



THE LEADING EDGE

NEWSLETTER OF MUROC EAA CHAPTER 1000

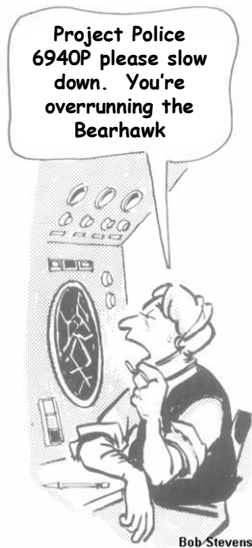
Voted to Top Ten Newsletters, 1997, 1998 McKillop Award Competition

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<http://www.eaa1000.av.org>

July 2011

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:

Project Police Inspect Los Angeles Center

Tuesday, 19 July 2011
1730 hrs (5:30 PM Civilian Time)
Blackbird Air Park
2503 East Avenue P
Palmdale CA

For this month's program, we plan to explore the combined efforts of **Daniel Bernoulli** and **Guglielmo Marconi**. What do these gentlemen have in common? Well, both last names end in a vowel, but only one of them was Italian. Both contributed significantly to the world of science, for which they are remembered. But, their truly great combined contribution was to give us air traffic control, or ATC. Think about it, with only **Marconi**, we'd be riding around on bicycles with handheld radios. The headsets would look particularly silly while riding a bicycle. With the contributions of only **Bernoulli**, we would be flying around trying to communicate with semaphore flags because smoke signals just would not work from an aircraft.

Now, about that gift of ATC. We have been granted an opportunity to see the inner sanctum of **Los Angeles Center**, or **ZLA ARTCC**. The portal shall be opened to us on **Tuesday, 19 July 2011 at 1730**. As you might expect if you have flown on a scheduled air carrier in the last ten years, security is a bit of an issue. So, to be counted among the anointed to visit the sanctum, you must prove yourselves worthy. But, take heart. You know this group, right? How worthy do you think you have to be? Still, there are two tasks before you. First, **you must notify me** that you plan to be a party to the party of the party. I must give the Federal Aviation Administration or FAA (pronounced "Fah") an accurate list of names on **Friday, 15 July 2011**. So, please notify me by some reliable means not later than Thursday evening. (Call or text to 661-317-9453, call 661-275-7595, e-mail scott.weathers@edwards.af.mil or flynwx@pobox.com. Semaphore flags or Morse Code is not recommended, as Stormy has forgotten those. See comment above about Marconi.) If you simply must – and I know some of you must – you can contact me at work before 1200 to get your name on the roster. At that time, I am going to send the list to our host. Please give me your **first and last name**, something that matches one of the government issued identification cards in your pocket (or planner). I asked, and the **Nice ATC Man** said they do not need your blood type or any other personal identification information.

The next task, simple enough to understand but harder to execute well, is to be at the facility **on time** at 1730. For once we have been met and escorted in, I don't believe anyone will be watching for stragglers. This is the FAA we're dealing with here.

Oh, one last note: In a fit of overwhelming gratitude to Tim, our gracious host, I may have actually promised that each and every one of us would from this day forth, promise to hear and respond to all appropriate radio calls from ATC on the first call. Sorry. They caught me in a weak moment.

OK, so, get me your name (first and last) by Thursday, 14 July, and be at the Blackbird Air Park by 1730 on Tuesday, 19 July. That's it. That's all there is to it. See you there.

- **Scott "Stormy" Weathers**
Vice Kommandant

Last Month's Meeting

EAA Chapter 1000

Clear Channel Stadium, nee "The Hangar"

Lancaster, CA

7 June 2011

Gary Aldrich, Presiding

The June meeting was held at the **City of Lancaster Skybox at Clear Channel Stadium** through the well-placed connections of **Mrs. Kommandant**.

Eighteen (or more) members and guests gathered in unusually cool weather for June to watch the hometeam **Jethawks** get their collective butt thoroughly kicked by the visiting Lake Elsinore Storm by a score of 24 to 4. The Storm outhit the 'Hawks 24 to 7 with five homeruns, one of them a Grand Slam. Needless to say, there was no joy in 'Hawkville this night.

Game attendance continues to noticeably decline, no doubt due in part to the also declining selection and quality of their epicurean offerings. It would appear that Jethawk Stadium remains solvent only through their excessively high price for beer. Knife pointed out their innovative pricing strategy of a chilidog at \$4, while a plain hotdog went for \$4.50.

