports. Why was this one different? I didn't know, but I figured that was the way it had come from Lycoming so it was no big deal.

The intake pipe and flange. The surface of the flange and the end of the intake pipe should be in the same plane. They're not—the intake pipe is slightly recessed, maybe about 0.025 inches

When I removed the intake pipe, I noticed that there was fuel residue (with the blue dye) on both sides of the gasket. I reasoned that the intake pipe was not tight against the intake port if there was room for the fuel dye to get on the gasket where it should be compressed between the pipe and port.

Eureka!

All of these things suddenly showed up at the same meeting in my brain, and I posited that perhaps the problem was an **induction air leak**. Not only was this a reasonable cause that I had not considered (a good thing since I had run out of ideas), but it was the first explanation of all those I had tried that could reasonably be traced to being caused by something I had done during the condition inspection. By futzing with the intake pipe I had somehow opened a leak that had not been there before.

Time To Collect Some More Data

I reassembled the engine as it was before and pushed the airplane out for another ground run. I was pretty sure the problem would still be there (it was), but now I had a better idea of what I was looking for, and thus could design a better test for it.

I had already decided prior to getting the idea of the induction air leak that I had checked every possible cause and I would go fly the airplane and see if the problem changed. After deciding that the problem might be an induction air leak, I was further convinced that it wouldn't

hurt the engine to go fly it. It wouldn't lead to a mechanical failure. The worst problem would be that one cylinder might run a little lean.

I started up the engine and confirmed that #6 was still not real interested in playing. I advanced the throttle and saw that the EGT on #6 not only came up to match the other cylinders, but it actually exceeded the other cylinders. As I taxied out to the run-up area I thought about the implication of this odd new piece of data.

At the run-up area, I started a normal run-up as if I were going to go fly. The mixture was leaned to approximately best power. Again, the #6 EGT not only came up to a similar number as the other cylinders, but the #6 EGT actually got higher than the other cylinders. When I turned off one electronic ignition, the EGT on #6 went up another 150 degrees. Same thing when I turned off the other electronic ignition. When I applied Carburetor Heat, and EGT #1-#5 decreased, but EGT #6 did not.

At this point, I figured I had enough data to analyze what was happening, but that would best be done with the mixture at IDLE CUT-OFF. Also the odd behavior of EGT #6 was something I wasn't ready to deal with airborne, so I taxied back to the hangar and shut down.

At Last! A Plausible Explanation!

So if the intake pipe was loose at both ends, allowing additional air into the intake charge for cylinder #6, how does this relate to the symptoms listed above? Here is my analysis:

The additional air (leakage) in the intake charge caused #6 to run much leaner than intended. At idle RPM, the large difference (vacuum) between manifold pressure and atmospheric pressure drew in a large amount of air through the leaks and leaned the mixture significantly. The high voltage sparks of the electronic ignition were able to ignite this very lean mixture, but it was so lean that it could just barely burn, hence the low EGT and CHT.

When the throttle was advanced to 1700 RPM, the higher RPM created a larger mass flow through the intake pipe. Additionally, the higher manifold pressure reduced the difference between the manifold pressure inside the pipe and the atmospheric pressure outside the pipe. Thus, the intake charge was diluted less by the air leak, resulting in a charge that was richer than it was at idle, but still leaner than the other cylinders. We know that lean mixtures have higher EGTs because the lean mixture burns slower than a rich mixture, so the exhaust is still hotter when it gets to the exhaust pipe. When the throttle returned to idle, the #6 cylinder mixture went back to very lean and the EGT dropped.

During the run-up, when I turned off one ignition, the intake charge took even longer to burn since it only started at one point instead of two. This longer burn further increased the EGT.

When I applied carburetor heat, the overall mixture became richer. In cylinders #1-#5 the mixture went from best power to richer than best power and the EGTs decreased. However, the mixture in #6 started lean of best power. Carburetor heat richened it to closer to best power, and the EGT changed little if at all.

So why was this not a problem during the previous 240 hours of engine operation with the same parts? Especially in the last year since the oil pan tube was found loose at last year's condition inspection? I have no idea. All I can think is that somehow I got a better seal on that intake pipe during a previous installation. I didn't really care why…all I cared about now was fixing the problem.

The Fix

As with so many problems, the actual fix is easy once you figure out what the real problem is. For the loose tube in the oil pan, I had seen this problem before. During the "rebuild" two such tubes had been loose. I had taken them to Bob Browne in Tehachapi who had a magic swaging tool (much like a very large tubing beader) that he used to fix them. Since I didn't want to remove the engine from the airframe, I asked him to let me rent the tool to fix the #6 tube. He agreed, and after removing the lower cowl and the left exhaust system, I was able to re-swage the tube into the oil pan.

Clamp to hold the tube in place while swaging

The magic tool. It's like a big tubing beader

Beading tool inserted into tube

As for the top end of the intake pipe, Bob suggested taking the flange that bolts to the cylinder to a disk sander and sanding it down until the recess was the correct depth.

The flange after sanding it down level with the intake pipe

After completing these operations, the intake pipe was reinstalled. Upon starting the engine for the next ground run, I was immediately struck by "Oh that's how smooth the engine used to run!" The #6 EGT was actually the first to come up, and all of the EGTs stabilized at one common value.

The airplane has since flown and is acting like its old self again.

- Russ Erb

TRC On The Move Again!