In summary, we came, we ate bad yet expensive food, drank even more expensive beer, and saw the 'Hawks get badly beaten, having a remarkably good time through it all and look forward to it again next year.



Part of the crowd. Is this really the way we dress in Southern California in June?



Mascot meets Mascot



Three and a half innings to go, and it already looks like this...

Most, if not all of this is true.

- Kent "Cobra" Troxel
Minister of Propaganda

Kommandant's Korner

Just returned from the **Fightin' Skywagon's** lair at WJF where **Jimmy Doolittle** and I stuffed a weekend's worth of camping



gear in the cavernous(?) cargo bay of the VC-180. Early tomorrow we will rocket off into the gathering light on our annual trek to **Johnson Creek** (3U2) in the Frank Church Wilderness area of Idaho. An early departure is dictated by the unseasonably moist and tumultuous weather we've been having. The intent is to get far north and slightly east before the great solar generator in the sky triggers the convective action. Those who know me well, recall that this trip is sponsored by the **Soquel-Monterey Hangar** (read "chapter") of the **Quiet Birdmen**. This organization, that has been aptly christened (by **Leigh Kelly**) "a drinking club with a flying problem", has been gathering each year on the weekend after July 4th for masculine camaraderie and commune with nature in the beautiful Idaho wilderness. Most also recall that it always occurs on my wedding anniversary...this year, number 39. That **Mrs. Kommandant** has allowed me to reach an anniversary of this magnitude while keeping company with a bunch of greasy pilots instead of her is testament to her patience and the quality of our relationship over the decades. Fear not, we will be celebrating our union in fine fashion the next weekend in a sumptuous hotel room overlooking South Coast Plaza, Orange County's world class collection of shoe stores and related feminine finery.

That trip will likely be by **Skywagon** as well since I-405 will be closed all weekend, doubtless throwing the car-crazy SoCal populous into fits of withdrawal from their characteristic road rage. If you think that N2705K is

getting a real workout this flying season, you're absolutely correct. Only last Saturday she brought me, **Mrs. Komm**, and first daughter **Rachel** safely home from Vail-Eagle County Regional Airport in Colorado where we had spent a week enjoying the high altitude scenery of that world famous resort area. We found that visiting a ski area in Jun/Jul was an ideal time to experience the fine restaurants, hiking trails, and tourist attractions...assuming you're not a skier, of course. Flying to KEGE, via Eureka-Murray Field (KEKA) to pick up Rachel, was an experience in itself. We were blessed with reasonable weather, though the afternoon thermals made for a bumpy ride when we descended from our "stratospheric" cruise altitude of 11,500 feet MSL. This high altitude flight also gave me an occasion to use my portable oxygen system. Though not legally required, we found ourselves more rested and alert after availing ourselves of a bit of O2. Our VFR arrival and departure from the Vail airport was an interesting exercise in mountain aviating. I drew from both my soaring experience and Skywagon-flying in our local mountains to make the ingress/egress safe and more comfortable for all concerned. IFR flight would have been much more challenging as Rocky Mountain MEAs run into the mid-teens and the lowest approach MDA to KEKA is a whopping 1800 feet AGL. **Anne** commented that she had never seen more "red" showing on the terrain page of the GPS Map 696 as we descended to the airport through the Eagle River canyon.



Negotiating the Wasatch Range near Provo, UT



The hearty travelers at 11,700 Feet MSL on top of the ski mountain at Aspen, CO



Posing atop Independence Pass, highest paved road in the US

Lest we let the **Skywagon's** oil settle too much, the Orange County trip will be followed closely by yet another aviation adventure...this time to **AirVenture 2011**. You've probably heard that a record number of **Project Police Assault Vehicles**, both Air and Ground, will muster at Conoco-Phillips Plaza (nee AeroShell Square) for a coordinated attack on EAA headquarters. The membership will have to put up with the standard "Death-by-PowerPoint[®]" report at a meeting in the near future.

Time to turn in this report (before the deadline, I might add) and then turn in to bed for the early morning go.

Fly Safe and Check 6!

- Gary Aldrich
Kommanding

Project Police Tactical Assault Force Goes To AirVenture (nee OSH)

For many years the **Project Police** of EAA Chapter 1000 have laid siege to EAA Headquarters under the cover story of attending the annual EAA convention known as "AirVenture". Through the use of advance stealthy tactics and the clever act of leaving much money behind, these raids have gone virtually unnoticed.

After a training raid on Sun 'N Fun in 1999 by **Fightin' Skywagon** with instructor aircraft **Strike Mooney**, a solo raid by **Fightin' Skywagon** was mounted in 2000. Following this success, additional solo raids by **Fightin' Skywagon** were mounted in 2002, 2004, and 2006. Buoyed by this amazing success rate, an additional aircraft was added in 2009 as the **Combat Bearhawk** joined the **Fightin' Skywagon**.

Sensing another weakness, an extreme low level raid was made in 2010 by the **Big White Ford** with great success.

Awash in success, this year the **Project Police** will launch the largest raid ever on **AirVenture** in the history of EAA Chapter 1000. In Kommand of the operation will once again be the **Fightin' Skywagon**, crewed by the **Kommandant** and **JDIII**. Reprising its role of leading the formation will be the **Combat Bearhawk** crewed by **Erbman** and **Tuki**. Diverting the attention of the ground

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forces will be the **Big White Ford** crewed by **Stormy** and **Greg** (call sign to be determined) **Jones**, an exchange **Project Police officer** from Australia. Finally, the new addition to the **PPTAF** is the **Glamorous Glasair** (possibly to be renamed **Glass Slipper**) to be confusingly crewed by **Doug Dodson** and **Doug Dodson** (Jr. and Sr., of course).

To improve mission security, this formation will not operate as a formation at all. Instead, each entity will proceed individually. The lead ship, the **Combat Bearhawk**, will depart a week early and attempt to throw off any early warning sites by first visiting Texas, North Carolina, and Tennessee. The initial assault will then arrive at Oshkosh on Saturday 23 July and establish a defensive perimeter to await the arrival of the other three parties on Sunday 24 July.

The **Glamorous Glasair** will proceed from Rosamond to Waco TX (planned non-stop) to pick up the elder **Doug**, and then proceed to Oshkosh.

The **Big White Ford** will proceed from Rosamond, with planned RON at Grand Junction CO and Des Moines IA. This will allow **Greg** a chance to see much of our fine country.

Finally, with the defenses subdued, the **Fightin' Skywagon** will proceed from Fox Field to an undisclosed RON point, arriving at OSH the next day.

While poopin' and snoopin' around the grounds, on Wednesday or Thursday the entire **PPTAF** will meet up with **Allison Gatlin**, our favorite aviation reporter from the *Antelope Valley Press*, who purports to make some sort of interesting newspaper article out of our exploits.

Wish you had thought ahead enough to have joined this adventure? Don't worry--you'll get a chance to relive the whole experience via the patented **Death by Powerpoint**[®] at a chapter meeting in the near future. You won't want to miss it!

Chasing Quertrons: Troubleshooting Tales of the Unqualified

I'm not an Radio Frequency (RF) engineer, and I don't play one on TV. I understand Direct Current (DC) and even Alternating Current (AC) power, but this RF stuff is still Pure Magic (PFM) to me (insert your own adjective for the "F"). Then again, if being unqualified meant you couldn't troubleshoot on your airplane, EAA would be a much smaller organization.

The problem in question was discovered during the Phase I flight test while cruising well above pattern altitude over Apple Valley (KAPV). Apple Valley has an automated reporting system that will transmit ATIS type information. To activate the broadcast, you simply key your radio three times in rapid succession on the CTAF, just like operating Pilot Controlled Lighting (PCL). I had the autopilot engaged in heading and altitude hold modes when I keyed the radio three times. Imagine my surprise as each click of the radio yanked the nose of the Bearhawk up progressively higher. I hadn't fully comprehended what had happened yet, but I knew I didn't like it, so I immediately applied that time-honored test pilot axiom of

"If you move a control or flip a switch and something unexpected or undesirable happens, put the control or switch back where it was before!" So I stopped keying the radio, which removed the interference, at which point the autopilot noticed "Hey, I'm off my assigned altitude" and commanded a LARGE push down (!) to get back on conditions. YIKES!

After thinking "That was odd, not to mention no fun," I, of course, had to investigate what had just happened. I rapidly keyed and released the COM1 radio and the nose rapidly pitched up and down. After a few more tries to get through the denial stage ("that didn't just happen"), I tried it on different frequencies—same result. I tried transmitting on the COM 2 radio, but this caused no response from the autopilot.