We have recently received word from **Scott "Stormy" Weathers** of EAA Chapter 1000 Det 5 (Arlington/Fort Worth TX) that the "**Total Rivet Count**" (TRC) has been on the move. (*yes, only Stormy would keep track of something like that*) Recent reports are:

17 Jun 13 5201
19 Jun 13 5237
1 Jul 13 5411
5 Jul 13 5563

The report is that the left aileron is done. A ***Project Police*** inspection is scheduled for the week before Oshkosh.

New Member

Last month's meeting saw another wingnut choose to join up with our crazy band of aviators. **Bruce Peters** is building an RV-9A in Bakersfield. ***PPO* Miles Bowen** was responsible for convincing Bruce to give our chapter a try. Bruce accumulates money to support his building habit by working as the VP/COO of Bakersfield Memorial Hospital.

We may need to mount a ***Project Police* Inspection Tour** to Tehachapi and Bakersfield as **Bruce** and **Miles** seem to be our only members currently building. Texas is a little too far for large groups.

Web Site Update

Just a reminder that the EAA Chapter 1000 Web Site is hosted courtesy of Quantum Networking Solutions, Inc. You can find out more about Qnet at http://www.qnet.com or at 661-538-2028.

Chapter 1000 Calendar

Jul 9: EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942

Jul 16: EAA Chapter 1000 Monthly Meeting, 5:00 p.m., Edwards AFB. USAF Test Pilot School, Scobee Auditorium. (661) 609-0942

Jul 29 – Aug 4: EAA AirVenture. Oshkosh WI.

Aug 13: ~~EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942~~ CNX

Aug 13: EAA Chapter 1000 Baseball Meeting, 6:30 p.m., The Hangar, Lancaster CA. (661) 609-0942

Sep 10: EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942

Sep 17: EAA Chapter 1000 Monthly Meeting, 5:00 p.m., Edwards AFB. USAF Test Pilot School, Scobee Auditorium. (661) 609-0942

Oct 8: EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942

Oct 15: EAA Chapter 1000 Monthly Meeting, 5:00 p.m., Edwards AFB. USAF Test Pilot School, Scobee Auditorium. (661) 609-0942

Nov 12: EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942

Nov 19: EAA Chapter 1000 Monthly Meeting, 5:00 p.m., Edwards AFB. USAF Test Pilot School, Scobee Auditorium. (661) 609-0942

Dec 10: EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942

Dec 17: EAA Chapter 1000 Festivus Etc Celebration, 6:00 p.m., Kommandant's Kwarters, 42370 61st Street West, Quartz Hill CA. (661) 609-0942

Jan 14: EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942

Jan 21: EAA Chapter 1000 Monthly Meeting, 5:00 p.m., Edwards AFB. USAF Test Pilot School, Scobee Auditorium. (661) 609-0942

To join Chapter 1000, send your name, address, EAA number, and $20 dues to: EAA Chapter 1000, Doug Dodson, 4431 Knox Ave, Rosamond CA 93560-6428. Membership in National EAA ($40, 1-800-843-3612) is required.

Contact our officers by e-mail:
President/Flight Advisor Gary Aldrich: gary.aldrich@pobox.com
Vice President Hellmuth Steinlin: hellmuthsteinlin@hotmail.com
Secretary Kent Troxel: kenttroxel@sbcglobal.net
Treasurer Doug Dodson: douglas.dodson @pobox.com
Technical Counselors: Gary Sobek: Gary@rvdar.com
Doug Dodson: douglas.dodson@pobox.com

EAA Chapter 1000 Technical Assistants

Composite Construction		
Doug Dodson	douglas.dodson@pobox.com	661-256-7276
George Gennuso	pulsar1@sbcglobal.net	661-265-0333
Brian Martinez	brianmmartinez@aol.com	661-943-5379
Bob Waldmiller	waldmilr@qnet.com	661-256-0932
Wood Construction		
Bob Waldmiller	waldmilr@qnet.com	661-256-0932
Aluminum Sheet Metal Construction		
Bill Irvine	wgirvine@yahoo.com	661-948-9310
Miles Bowen	cessna170bdriver@yahoo.com	661-822-0806
Russ Erb	erbman@pobox.com	661-256-3806
Welding/Welded Steel Tube Construction		
Russ Erb	erbman@pobox.com	661-256-3806
Engine Installation		
Bob Waldmiller	waldmilr@qnet.com	661-256-0932
Doug Dodson	douglas.dodson@pobox.com	661-256-7276
Electrical Systems		
Miles Bowen	cessna170bdriver@yahoo.com	661-822-0806
Instrumentation and avionics requirements for VFR/IFR		
Gary Aldrich	gary.aldrich@pobox.com	661-609-0942

Inputs for the newsletter or any comments can be sent to Russ Erb, 661-256-3806, by e-mail to erbman@pobox.com

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THE LEADING EDGE
MUROC EAA CHAPTER 1000 NEWSLETTER
C/O Russ Erb
3435 Desert Cloud Ave
Rosamond CA 93560-7692
http://www.eaa1000.av.org

ADDRESS SERVICE REQUESTED

THIS MONTH'S HIGHLIGHTS:
REGULAR MEETING 16 JUL AT TPS
HOW TO FLY IN THE CARIBBEAN
TROUBLESHOOTING WOES
d(TRC)/dt > 0 FINALLY

EAA™
THE SPIRIT OF AVIATION