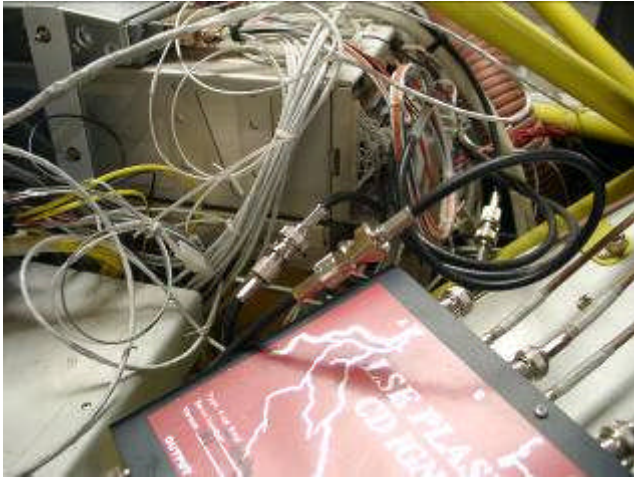
With the limited time available between the completion of Phase I Flight Test and departure for Oshkosh 2009, the problem was fixed with an operating limitation ("Don't transmit on COM1 while the autopilot is in Altitude Hold Mode."). Unfortunately, this didn't work well with the planned protocol of talking to ATC (flight following) on COM1 and my wingman (the Fighting Skywagon) on COM2 while flying on autopilot. As it was, the air was generally too turbulent to use the autopilot on that trip anyway. An attempt to use COM2 as primary for ATC didn't work so well either as that radio became intermittently unreadable. After returning from Oshkosh the COM2 radio was sent to Garmin for repair, where they did something to fix it but gave no feedback on what the problem was. At least that radio has continued to work since.

While at Oshkosh I talked to the TruTrak tech rep, and (as always, it seems) he hadn't heard of such a problem, but surmised the problem was that I had a bad comm antenna that wasn't well matched to my transmitter, so that much of the RF energy going to the antenna was reflected back toward the transmitter instead of being transmitted out into free space. When this energy got back to the transmitter, it splattered out all over the cockpit, causing electromagnetic interference (EMI) with the autopilot control head. This would become Theory #1.

(The funny thing about theories is how quick they change. A theory is an explanation of some observed phenomena. The theory is accepted as explaining exactly why something happens, right up until it is either proven wrong by counter-example or another theory comes along that describes the observed phenomenon better.)

Once I returned from Oshkosh I put the Bearhawk down for several months while I addressed multiple issues. The first test I did was to determine if the problem was with the transmitter or the antenna. To do this I cut the antenna leads for both the COM1 and COM2 radios behind the panel and installed male and female (don't ask me which is which) BNC connectors on the antenna leads to reconnect them. This allowed me to swap which radio transmitted to which antenna. I realized that I could test the EMI on the ground by simply engaging the autopilot in both axes on the ground, then key the radio to see if the controls moved. I connected the antennas as they originally were and ran the test with the expected results (autopilot responds to COM1, not to COM2). I then

swapped the antennas so that COM1 transmitted out of the rear antenna and COM2 transmitted out of the front antenna. I repeated the test and this time the autopilot responded to COM2. Therefore, the problem was with the forward antenna, not with the COM1 radio.



Comm antenna leads with inline BNC connectors

Before I could act on Theory #1, Theory #2 presented itself. My avionics guy (Tim Hass of Approach Fast Stack) told me that on the TruTrak web site there was a thread describing a problem with autopilot pitch up that sounded like mine. The solution called for installing a connector, available from Digi-Key, on the DSub connector on the back of the control head. This connector was a straight pass-through for each line, except that each line had a capacitor to filter out spurious RF. Several people testified that this solved their problem, which apparently was caused by RF interference entering the control head through the wiring (Theory #2). I purchased said connector and installed it with great anticipation. I ran the ground test, and...no change. Apparently the problem that other people were having wasn't the problem I was having. Back to Theory #1. I left the connector installed since it wasn't creating any problems and there was that very small chance that it was solving a problem.

Theory #1 sounded a lot like what the EE guys describe as a bad SWR (or VSWR for some EEs who like to be picky). Both of my COM antennas were simple stainless steel rods with the antenna leads connected by ring terminals. I chose stainless steel rods because Bob Archer told me that in his experience there was very little difference in antenna performance between stainless steel rods and the high-priced "broadband" commercial antennas. I measured my antennas and found that even though they were both ordered from Aircraft Spruce under the same part number, the forward antenna was noticeably longer (up to a couple of inches) than the aft antenna. This seemed to support the theory that the radio/antenna match (SWR) was off. Referencing several sources including *The AeroElectric Connection* I learned that SWR was adjusted by changing the length of the antenna. In my case, all I could do was to shorten the antenna. Just like getting your hair cut or carving a sculpture, you can only go one way, so you need to sneak up on the answer so you don't overshoot.

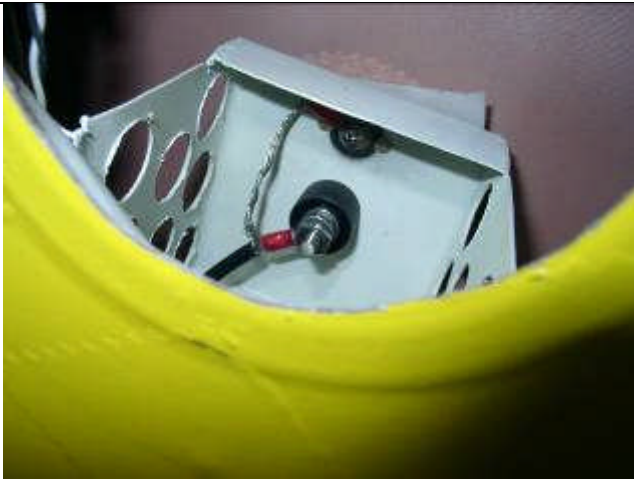


Original stainless steel rod antenna

Our resident amateur radio nut (in remission) Gary Aldrich had a couple of SWR meters with appropriate adapters to insert the meter into the antenna line at the previously mentioned BNC connectors. He let me borrow the meters, and the initial test showed an SWR of 2.5 to 3. The ideal answer is 1, and above 3 is usually just considered "bad". I read somewhere else that doing this test inside the hangar could lead to distorted results, presumably from RF bouncing around inside the big metal box and re-entering the antenna. Therefore I moved the airplane out of the hangar and repeated the test with the same results.

With Moto-Tool and cutting wheel(s) in hand, I recorded the SWR reading. I then cut off about 1/4 inch of antenna and tested the SWR again. Cutting the antenna was quite a trick trying to reach the most inaccessible part of the airplane without falling off of a ladder, and then keep the Moto-Tool under control. After each cut, I tested the SWR and recorded the result. I expected to see the SWR get smaller or get bigger consistently as the antenna was cut shorter. As it was, the SWR never really changed much. I kept cutting until the antenna was several inches shorter than the calculated length, and then decided that maybe this wasn't the answer. I had to assume that the SWR meter was working correctly because I didn't have any independent method to calibrate it. In the end this would turn out not to be the problem anyway.

Having had no success with Theories #1 and #2, I needed a new theory. I needed to replace the forward antenna anyway after having whacked it off (so to speak). If the type of antenna really was the problem, then replacing it with the same type of antenna wouldn't accomplish anything. The stainless steel rod antenna had been installed without a dedicated ground plane because Bob Archer had told me that the fuselage frame and aluminum wings would be sufficient as a ground plane. Additionally, the ring terminal connection of the antenna lead opened up part of the transmission line without a shield. Perhaps spurious RF was leaking out in this area. Theory #3.



Original Comm 1 radio antenna lead connection with ring terminals

To address Theory #3, Tim Hass recommended that I replace my stainless steel rod antenna with a Comant CI-121 antenna which used a BNC connector to attach the antenna lead. Perhaps keeping the shield intact all of the way to the antenna would contain the RF and solve my problem. Additionally, he recommended that I install a sheet aluminum ground plane (electrically grounded, of course) at least 12"x12" if possible. After some noodling, I figured out how to modify the antenna mount to mount the new antenna with a completely different mounting style, complete with ground plane, all without having to remove the fabric covering. Part of the modified design required a 1/2 inch spacer, fabricated by master woodworker **Stormy Weathers**, who dubbed it the "Space Occupying Chunk Of Wood" (SOCOW). At the same time, I installed a similar ground plane on the aft antenna. After everything was installed, I repeated the ground test, and...still no change. So much for Theory #3.



On the "Bridge To Nowhere" cutting the fabric to make room for the new mounting screws



Newly installed ground plane



Closeup of Space Occupying Chunk Of Wood (SOCOW)



Newly installed BNC connector on Comm 1 antenna. Because of the differences in the mounting method, the BNC connector is buried in the SOCOW and is only accessible after removing the antenna from the fuselage. The nuts shown here took about an hour to install because of limited accessibility. Later they would be replaced with an aluminum sheet with four nutplates.

Come back next month to continue with the next theory.

- Russ Erb
Not an RF Engineer

The End Of Snail Mail?



If this newsletter was delivered to you by a uniformed representative of the United States Government (or a non-uniformed contractor to the United States Government), this is the last time that will happen. The USPS has expanded its services to help our chapter members save time in their lives by mangling their newsletter rendering it unreadable, removing "unnneeded" pages, or just refusing to deliver it at all. Our traditional method of stapling the newsletter has been declared "non machinable". Even when we tried to follow USPS rules, they went the extra


mile to make sure that the newsletter did not arrive in its original condition. And for this we pay the handsome sum of \$0.44 a piece. Soon they will probably want more money for all of the extra work it takes to make these "modifications."

Therefore, your Board of Directors has decided to limit primary distribution of this newsletter to e-mailed PDFs. This is the way most of you are receiving it already. If you are not currently receiving your newsletter by e-mail, send your e-mail address to **Evil Editor Zurg** at eez@pobox.com . If you are still living in the early 20th century and for some reason still don't have e-mail, you'll need to make alternate arrangements for the delivery of your newsletter.

The good news is that with the PDF version you get everything in full color like **Evil Editor Zurg** intended it. Of course, if you'd like, you can still use your own printer to produce a paper copy.

Web Site Update

As of 9 July 2011, the hit counter showed **138749**, for a hit rate of 13 hits/day for the last month.

 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.

Hellmuth Steinlin Becomes College Celebrity

Hellmuth Steinlin's son forwarded this image of the Chaffey College home page on the Internets.

Chapter 1000 Calendar

Jul 19: EAA Chapter 1000 Monthly Meeting, 5:30 p.m., Blackbird Air Park, Palmdale CA. (661) 609-0942

Jul 25-31: EAA Airventure Oshkosh. Multiple **Project Police** missions in progress.

Aug 2: EAA Chapter 49 Monthly Meeting, 7:00 p.m., General William J. Fox Field, Lancaster, CA. (661) 948-0646

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

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

Sep 6: EAA Chapter 49 Monthly Meeting, 7:00 p.m., General William J. Fox Field, Lancaster, CA. (661) 948-0646

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

Sep 20: EAA Chapter 1000 Monthly Meeting, 5:00 p.m., Edwards AFB. The Airventure Death by Powerpoint Presentation. USAF Test Pilot School, Scobee Auditorium. (661) 609-0942

Oct 4: EAA Chapter 49 Monthly Meeting, 7:00 p.m., General William J. Fox Field, Lancaster, CA. (661) 948-0646

Oct 11: EAA Chapter 1000 Board of Directors Meeting, 5:00 p.m., High Cay, 4431 Knox Ave, Rosamond CA. (661) 609-0942

Oct 18: EAA Chapter 1000 Monthly Meeting, 5:00 p.m., Edwards AFB. USAF Test Pilot School, Scobee Auditorium. (661) 609-0942

Nov 1: EAA Chapter 49 Monthly Meeting, 7:00 p.m., General William J. Fox Field, Lancaster, CA. (661) 948-0646

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

Nov 15: 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.

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

From the **Project Police** legal section: As you probably suspected, contents of The Leading Edge are the viewpoints of the authors. No claim is made and no liability is assumed, expressed or implied as to the technical accuracy or safety of the material presented. The viewpoints expressed are not necessarily those of Chapter 1000 or the Experimental Aircraft Association. **Project Police** reports are printed as they are received, with no attempt made to determine if they contain the minimum daily allowance of truth. So there!

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MUROC EAA CHAPTER 1000 NEWSLETTER

C/O Russ Erb

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THIS MONTH'S HIGHLIGHTS:

MONTHLY MEETING 19 JUL @ ZLA ARTCC

KOMMANDANT ROCKY MOUNTAIN HIGH

THE UNQUALIFIED TROUBLESHOOTER

THE END OF SNAIL MAIL

